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Christof Nägele, Natasha Kersh and Barbara E. Stalder (Editors)

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Editorial

It's our great pleasure to offer the 2021 edition of the VETNET ECER proceedings, '*Trends in Vocational Education and Training Research', Vol. IV*. At the time of unprecedented challenges imposed by the COVID-19 crisis, promoting and sustaining both scientific communication and mutual learning have never been more important. As the pandemic continues to have a massive impact on face-to-face scientific communication throughout the world, the European Conference on Educational Research (ECER 2021), which was to take place in Geneva, Switzerland, is taking place online this year. Therefore, while meeting in person is still not possible, and we are all taking on alternative opportunities to sustain and foster active interaction and communication within our research community, and beyond.

VETNET is a network of researchers interested in exploring different aspects of VET-related research, including initial VET, continuing vocational education and training, school-based and workplace-based learning provisions. It was founded in 1996 as the second research network of the European Educational Research Association (EERA). As a research community we attach great importance to stimulating and fostering VET and lifelong learning debates, aiming to bring fresh perspectives and critical discussion of emerging issues, thus contributing to multi-disciplinary research and implications for policy and practice both in Europe and worldwide.

The present edition, *Trends in Vocational Education and Training Research, Vol. IV* endeavours to support communication amongst researchers and to contribute to policy and practice in VET-related research in the modern world. The present edition includes more than thirty papers that provide a platform for sharing findings and identifying emerging trends for future research in Europe and beyond. The COVID-19 pandemic has brought unprecedented challenges both for individuals and society and profoundly disrupted vocational education and training around the world. The compilation of papers in this edition, while not focusing exclusively on COVID-19, provides an opportunity to reflect on current and future implications of the pandemic, specifically, exploring the ways to facilitate a more effective system of trans-national cooperation and mutual learning in order to contribute to more effective solutions for societal challenges which will continue to exist post-Covid. All papers are based on double-blind peer-reviewed abstracts that were accepted for presentation at the ECER in Glasgow. Final papers were commented by VETNET co-conveners and supported authors in revising their contributions.

It's our great privilege to thank all the authors for their valuable contributions to this volume. As the papers demonstrate, this edition has a strong international focus and brings together research findings from multi-disciplinary perspectives, diverse theoretical backgrounds and methodological approaches. It's our sincere hope that new and existing network members and supporters will find the papers interesting and stimulating, initiating new discussions and issues for debate.

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Trends in Vocational Education and Training Research, Vol. IV. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)

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Pupils' Experiences of Pedagogy in Danish VET in the Context of COVID-19 and Remote Teaching

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Abstract
Teaching in Danish vocational education and training (VET) during the COVID-19 crisis switched to remote teaching from March 2020 and thus took place under conditions that differed significantly from the ordinary ones. In the article, pupils describe the changed context for the pedagogy and teaching in VET in focus group interviews. Using a sociological approach, the described changes and conditions in the remote teaching are analysed seen in the light of concepts such as power, control, and discipline. The findings show that the context of the remote teaching influenced the pedagogical practice, the teacher-guided supervision as well as teachers' mandatory control of pupils' attendance. Based on the analysis we concluded that the pedagogy of the remote teaching influenced processes of inclusion and exclusion.

Keywords
VET, pedagogy, remote teaching, COVID-19, power, discipline

1 Pedagogy in the Context of COVID-19

Education is a key context in society's socialization of young people. Pedagogical practice in educational contexts is characterized by the exercise of discipline, power, and control in various forms (Foucault, 2002; Bourdieu & Passeron, 1990). In what can be considered "ordinary" teaching with physical presence, the visibility of pupils—in a physical sense—plays an important role in the exercise of control of pupils' presence and activities. Teachers also have various ways of "monitoring" pupils' activities in the physical settings, in which absence is understood as physical absence. With regard to these conditions, Foucault uses the concept of "panopticon" or the "surveillance eye" in education (Foucault, 2002, p. 211).

From March 2020, teaching in Danish VET during the COVID-19 crisis switched to remote teaching and thus took place under conditions that differed significantly from the ordinary ones. This changed teachers' context for supervising the pupils as well as their mandatory control of pupils' attendance. The remote teaching included distance learning and virtual teaching, with pupils working individually "according to instructions from the teacher" or with "homework for digital submission and subsequent assessment and evaluation from the teacher" (Ministry of Children and Education, 2020).

The schools had to decide for themselves how pupils' absence from teaching activities—defined by the ministry as a "lack of active participation in the remote teaching in which they are obliged to participate" (Ministry of Children and Education, 2020)—were registered. However, in traditional teaching (with physical presence) teachers can follow up on pupils' activities

in workshops and classrooms and in doing so maintain control with regard to their presence. The conditions for such control were changed in the remote teaching, which also formed a context in which it is presupposed that pupils act more or less as the teacher wants, because they are already socialized to understand and align themselves with the demands of the school and its forms of power and discipline.

Pupils at vocational education are offered practical training by the school as well as more theoretical lessons, and part of the training takes place as an apprenticeship. Usually, schools are concerned with creating pedagogy that reflects coherence between such contexts for the pupils in relation to the diversity with regard to age, social background, and other factors (Juul, 2006; Hvitved, 2014; Jørgensen, 2009, 2013; Duch, 2017; Louw, 2017). However, in the context of remote teaching, diversity became increased and took new forms.

During the remote teaching, the pupils were at home under different family conditions, which also entailed different types of obligations other than the educational ones, and the pupils had different preconditions for structuring an everyday life where they did not—as in the traditional physical sense—have to attend the school. Pedagogy and its forms of power were changed with the physical distance between pupil and teacher using the technologies that vocational education used to continuously integrate (Duch & Kjærgaard, 2015; EVA, 2015; Aarkrog & Puge; 2019).

The pupils' experience and reflections on pedagogy during the crisis in spring 2020 is relevant seen in light of the challenges of VET and the political goals of attracting and retaining more pupils (Jørgensen, 2011, 2016; Aarkrog, 2020).

Thus, the research question and purpose of the article is, based on pupils' experiences, to contribute to knowledge about pedagogy in VET during COVID-19. Drawing on sociological theories and data from focus group interviews with pupils who in the spring of 2020 went on a basic course, we analyse pupils' experiences of the pedagogy, focusing on the role of power and discipline in the remote teaching.

1.1 Socialization and Power in Pedagogical Contexts—Sociological Perspectives

Socialization can be described as the process by which individuals are influenced by and adapt the values of the society and culture in which they grow up and to which they belong (Bourdieu & Passeron, 1990; Jerlang, 2008). It is the individual's adaptation to society, and education plays a key role in such processes that take place in educational institutions and different kinds of pedagogical contexts. However, primary socialization plays a significant role and also influences how students meet the culture of the school (Munk, 2014).

Analyses by Bourdieu and other sociological theorists show how the culture of educational systems has a reproductive function in relation to the social structures of society, which also means that pupils with different social backgrounds do not have the same objective chances of success (Bourdieu & Passeron, 1990). Bourdieu and Passeron (1990) describe the relationship between pedagogy and power this way: "All pedagogic action (PA) is, objectively, symbolic violence insofar as it is the imposition of a cultural arbitrary by an arbitrary power" (p. 5).
Depending on the culture of the educational context and as a result of the pupils' social backgrounds, pupils may not feel that they "fit in" in schools and may drop out or, in the words of Bourdieu, "eliminate themselves" (Bourdieu & Passeron, 1990, p. 153; Bourdieu & Passeron, 2006, p. 191).

Foucault (2002) also deals with the question of how individuals are socialized and "disciplined" and develop an understanding of normality, to which they adapt. In these processes, control and "surveillance" also play a role (p. 200). In the remote teaching, the "monitoring" of students as a means of disciplining and exercising power has a different character and conditions that differ from what those that what characterizes ordinary teaching with physical presence.

Inspired by such theoretical perspectives, we will analyse the way pupils experience the remote teaching and how they feel they are "met" in school, and we also take a closer look at how pupils thematize absenteeism and the question of being visible to the teacher in remote teaching.

1.2 The Empirical Data

The informants for interviews were selected by the school in order for us as researchers to gain knowledge about different pupil experiences. Thus, the pupils selected in autumn 2020 were also affiliated with different main subject areas, including Office, Trade and Business, as well as Technology, Construction, and Transport in vocational education. Some of the oldest had children, but also the youngest were in different life and housing situations. Some lived alone, others with their parents, and some were in relationships. The interviews reflect their different retrospective perspectives on the remote teaching and pedagogy—for example, also as a result of them being in different situations at the time of the interview as internship applicants, in internships, on training courses at EUX (the vocational education program that also qualifies students for higher education), or at the vocational school. However, all the informants had completed the basic course in the spring 2020.

Despite the planned selection of informants, pragmatic conditions also came into play in the final recruitment. However, we believe we can say that the pupils contribute with a fairly broad experience base in these main areas, with the bias that during the interview they were at school (remotely) except for two students in internships, who were included online after their working hours at the internships. Likewise, pupils who dropped out before August 2020 were not included, since it was not possible to contact them.

A summary was written during the interviews. Thereafter, the focus group interviews were transcribed and analysed based on the mentioned theories, but the analysis initially had an inductive focus. In the following first part of the analysis, an insight is given into the variation of the pedagogy and its changed physical framework, as described by the pupils.

2 Socialization and Discipline in the Context of Remote Teaching

2.1 The "Classroom" of Remote Teaching

The pupils describe different technologies being used in the remote teaching to distribute material and to constitute the changed classroom and facilitate the communication between teachers and pupils. Among other things, they mention a platform called UDDATA—where pupils can also submit their assignments—and PraxisOnline, which is a textbook system. Some used MS Teams for online meetings with audio and video. Thus, the pupils' experienced a variety of technologies that appear to be subject- and teacher-dependent. The context for the pedagogical practice might differ depending on the specific subject and the teacher. The pupils themselves also had different conditions in the digital space, since they did not all have a well-functioning Internet and camera, and their prior knowledge of digital technologies varied.

The structure of the teaching could also differ. For some pupils, it was almost identical to and followed a traditional schedule throughout the school day—but of course just being online all the time. Most of the pupils described how they spent a lot of time working with written assignments to hand in to the teachers, who gave different kinds of feedback. During the remote teaching, pupils could approach the teachers with questions and get answers in different ways (e.g., by e-mail, telephone, or chat). In addition, some of the informants described that they felt that they had very good accessibility to the teacher, while others waited for answers, for example, until the next day. Some problematised the feedback they received.

For pupils in the technical educations, workshop-related content and activities were postponed until they could return to the "normal" teaching (not remote and after lockdown) or it

was reorganized to fit into the remote context, as the formal rules allowed but which significantly changed the content. In particular, two of the older pupils among the interviewees felt that they were missing the professional dialogue with the teacher as well as the practical work in the workshop environment, but other pupils also thematized this change.

For instance, a pupil at EUX from a technical education, who was one of the younger students, described: "That's probably what happens to us (...), we are more happy to work with our hands than just having to sit all the time at a chair and have the theoretical content" (Boy, younger), while a younger VET pupil highlighted a new form of creativity by describing: "You make your own tools, you could say, one becomes a little more inventive in how to make things" (Boy, younger).

Another pupil from a technical education emphasized the positive aspects in the fact that the teaching continues at all during the lockdown—also seen in the light of the importance of obtaining important certificates that they must have in order to be able to pass their exam in certain tasks in their internship. In the dual training, the working life perspective thus appears central to pupils in technical educations, and one pupil in a mercantile education also mentioned this perspective.

The physical space of teaching is also different in the remote context, since the pupils are attending classes from their homes. Some pupils describe that they cooked while they had classes and that they, according to their own opinion, were able to listen well to the teacher at the same time. Where in traditional teaching one is expected to sit down in the classroom, there seem to be other norms that pupils do not problematize in remote teaching.

2.2 The Teacher's Role

The teacher cannot see pupils directly, neither in the same way nor to the same degree as in teaching with physical presence. The camera is frequently not used by the pupils and the "field of view" is also limited with regard to what the camera shows. Classroom dialogues are sometimes replaced by communication through media such as emails, chat forums, and telephones. Pupils' communication with classmates is limited, but the already used and known media are central. The teacher may not therefore have the same overview of pupils' activities, progress, and wellbeing as usual.

In general, from their descriptions the pupils' ideal for the pedagogy in a future distance learning appear to be characterized by the teacher standing in front of a blackboard, explaining, managing time, keeping calm, and being available for questions. We think that this can be understood as an expression of the kind of teaching that pupils know and are used to, and that remote teaching for them should ideally imitate this. However, this does not mean that the pupils' attention to the teacher's gaze, cf. panopticon, disappears. On the contrary, they are preoccupied with being seen for the sake of the power that the teacher has, and perhaps that is why pupils are very much aware of making themselves visible, among other things simply to make sure to minimise their risk of being registered with absence.

2.3 Being Visible to the Teacher and Avoiding Absence

The pupils are very much aware of showing the teacher that they attend class and are active. If they do not, they will be registered as absent—and too many absences can cause exclusion from the education. However, the ordinary form of registration has changed conditions in the remote context, and participation and absence were therefore redefined because they could no longer be understood as presence in the same sense as in the classroom at the school. In the context of Bourdieu's theory, absence and presence can thus define whether students are included or excluded from the education in a new way. Pupils can eliminate the risk of exclusion by being visible or appearing to be, and they addressed this question in different ways in the interview.

One pupil described: “There were also some who just checked in, and then they left the program open, but they were not there” (Girl, younger).
Other pupils seemed to be very much aware of which situations they needed to make themselves visible in in different ways, even though they may actually have been busy doing other things (that could not be seen by the teacher). In this way, the meaning of absence can establish a form of discipline that continues in the changed classroom, which gives new opportunities to *pretend* to be present.

Other pupils’ absences are sometimes referred to by the pupils as “bad excuses”: “Yes, it’s demotivating that many of them just sit and say, ‘Well, I just need to leave class, I have an appointment’” (Boy, older). We understand this quote as if the pupil who had self-discipline experienced a form of injustice when others did not practice the same behavior, and it demotivated the pupil with discipline. Something similar was expressed by two slightly older pupils, who formulated a rather strong wish for teachers’ control and consistency by making a comparison with puppies being kept on a leash:

> Pupil 1: You have such a bunch of puppies which are in training, just like we are. If you do not keep them on a short leash, then they will see how long the leash can get, and if there is no consequence for them, and they are absent, well then. (Boy, older)
>
> Pupil 2: Then it gets longer and longer. (Boy, older)

As shown above, it is on a somewhat uncertain basis that a teacher must “note” absence, because pupils can strategically make themselves visible—an opportunity that is not present in the same way in ordinary teaching. It seems unclear whether attendance in remote teaching is identical to being logged into the computer and which explanations for online absence are valid. Assignment submission is, as mentioned, another practice that is also used to define active participation.

2.4 Control as an Internal Process

The registration of absence is described above as being linked to something external and observable such as presence online or assignment submission. For some pupils, it is also connected to something internal and the experience of legitimacy for continued public financial support, in the form of the state educational grant: “So for me, I have a good conscience, then I’m also doing something. Then I'm not just standing still in my life (…), so it is also the income, but also that I am in the process of studying something” (Boy, younger).

The pupil describes the feeling of having a “good conscience”, which we understand as him feeling that he is really entitled to the benefit he receives. The discipline is thus linked to something more abstract in the form of an individual’s morality in relation to receiving public financial support. At the same time, it seems to influence the way he understands himself, because it also relates to the feeling of being in progress but can also be about whether his professional performance is seen and being recognised by the teacher.

2.5 Visible Performances

Some pupils are expressing a kind of uncertainty in relation to how they can make their participation visible in the classroom, for instance as described by this boy:

> I also think it feels tiring if you (...) disappoint the teacher by not doing anything. (…) But also when the (…) teacher the class and a lot raise their hands, you want to answer. (Boy, younger)

The pupil describes the feeling of "disappointing" the teacher when not being active, but also that it is in his (the pupil's) benefit when he can answer a question. We understand this in relation to the teacher having to assess whether and to what extent pupils live up to the requirements of the education. Raising the hand relates to visibility, but it is in competition with all the other pupils, so the teacher has the power to choose between those who raise their hand. It is a disciplining practice that is also traditionally found in ordinary teaching, reflecting norms such as them having to wait for the teacher's selection of who is to give answers and say something.

In general, however, it seems that it is more difficult for the pupils to be seen and to concentrate on working in the context of the remote teaching, as there can be many distractions in the home context. Some pupils mention what they describe as "slacking" at home, and the fact that this is at all mentioned may indicate that they are socialized to norms saying that such behavior is not okay. If one assumes that visibility for the teacher's gaze is central, cf. panopticon, then other possibilities arise in remote teaching, where pupils are not necessarily visible and yet must show active participation, but some describe the positive in being able to immerse themselves, sit still, and mute the sound on their computer.

Some pupils describe that they stop listening when they are not seen by the teacher and have got the answers they need, while others discovered that they were able to find answers themselves and that answers could be more complex than a teacher would usually give. For example, one pupil has also learned to search for answers on websites in foreign languages and reflected: "The web is a little bigger than your teacher" (Boy, younger).

Based on such experiences, we will conclude the article and discuss the experiences in a future perspective.

3 Conclusion and Reflections in a Future Perspective

The pupils interviewed on the basic course at Danish VET in the spring of 2020 had different conditions for and experiences with remote teaching, but what they had in common was that active participation in the form of their performance or attendance was required. They were very preoccupied with living up to the demands of the kind of control that continued, regardless of the fact that the teacher's conditions for and ability to see them and exercise control had changed, and it appeared as a strong socializing factor. At the same time, they were also very much aware of whether other pupils respected the rules or tried to circumvent them.

The situation can be problematised seen in the light of pupils' resources and different social situations and backgrounds. As in ordinary teaching, some pupils are privileged—for instance, having better technical equipment than others, a situation at home that better fits with and supports remote teaching and in general do not need the teacher's support much—while others who need more regular contact with the teacher for guidance, support, and response, may be excluded. This can also be seen in light of the fact that the pupils in general expressed the need for and importance of a guiding teacher in classrooms, also during future remote teaching.

However, some of the pupils also describe that they experience new and positive potentials of the remote teaching that increase their well-being and professional development by giving them new forms of independence in situations where they did not feel as exposed to and influenced by teacher power, teacher responses, and the teacher's gaze. In this way, remote teaching had the potential to include other students. From a societal point of view, there may be a wish for pupils to be socialized to engage in a pedagogy based on more independence and immersion. However, research also indicates that such a pedagogy may have a social bias, and therefore such a rapid transition as in the spring of 2020 was complex and challenging (Bourdieu & Passeron, 1990; Munk, 2014).

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Arenas Diaz, G., Guzzetti, G., Sebastian Irigoyen, G. & Nardi, P. (2021). COVID-19 and VET: risks, impacts and mitigation measures in the context of a VET centre. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. IV. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 8–16). https://doi.org/10.5281/zenodo.5414966

COVID-19 and VET: Risks, Impacts and Mitigation Measures in the Context of a VET Centre

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Abstract

Context: The effects of COVID-19 have shown diverse repercussions on VET. Among the others, it dramatically affected social-emotional learning (SEL), which represents a central point in VET systems, beside entailing an explicit double disadvantage both in the process of on-the-job training and in their insertion into the labour market. In order to cope with these emerging issues, Cometa VET centre (Como, Italy) has implemented several measures to mitigate this impact. This research aims at focusing on the impact generated by COVID-19 on both technical skills and SEL.
Methods: In line with studies on SEL components, the authors have implemented a survey to identify the self-perception by a sample of Cometa VET learners, aiming at studying and analysing the emotional areas in which learners have been impaired in the learning process in the context delineated by the COVID-19. Answers have been collected before and after the pandemic impact, making possible a comparison between the two contexts.
Findings: During the end of the 2019-2020 period and during the beginning of the 2020-2021 wave, the effects of the pandemic emerged in terms of an important decrease in their satisfaction and emotions. Nevertheless, at the end of the period of 2020-2021 it seems that the students improved their response in terms of motivation in the same items, mostly related with the adaptability of the pandemic with tutors' actions.
Conclusions: This research aims at contributing to develop scientifically valid measurements that allow a clear diagnosis of the development of SEL in their students, and to monitor progress over time. By this system it has been possible to evaluate the negative impact of Covid emergency on the SEL dimensions of the Cometa VET program, mitigated by specific measures of tutoring.

Keywords

SEL, COVID-19, life skills, VETfullness, inclusion

1 Introduction: the COVID Impact on Education and Training. The Cometa Experience.

COVID-19 emergency has dramatically affected education, globally. As highlighted by OECD (2020), more than 1.5 billion students had to interrupt their regular education because of school closures; furthermore, the introduction of remote learning, although necessary to keep educational activities active, in many cases generated some criticalities in terms of equity. Not every learner had access to technology (both tools and connection); not every teacher and trainer was ready to shift their methods to online didactics, showing a lack of skills (and technology) on school side. The psychological impact, namely on vulnerable learners, has been paramount.
Beyond the general education sector, the consequences on the VET sector have been even more critical. In terms of school-based activities, lockdown interrupted practical learning which can be considered pivotal in VET curricula; at the same time, the closure of companies and work activities, made work-based learning (internships, apprenticeships) almost impossible (OECD, 2020) in many sectors where remote working is not available.

In a long-term perspective, the COVID-19 emergency simply accelerated an on-going paradigm shift in the general attention to social-emotional learning (SEL) & life skills (Schleicher, 2020). While the relevance of technical skills in VET is undoubted, recent analyses outline the role played by transversal and life skills for the future of job. As pointed out by the WEF (2020), the business community, after almost 6 months after the beginning of the Covid crisis, confirmed the increasing value of self-management, active learning, flexibility, stress-tolerance, as complementary to technical skills, namely digital. The importance of the "human potential" of current and future employees is close to the concept of "VETfullness" developed by Gendron (2018).

This case study aims at pointing out the experience of "Cometa", a VET centre based in Como (Italy): since 2020, Cometa has been recognized by the European Commission as one of the 12 Centres of Vocational Excellence for its inclusive approach to learning developed namely for vulnerable learners, including dropouts, NEETs, migrants and young people with mental or learning disability. This approach, called "Inclusive Excellence", consists of a set of both pedagogical and governance practices in order to train learners on advanced technical and professional skills, but also to engage and support them in a social-emotional learning process (Koenig & Nardi, 2019). One of the personalized programs, Liceo del Lavoro (Italian for "High school for work") is designed to train young dropouts (Arenas et al., 2020): it is a 2-year work-based training program, aiming at guiding learners towards a formal certificate or, if the case, to a concrete and effective transition to work. This target represents the group of learners who have been among the most affected by the emergency: although their renewed interest in starting a learning pathway, the legal restrictions obliged to interrupt training activities and the regular support offered by Cometa tutors during the daily routine.

In order to cope with these emerging issues, Cometa VET centre (Como, Italy) has implemented several measures to introduce online training, to provide access to every learner and to mitigate the social and psychological impact of the pandemic on its activity, in line with international measures (OECD, 2020b). Among them:

- remote learning based on more active didactics, encouraging strong interaction and learners' active engagement;
- a strongly personalized support to learners played by school tutors through one-to-one sessions and community activities to foster self- and social-awareness.
- reskilling of trainers and tutors to adapt their methods and support learners' attention, participation and learning outcomes

The school-year 2019-2020 was partially affected by the pandemic, when at the end of February 2020 all the activities were interrupted and shifted online since the first week of March until June (end of the school-year); internships and practical training were cancelled, and project works were suggested. The school-year 2020-2021 had a more uncertain flow of activities: presence at school were possible only during few weeks along the school-year, but blended learning was adopted for general subjects; practical learning in workshops and internships, thanks to the National and Regional regulations were allowed, although companies' activity has been under potential. During both the school years, tutoring was strengthened thanks to a deep personalization of the support provided by tutors: weekly (in some cases also daily) contacts, team-works to share updates on the pandemic, debates to discuss the emerging criticalities in learners' daily routine.

This research aims at focusing on the impact generated by COVID-19 on both technical skills and SEL on a sample of learners in the Liceo del Lavoro program at Cometa VET centre. The authors, in particular, will build an ad-hoc measurement system, will evaluate the impact of COVID-19 on learners' SEL, and eventually will describe and assess the measures of mitigation implemented by the same centre.

2 COVID-19 Impacts on Education: A Literature Review

The effects of COVID-19 have shown its diverse repercussions on education at global scope, where conventional schooling at all levels was interrupted (OECD, 2020). Such a context distanced students and educators from their ordinary training environment, implying great challenges to carry out an adequate learning process (UNESCO, 2020).

For the case of vocational training programs, designed to improve the transition between formal schooling and access to employment, the pandemic entailed an explicit double disadvantage both in the process of on-the-job training and in their insertion into the labour market (Özer, 2020). First, due to the partial paralysis of economic activity, VET systems were forced to rethink new and diverse strategies to ensure and complete the training processes (UNESCO, 2020). Second, training became mostly distance learning, where the components necessary for the acquisition of skills for successful insertion into the labor market were substantially limited (Avis et al., 2020).

On the other hand, the documented effects of COVID-19 on the educational aspect also occurred at the psycho-emotional level, where high levels of anxiety, demotivation and stress have been described in students from various countries around the world (Salari et al. 2020). It is noteworthy that the recommendations promoted by the World Health Organization (WHO) on the importance of paying attention to socioemotional well-being are not only more difficult to comply with in low- and middle-income countries, but also in vulnerable contexts, even in countries considered high-income, which includes individuals who are often part of the VET system (Banati et al., 2020; Kugler et al., in press; Özer, 2020; Reichelt et al., 2019).

The different reasons in why it is important to pay attention to socioemotional performance in formative processes is that, in both the short and long term, VET graduates may be disadvantaged if their training does not provide them with the necessary competencies to adapt to changes in the work environment, where soft skills development is specifically linked (Acevedo et al., 2017; Deming, 2017; Hirshleifer et al., 2016).

In this sense the importance of SEL in VET systems lies in the fact that it is a fundamental axis for closing the gaps between students from different socioeconomic contexts (Heckmand & Kautz, 2013). It can also trigger a strong impact on both educational and labor outcomes, such as schooling levels, improved wages, productivity, labour progress, among others (Heckman et al., 2006; Carneiro et al., 2007). Barrera-Osorio et al. (2020) present empirical evidence on obtaining both better salaries and more successful labour trajectories in those vocational training programs focused on the development of soft skills. Part of their high demand lies in

the fact that they are considered skills that generate are able to "generate skills", which means that learned social-emotional skills reinforce the capacity and curiosity in detonating skills in the future and promote the formation of cognitive skills (Heckman & Kautz, 2013; Busso et al., 2017).

In this sense, COVID-19 places an additional challenge in vocational training linked to the affectation and limiting of SEL as a result of the pandemic, a central point in VET systems. One of the main initiatives taken by VET systems to address the challenges of COVID-19 lies in the implementation of specific programs to develop social-emotional skills in the school environment as well as in the workplace (OECD. 2020b). In this process, the role of the tutor becomes even more important, as evidence shows that has an active role in monitoring, supervising the transfer of knowledge as well as in the development of the learner's skills.

3 Methodology

SEL is broadly defined as part of a process of acquisition of capacities, skills and aptitudes for the handling of emotions, the development of empathy and communication skills, to establish positive relations, to take decisions with a grade of responsibility. As mentioned, it is recognized as a vital component of job performance by the labour market (Dudley et al., 2006; Noftle & Robins, 2007; Heckman & Kautz, 2012). Several components and wide dimensions of SEL have been identified by scholars, including Task Performance, Emotional Regulation, Collaboration, Open-Mindedness, Engaging with others (Kankaraš & Suarez-Alvarez, 2019).

According to these SEL components, the authors have implemented a survey to identify the self-perception by a sample of Cometa VET learners, aiming at studying and analysing the emotional areas in which learners have been impaired in the learning process in the context delineated by the COVID-19.

The survey was implemented in four different waves, at the beginning (T0) and at the end (T1) of the school year in 2019 and in 2020, involving 15 learners enrolled in the Liceo del Lavoro program. It contains 17 different questions in which respondents could indicate their perception on a 0-100% point scale related to the different dimensions of the validity of SEL components suggested in the OECD study (Kankaraš & Suarez-Alvarez, 2019).

Answers have been collected before and after the pandemic impact, making possible a comparison between the two contexts. In order to test the hypotheses about the emotional impact of COVID-19 on learners, the authors will analyze the data from the internal survey (using the waves 2019 and 2020). Authors will list the responses (anonymized) of the respondents who participated in the waves of the questionnaire providing basic descriptive statistics. Subsequently, the Principal Component Analysis (PCA) method will be used to identify indexes (Rabe-Hesketh & Skrondal, 2008; Snijders & Bosker, 1999). An explorative factor analysis will indicate how many components can be clustered for the creation of internal indexes for the analysis of learners' behavior taking into account the pandemic context.

4 Analysis of the Results

In this section, the descriptive statistics of some survey questions will be shown, based on the survey that captures SEL dimensions mentioned above. It is important to state that the pandemic and the consequent restrictions have affected the natural ways to carry out the learning: to some extent, telecommuting and remote learning are not enough to motivate learners.

This section presents two tables with the information of tutors (Table 1) and students (Table2). Specifically, the authors chose seven questions based on two principal characteristics. First, the questions must appear in the four waves and second, the questions must be for both tutors and students. The selected questions are the following:

- How much do you think you will be able to handle your time?

- How much do you think you will be able to schedule activities?
- How much do you think you will be able to handle and accomplish a task on your own or ask for help when you need it?
- How much do you think you are able not to avoid a problem but to find solutions?
- Compared to school activities (classroom lessons, online, workshops) how do you evaluate your motivation?
- Compared to the internship you did, how do you evaluate your motivation
- How much do you think you will be able to ask others for help when you are in trouble?

The structure of the tables is here described. The first four columns present the mean of the answers for each wave of time (T0 & T1) at the beginning and end of the first year (2019-2020) and beginning and end of the second year (2020-2021). Then, Columns 5 and 6 show if the mean at the beginning and end for the first year are statistically different ("Hotelling test"). Finally, columns 7 and 8 report the same test as columns 5 and 6, but now for the second year. In the first question "How do you assess the student's ability to manage their time?", as shown in Table 1, tutors evaluated this question at the beginning with a mean of 64. Then it presents an increase of 65.8 at the end. However, the null hypothesis is not rejected. It suggests that there is no evidence to state that there is a real improvement. Then, in the second year, in the beginning, the mean is 62.3, and at the end, the mean is 71.1. In this case, the null hypothesis is rejected, suggesting a real improvement in the second year, which is statistically significant (at 95% of confidence).

Students evaluate this question with higher means than tutors' answers. For instance, at the beginning of the first year, the mean of this question is 79.3, then at the end of the second year, the mean is 73.0 (as shown in Table 2). The reduction in the punctuation of this question is not significant according to the Hotelling test. For the second year, the mean is 69.6 at the beginning, and at the end is 85.8. The increase in perception in the second year is significant according to the Hotelling test.

Similar results are found for the case of "How much do you think you will be able to schedule activities?", "How much do you think you will be able to handle and accomplish a task on your own or ask for help when you need it?" and "How much do you think you are able not to avoid a problem but to find solutions?". The results for tutors and students suggest a not significant change in the first year, but a significant (95% confidence) improvement in the perception of this question in the second year.

In the case of tutors, the question "Compared to school activities (classroom lessons, online, workshops) how do you evaluate your motivation?", there is no evidence of a difference neither in the first year nor the second year (See Hotelling Test for the first year and second year). In the case of students, a significant decrease appears in the perception at the beginning (76.6) and the end (57.5) for the first year. It is essential to mention that this question captures the COVID-19 effect because, at the beginning of the year, the classes were face to face, and in the second part of the first year, they became online. It shows one of the consequences of the pandemic situation in the teaching centres. However, in the second year, the mean of the perceptions improves, but the difference is not significant (see Hotelling test).

The tutors' perception in the question "Compared to the internship you did, how do you evaluate your motivation" shows no significant difference in both years. Contrarily, the students present a significant increase for the first year (the means are 64.7 and 70.3, respectively) and the same situation for the second year (the means are 68.8 and 73.2, respectively).

Finally, the tutor's answer, "How much do you think you will be able to ask others for help when you are in trouble?" shows a significant increase in the first year with a mean of 50.3 for the beginning of the first year and 64.7 for the end of the first year. In the case of students, the results suggest that there is not a significant difference neither the first year nor the second year.

As a general conclusion, Cometa, like other organisations and centres VET, deal with the crisis due to COVID-19. The data suggest that Cometa was able to adapt to this situation, the students' perception improves in many of the questions (especially in the second year). On the other hand, tutors evaluate with lower values, but the results suggest an improving their perceptions.

Table 1

Means of the tutors' answers and statistical difference among them

Tutors	2019-2020		2020-2021		Difference in the first year		Difference in the second year	
Questions	T0	T1	T0	T1	Hotelling Test	Prob	Hotelling Test	Prob
How do you assess the student's ability to manage their time?	64.0	65.8	62.3	71.1	0.4	0.55	14.6	0.00
How do you assess the student's ability to plan their activities?	62.0	65.7	65.4	74.6	1.4	0.26	29.9	0.00
How do you assess the student's ability to perform a task independently?	60.7	67.0	62.7	70.4	8.2	0.01	7.3	0.02
How do you assess the student's ability not to avoid a problem but to find solutions?	52.3	61.5	59.2	64.6	25.5	0.00	14.9	0.00
In relation to school activities, how do you assess the motivation of the student?	62.3	66.0	66.5	69.3	1.9	0.19	0.4	0.53
Relative to the internship, how do you evaluate the student's motivation?	64.7	70.3	68.8	73.2	5.4	0.04	1.4	0.26
How do you assess the student's ability to seek help from others when they are struggling?	50.3	64.7	59.6	60.4	50.9	0.00	0.0	0.85

Table 2

Means of the students' answers and statistical difference among them

Students	2019-2020		2020-2021		Difference in the first year		Difference in the second year	
Questions	T0	T1	T0	T1	Hotelling Test	Prob	Hotelling Test	Prob
How much do you think you will be able to handle your time?	79.3	73.0	69.6	85.8	0.1	0.78	5.6	0.04
How much do you think you will be able to schedule activities?	70.7	68.5	66.2	83.8	0.1	0.73	11.1	0.01
How much do you think you will be able to handle and accomplish a task on your own or ask for help when you need it?	71.6	76.0	68.8	89.2	0.1	0.77	8.4	0.02
How much do you think you are able not to avoid a problem but to find solutions?	68.3	70.8	65.4	76.6	0.3	0.57	5.4	0.04
Compared to school activities (classroom lessons, online, workshops...) how do you evaluate your motivation?	76.7	57.5	73.8	82.3	6.1	0.04	1.9	0.20
Compared to the internship you did, how do you evaluate your motivation?	14.7	68.5	72.3	89.2	12.4	0.01	12.6	0.01
How much do you think you will be able to ask others for help when you are in trouble?	63.7	52.0	65.0	75.4	0.3	0.57	4.9	0.05

5 Policy Implications and Conclusions

Taking into account the limitations of the survey sample developed for the students and tutors of the Cometa educational community, the results show important findings in terms of development as SEL impacts during the COVID-19 period.

One of the main aspects that stand out in the tutors' responses is that they evaluate the effect of the pandemic on social-emotional skills, taking into consideration their perception in the year prior to the COVID-19 crisis. It is clear a decrease in their students' survey items related with time management and motivation during the internships at the beginning of 2020-2021 period. However, tutors report motivational improvements in the same areas, due to a possible adaptation and management of the pandemic conditions at the end of the period of 2020-2021.

On the other hand, in the case of student responses, during the end of the 2019-2020 period and during the beginning of the 2020-2021 wave, the effects of the pandemic expressed with an important decrease in their satisfaction and emotions in the survey items of internships, personal motivation, time management and ability to ask for help from their peers to solve some problems. Nevertheless, at the end of the period of 2020-2021 it seems that the students improved their response in terms of motivation in the same items, mostly related with the adaptability of the pandemic with tutors' actions.

The results of this research propose a specific and novel SEL questionnaire for Cometa students that allows to analyse the social-emotional performance and the development of social-emotional skills of students belonging to the professional training in different periods of time, where the wave prior to the pandemic, as well as during it, can be taken as a parameter. These questionnaires also take into account the perception of the tutors as well as that of the students themselves to carefully monitor the existence of possible emotional impacts of the COVID-19, together with their usual performance, and thus be able to influence in a personalized way from the tutors and focused support for those individuals who present an impact in their learning process.

Given that part of a general challenge for educational and VET systems is to develop scientifically valid measurements that allow a clear diagnosis of the development of SEL in their students, and to monitor progress over time, the contribution of this research proposes a novel questionnaire that open the possibility of building indicators from different items specialized in SEL in VET systems. The development of this work seeks to promote the periodic measurement of SEL of Cometa students.

An additional aspect that allows the empirical analysis of students and their SEL development is to establish personalized orientations and supports for the educational community, in order to incorporate the WHO recommendations for VET students.

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Let's Vary the Travel Speed - Interaction and Critical Aspects in Welding Education

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Abstract

Learning to weld in vocational education is an action research project and its purpose is to meet the demand of research regarding the relation between teaching and learning in technical vocational education.
In the research project the welding education at an upper secondary vocational school in Sweden is video-recorded in iterative cycles. The two theoretical perspectives conversation analysis and variation theory are combined and a new didactic approach is formed – CAVTA (Conversation Analysis and Variation Theory Approach). CAVTA permeates the complete process of the study, where analytic tools deriving from the two theoretical perspectives have been used in the design of the teaching and in the data analysis. *Learning to weld in vocational education* is inspired by the learning study method but the traditional pre- and post tests have been removed. This paper focuses the second year of *Learning to weld in vocational education,* developing previously published material. The systematic implementation of CAVTA into welding education is in focus. The research question is formulated: How can the didactic approach CAVTA be implemented in TIG welding education?
Preliminary results of the second year of the study confirm the results of the first year. The implementation of CAVTA affects the design of the welding lessons and the evaluation of the lessons. The vocational teachers' discussions concentrate on subject specific issues. There is an increased focus on the object of learning with its critical aspects. The discussions about how to design the teaching to make the critical aspects discernable result in adjustment of the welding lessons. The systematic teacher and student interactions, including other semiotic resources than verbal language, gradually increase throughout the cycles.
The main implications of the paper concern the forms of teaching subject specific contents within welding education. Nevertheless, the results of the second year of *Learning to weld in vocational education*, may spur development of the teaching of other objects of learning. The project also contributes with knowledge in other fields, such as theoretical framework and methodology, with its combination of conversation analysis and variation theory. The collaboration between researchers and a team of vocational teachers might be of interest to anyone interested in professional development.

Keywords

VET, variation theory, conversation analysis, CAVTA, learning study

1 Introduction

Learning to weld in vocational education is a three-year action research project inspired by the learning study method, where the welding education at an upper secondary vocational school in Sweden is video-recorded in iterative cycles (Asplund & Kilbrink, 2020; Kilbrink & Asplund, 2020a). It is funded by the Swedish Institute for Educational Research to meet the demand of studies regarding the relation between teaching and learning in technical vocational education. The two theoretical perspectives conversation analysis and variation theory are combined, and a new didactic approach is formed – CAVTA (Conversation Analysis and Variation Theory Approach). This approach is used to design the education, but it also serves as an analytic tool when the video-recorded material is scrutinized. Two researchers at Karlstad University have designed the study in co-operation with a team of vocational teachers at the industrial program. The researchers and the vocational teachers have developed the project, which has progressed into its final year.

Regarding learning situations and learning processes in technical vocational education, there is a gap of knowledge (e.g., Kilbrink & Asplund, 2020b; Öhman, 2018). There is a need for practice-based research focusing on learning and teaching. *Learning to weld in vocational education* intends to contribute with knowledge filling the void of empirical research results regarding didactics of subject specific contents. Although the study is subject specific, with its increased focus on the object of learning intertwined with a systematic interaction aimed at a mutual understanding between teacher and student, it may serve as a platform for further studies, where other practical objects of learning in vocational education are studied. In a wider context, the results may be of interest regarding the integration of theoretical perspectives in the design of education. The design of the study may also spur to methodological discussions within the phenomenographic tradition with its links to variation theory and learning studies. Furthermore, the study gives an insight into the collaborative processes between researchers and teachers.

Results from the first year of *Learning to weld in vocational education* has been published already (Asplund & Kilbrink, 2020; Kilbrink & Asplund, 2020a). This paper is focused on the second year of the project, developing previously published material (Asplund et al., 2021; Axelsson, 2021). The research question is formulated: How can the didactic approach CAVTA be implemented in TIG welding education? The purpose is to contribute with knowledge regarding the integration of a didactic approach into welding education.

2 Literature review

There is extensive research within vocational education and training (VET) that focus on different perspectives of the vocational teachers' practice; the heterogeneous international educational systems of vocational education; and work placed learning (Skolverket, 2019). Hallström (2018) highlights the ample research in VET regarding technology, but also claims the didactic question 'how' has been neglected in technological education and VET research. However scant, there is VET didactics research - there are chapters in the UNESCO report, edited by Lucas et al. (2012), dealing with subject specific vocational contents. Being a compilation, the results are diverse and the general conclusion may be summarized by the following quote: "The evidence is clear that vocational education needs to be taught in the context of practical problem-solving, and that high-quality vocational education almost always involves a blend of methods" (Lucas, 2012, p.9).

Questions of VET didactics and Shulman's (1986) concept pedagogical content knowledge are dealt with by Robertson (2008). He questions Australian vocational teachers' opportunities to develop the pedagogical and didactic competence needed to become expert teachers. In the Swedish VET discourse there are also exceptions with projects focusing closely on the actual

practice: Gåfvels' dissertation (2016) studies the interplay between teacher and student in the floristry education. Formative assessment in hairdressers' education is displayed by Öhman (2018). The question of transfer regarding knowledge and competence has been studied by Kilbrink et al. (2018).

Kilbrink & Asplund address learning situations and learning processes in technical vocational education in several studies (e.g., Kilbrink et al., 2021; Kilbrink et al., 2021). Prior to the project*, Learning to weld in vocational education,* they had built a bridge between the theoretical perspectives conversation analysis and variation theory, studying technical education at Swedish vocational programs (Asplund & Kilbrink, 2018; Kilbrink & Asplund, 2020b). In those studies, Kilbrink & Asplund argue that the two perspectives may be used to visualize tacit knowledge. They show how teacher and student in the learning situation use patterns of variation in the learning process and how the learning is negotiated in an orientation towards mutual understanding. Asplund & Kilbrink highlight the need for further studies and in *Learning to weld in vocational education* their thoughts have developed as far as merging the two perspectives into the didactic approach CAVTA (Conversation Analysis and Variation Theory Approach). *Learning to weld in vocational education* is an offspring of their earlier works.

3 Theories and methodology

The theoretical framework for *Learning to weld in vocational education* is the combination of the two perspectives conversation analysis and variation theory. Research within the conversation analytic field stresses that participants learn and create meaning in interaction, using semiotic resources (e.g., Melander & Sahlström, 2010). Variation theory, on the other hand, emphasizes the focus on the contents of the learning situation, the object of learning (e.g., Lo, 2012; Marton, 2015). A combination of these theoretical perspectives has been used in studies prior to *Learning to weld in vocational education* (e.g., Emanuelsson & Sahlström, 2008; Kilbrink & Asplund, 2020b), but in this project there is an attempt of a complete fusion into a new didactic approach – CAVTA (Conversation Analysis and Variation Theory Approach). Systematically, a bridge has been built between variation theory with its focus on what is possible to learn, critical aspects of the object of learning and interaction brought from conversation analysis. CAVTA permeates the complete process of the study, where analytic tools deriving from the two theoretical perspectives have been used as well in the design of teaching, as in the data analysis.

Variation theory evolved to a learning theory from the research approach phenomenography (e.g., Marton, 2015). A strong focus is put on what is to be learnt – *the object of learning* (e.g., Lo, 2012). The conceptual tool box is rich and the most important ideas and concepts for this study are summarized in the following sentences. Variation theory emphasizes the interplay between entity and parts of the object of learning. Learning entails the ability of a simultaneous understanding or *discernment* of the complete object of learning and its parts. Parts, or aspects of the object of learning, which the student needs to discern or master in order to proceed in the learning process, are called *critical aspects*. To support the student in the learning process it is necessary to enable the discernment of the critical aspects, and the teacher can do that by highlighting, *separating,* the critical aspects. For the specific aspect to be separated, the teacher can try to visualize *dimensions of variation*. For example, in TIG welding the length of the arc is a critical aspect. In order to visualize the length of the arc, the teacher uses *the pattern of variation* called *contrast*. He demonstrates different values of the length of the arc – too long; too short; and the correct value. The task of the teacher is to identify which aspects that are critical for the progression of the students and visualize these in the lesson plan for the *intended object of learning*. In the actual learning situation, *the enacted object of learning*, what is possible to learn, is realized. The ambition is that the students' understanding of the object of learning, *the lived object of learning*, gets as close to the intended object of learning as possible.

In conversation analytic research, learning is perceived as constituted in interaction between participants, in a situation where *the artefacts* of the context may play an essential role (e.g., Melander & Sahlström, 2010). Within conversation analysis the way persons communicate, thus creating meaning and understanding by the use of the situational components, is studied (e.g., Goodwin, 2000). In the conversation analytic discourse, it is stated that different *semiotic resources*, not only the obvious speech and body language, are used in the interaction. The material structure of the context also affects the progression of the communication. A central task in conversation analysis is to identify and display how the acts of the participants create the meaning in the communication and for those participating (e.g., Sidnell, 2012). The participants' *negotiation* towards *mutual understanding* is captured in conversation analysis. Their acts and turn taking are empirically documented and then described in the analysis (e.g., Schegloff, 2007).

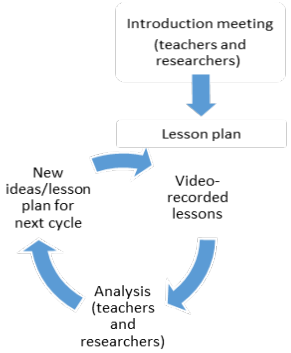
Studies regarding technical vocational education have shown that the learning contents to a great extent is dealt with in the interaction between the teacher and the students (e.g., Filliettaz, 2011; Sakai et al., 2014). Thus, the use of conversation analysis is almost self-explanatory in an attempt to describe the vocational learning situation.

Over the past few decades, the learning study method has been used to investigate learning processes and to develop teaching (e.g., Carlgren, 2018; Pang & Ling, 2012). Learning study as a method has emerged from the phenomenographic tradition and variation theory. In this project, we claim the study to be inspired by the method, since we do not use the pre- and posttests, which are usually conducted in the tradition. In line with the learning study method, the vocational teacher along with colleagues and researchers, plan, enact and evaluate the education in iterative cycles, adjusting the education from one cycle to another. Following the tradition, the learning content is focused, but apart from the lack of pre- and posttests, what distinguishes this study from other learning studies is the systematic and structural combination of variation theory and conversation analysis.

Two researchers have cooperated with vocational teachers at the industrial program. The vocational teachers have designed welding education in the welding method TIG, encouraged to implement ideas from CAVTA. The design draws heavily on the experiences of the first year, but with another vocational teacher conducting three cycles consisting of the steps: planning; enacting; and evaluating welding lessons. Three or four students, who were aged 17 and 18, participated in each cycle. There were different students in each new cycle and the selection was purposive – the students had not been educated in TIG welding before.

Figure 1

Process; cycles 1-3



The second year of *Learning to weld in vocational education* began with a recorded meeting, where the researchers and the vocational teacher who was filmed during the first year of

the project, briefly summarized the first year and proceeded to making plans for the second year (see Figure 1). The vocational teacher (the author of this paper) had been accepted to begin his PhD studies after that year, and his role in the project had to be clarified. It was decided that he would function as a bridge between the senior researchers and the team of vocational teachers during the second year, gradually taking more responsibility for the progression of the project. His time was evenly distributed between the PhD studies and his work as a vocational teacher. Hereafter, he will be referred to as the researching teacher.

Before introducing the teacher, who was to filmed the second year, hereafter called teacher B, other issues had to be discussed. We found it unethical towards both teacher B and the students, not informing teacher B of the results of the first year – hence his lesson plans could build upon the experiences of the first year. Furthermore, teacher B did not have any extra time in his duties for the project, so a decision was made that the researching teacher would introduce him to conversation analysis, variation theory and their merging into CAVTA.

The outline of year 2 in *Learning to weld in vocational education* was presented to teacher B, as were the theoretical perspectives. Teacher B was encouraged to implement CAVTA using experiences of the first year – to focus on the object of learning and a few critical aspects and to stimulate interaction. Teacher B had a free hand to use whatever exercises he wanted. The researching teacher kept journal notes from the planning meetings.

The video-recorded lessons took place in the workshop. Another vocational teacher was responsible for rest of the students in the workshop, so teacher B could concentrate on the students participating in the study. Three cycles were video-recorded during year 2, resulting in roughly two hours and 32 minutes video.

After each cycle, the analytic process progressed. The researchers and the teachers watched the material on their own and then met to discuss the material, using the analytic tools of CAVTA. In the analysis different phases of the welding lessons have been categorized. The discussions we have had were recorded or documented as journal notes. We have studied how the intended focus on the object of learning and its critical aspects is enacted and how interaction is displayed. Display of the patterns of variation separation, contrast, generalization and fusion have been listed. Signs of orientation towards a mutual understanding, not always verbal, have been noted. In order to visualize and clarify our observations we have highlighted sequences from the videos.

The next step has been to form new ideas for the next cycle. We have discussed if and in what way we could develop the implementation of CAVTA. The researchers, with their expertise in the theoretical perspectives, have contributed with aspects the vocational teachers might not think of, whereas the vocational teachers have contributed with their pedagogical content knowledge. Finally, teacher B constructed a new lesson plan, and the work process was repeated in three cycles.

4 Analysis and preliminary results

The analytic process of the second year of *Learning to weld in vocational education* is at an early stage. Thus, the results presented in this article are preliminary. The different phases of the lessons have been identified. The analysis regarding the focus on the object of learning with its critical aspects and the relationship with a stimulation of interaction has yet to be pursued. The initial process started already with the analytic work in the cycles, but a more thorough, systematic and structured analysis including transcribed and visualized examples is not ready to publish.

The outline of the lessons follows the same phases throughout the three cycles. Phase 1 is a phase which lasts from 6 to 8 minutes. In phase 1, teacher B assembles the students. He states the purpose of the lesson, informing them about the object of learning. There is a brief

introduction of the welding method TIG. This is followed by instruction of the aspects of TIG welding that teacher B wants to focus during the lesson.

In phase 2, teacher B demonstrates the welding exercise in action. He clarifies and exemplifies what aspects he wants the students to focus on. This phase lasts for less than 5 minutes in all of the cycles.

Phase 3 consists of the students practicing individual welding. Teacher B has prepared plates for the students and they carry out the exercises individually in separate welding booths, with teacher B walking from one welding booth to the other giving individual feedback. This phase lasts between 32 and 37 minutes. In phase 3 teacher B encourages interaction with the individual student, trying to assess whether or not the student has understood and has the practical ability to carry out the exercise. Teacher B makes two rounds of individual feedback in all of the cycles.

In phase 4 there is a concluding reassembly. Teacher B interacts with the group of students by summarizing the aspects of the object of learning which were the focus of the lessons. This phase lasts no longer than 5 minutes in any of the cycles.

In the planning meeting before cycle 1, teacher B clearly states how he finds it hard to separate one critical aspect from another – there is an interplay between the aspects. In line with variation theory, he agrees on trying to move from the entity of TIG welding to separate different aspects, though; to move from instantiation to separation. He builds upon the experiences of the first year of the project and already in cycle 1 he has minimized the introduction phase in order to focus on a few critical aspects of the object of learning. The critical aspects focused in the first cycle are: the melt; the length of the arc; the angle of the torch; and the travel speed. In the welding lesson of the first cycle, the patterns of variation called separation and contrast are displayed, mostly through instructions by the teacher and the students acting upon the instructions. The verbal interaction is sparse.

There are notable changes made between cycle 1 and 2, though. In the recorded conversations and the journal notes subject specific didactic issues are dealt with. Already in the discussions before cycle 1, the discussion of a narrow object of learning surfaces. The teacher team agrees that in cycle 2 ‘the melt’ (the little pool of melted metal, completely crucial to discern, when welding) would be a proper, more limited object of learning. The possibility of minimizing the number of critical aspects is also discussed. Teacher B wants to find an exercise, which supports the students discern the critical aspects better. Suggestions of changes regarding type of joint and thickness of the material are brought forward. These discussions and considerations result in teacher B changing the exercise between the different cycles.

In cycle 2, the object of learning has been limited from TIG welding in welding position PA, to a much more limited object of learning, ‘the melt’. Furthermore, teacher B only focuses the critical aspects the length of the arc and the travel speed. The critical aspect of the angle of the torch is something teacher B decides not focus on – he wants to be mentally prepared to add focus on this aspect if it shows that the students have not mastered this specific aspect.

The change of exercise and critical aspects affects the actual welding the students perform in cycle 2. The interaction is also increased in cycle 2, in line with teacher B’s outspoken ambition to stimulate the students to express how they perceive their welding. In an interaction with one of the students the decision of avoiding the aspect the angle of the torch, is made topical and he makes use of his preparation to put it in the forefront again, in order for the student to progress. In this interaction an orientation towards a mutual understanding is displayed. In cycle 2 the pattern of variation called contrast is visible to a higher degree – teacher B encourages the students to vary the length of the arc and the travel speed. The students comply with these variations and engage in verbal interaction to a higher degree than in the first cycle.

Between cycle 2 and 3 there are discussions about how to further implement CAVTA. Considerations from these discussions result in slight adjustments of settings of the equipment

and thickness of the exercise plates. Above all, teacher B moves into cycle 3 with the ambition to stimulate the students' verbalization during their individual welding even more. It is decided that the critical aspects to focus will be the same as in cycle 2.

The orientation towards a mutual understanding of the critical aspects is clearly displayed in cycle 3. Teacher B struggles to get the students describe what they perceive during their individual welding. One of the students has great problems to speak while simultaneously welding, but teacher B manages to get the student to verbalize his discernment of the critical aspect directly afterwards, thus assessing the student's understanding.

5 Discussion

How can the didactic approach CAVTA be implemented in TIG welding education? The answer to the research question is found in the empiric material and in the analytic process a comparison with year 1 of the project is inevitable. In a comparison with the first year of *Learning to weld in vocational education* similarities are found regarding the different phases of the lessons: the introduction, where the students are gathered; the demonstration of the exercise; the individual practice with the welding exercise; the reassembly.

To a high degree the preliminary results of the second year of the study confirm the results of the first year. It is possible to implement CAVTA in TIG welding education by analyzing critical aspects and to help the students discern them. It is possible to focus on these few critical aspects and by a systematic interaction assess the students' discernment of those critical aspects. Differences between year 1 and 2 are observed in regard to which critical aspects to focus and how the didactic discussions between the vocational teachers result in changes of the practical exercise. We have observed the impact CAVTA has had in the design of the welding lessons. The focus on the object of learning and a few critical aspects helps the students understand and master critical aspects in order to progress. The patterns of variation called separation and contrast are effective in supporting the students discern the critical aspects. The systematized and structured interaction, where the teacher constantly encourages the students to verbalize and show their perception of different values of the critical aspects, enables the teacher to assess if the students have discerned and are able to master the critical aspects.

Further interesting observations have been made in the early stages of the analytic process and these need to be pursued. For example, the pattern of variation called fusion has been discussed among the vocational teachers and there are some sequences in the video-recorded material where this pattern of variation is visible.

There are interesting ongoing conceptual and methodological discussions regarding CAVTA. The use of one of the core concepts of variation theory, critical aspect, is debated not only in the phenomenographic and variation theory movement, but also among the researchers of this project. In an article in progress, we propose the use of another concept, *expected critical aspect*, in order to avoid misconceptions. Another interesting development regards a methodological issue; the deviation to avoid pre- and posttests in a learning study. Could that be a way forward conducting learning studies regarding practical objects of learning?

The results of the second year of *Learning to weld in vocational education*, may contribute with knowledge in widely differing fields. The main implications concern the forms of teaching subject specific contents within technical vocational education. The results may also be of interest regarding theoretical framework and methodology with its unique combination of conversation analysis and variation theory. The collaboration between researchers and a team of vocational teachers is of interest for anyone interested in professional development.

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Biographical notes

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Azizi, N., Thang, P.-O., & Nikounejad, S. (2021). Connecting higher education to industry: A critical reflection on Swedish and Iranian HE policies and practices. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. IV. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 26–34). https://doi.org/10.5281/zenodo.5172321

Connecting Higher Education to Industry: A Critical reflection on Swedish and Iranian HE Policies and Practices

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Abstract

In recent years the importance of collaboration between higher education and industry has been increasingly acknowledged by HE's policymakers and scholars and different national policies and practices all around the world have been carried out to bridge these two parties effectively. Although developing countries have realized the importance and necessity of university-industry collaboration, yet they are confronting a deep-rooted mismatch between universities and industry. This paper however, aims to critically analyze and compare relevant current mechanisms, policies and practices in Iran and Sweden. As multiple qualitative approach was used to enable deep exploration of participants. Participants included 29 Iranian and Swedish experts representing universities and industries who were purposefully selected and were interviewed using semi-structure interview. Data was analyzed via the coding method (open coding, axial coding and selective coding). Findings revealed that Iran and Sweden use two relatively different models to fill the gap between their universities and industries emphasizing on different aspects and players. Despite some similarities between these two countries in their approaches to link universities to the industry, the findings showed that in contrast to Iranian triple model in Sweden a five-way model is applied for university-business collaboration (UBC). Findings also show that despite the reported needs for close cooperation between universities and industries in Iran, current policies and methods, including the types of relationships and interactions and strategies used, need to be critically reviewed. In addition, given the findings on Swedish policies and methods for connecting universities and industries, some practical strategies have been proposed to improve the relationship between universities and industries in Iran.

Keywords

higher education, university-industry collaboration, national policies and practices

1 Introduction

Universities are organisations that perform a key role within contemporary societies by educating large proportions of the population and generating knowledge and playing a crucial role in achieving economic growth in today's knowledge-based societies (Azizi & Alikhani, 2013).

Consequently many universities have taken action to develop a 'third mission' by fostering links with knowledge users and facilitating technology transfer (Etzkowitz et al., 2000; Gulbrandsen & Slipersæter, 2007).

University-industry collaborations have a long tradition worldwide, but the rise of a global knowledge economy has intensified the need for strategic partnerships that go beyond the traditional funding of discrete research projects (Edmondsonm, 2012; Mowery & Nelson, 2004).). Therefore, ambition of policymakers and universities to develop 'third missions' in addition to the two traditional core missions of research and teaching, and to commercialise academic knowledge, for instance through continuing education programmes, patenting, technology transfer offices, science parks or incubators has intensified the relevance of such collaborations (Marhl & Pausitsm 2011; Perkmann et al. 2013). This sort of collaboration and engagement represents an important win-win strategy in which academic knowledge is transferred into the industrial domain; many companies consider it significantly more valuable than licensing university patents (Cohen et al., 2002). However, despite all, individual university scholars are not equally interested in university-industry collaboration but university-industry collaboration is encouraged because its positive impacts on innovation processes in firms.

Nowadays, the university-industry association is considered as an important relationship for promoting the universities, the industries, and also the countries (Arbuthnott et al., 2011; Chakrabarti & Santoro, 2004). Based on empirical studies, the effective and efficient relationship between universities and industries can improve and provide extensive advantages and benefits for both sectors (Anatan, 2015; Biedenbach et al., 2018; Cervera, 2012; Frasquet et al., 2013). Effective and efficient relationship between universities and industries can spread knowledge from the industries to the universities and vice versa, and then from the universities to the society (Baraldi et al., 2013). There is a balance as well as a coordinate cycle between these two parties in many developed countries such as Germany, England, the Netherlands, Sweden, the U.S.A, Canada, and Australia (Bagheri, 2004; Mortazavi, 2004). However, the collaboration between the university and industry is somehow different in the developing countries, e.g., some Asian countries, including Iran (Behroozi, 2009).

The importance of improving the universities' connection to the workplace and providing students deeper insights about the reality of work and employment opportunities from one hand and some reports on ineffective collaborations and interactions between these two sectors in Iran (Shiri, 2015) have urged us to review and compare relevant policies and practices in Iran and Sweden as one of the leading and successful countries. As one of the most advanced countries in Europe, Sweden is embracing the need to create a more connected and functional relationship between government, business and HEI in order to increase employment, productivity and social cohesion (European Commission, 2011). As an 'interactions' between HEIs and businesses for mutual benefit, the university-business cooperation (UBC) by fostering and extracting its value can help society face a number of issues (Davey et al, 2013). It helps universities to tackle problem of decreasing public funds (Carayol, 2003), helps businesses to gain and maintain their competitive advantage in today's dynamic international markets, contributes to the economic development on regional and national level (OECD, 2002) as well as meet the demands of the labour market to provide more relevant knowledge and skills and greater job prospects of students (Bozeman & Boardman, 2013). Additionally, there are substantial indirect outcomes of UBC including support in the creation of a knowledge economy (Etzkowitz & Leydesdorff, 2000), support for local business (Davey et al. 2011), creation of jobs, stimulation of economic growth and increased living standards whilst reducing hindrances to good living. In this context, UBC creates mutual benefit for all parties involved, and wider, to society. According to the statistical reports published by UNESCO that was mentioned before Sweden was one country among countries with the high rate of research and development costs based on the GDP and Iran was among the lowest rated countries (UNESCO, 2015, quoted from Ministry of

Science, Research, and Technology, 2020: 20). Despite these achievements empirical data on Swedish UBC shows that this model has been facing to some concerning challenges and barriers towards intended goals.

Indeed, in recent decades Iran critically has been suffering from increasing unemployment rate among graduates resulting from mismatch between higher education and the needs of labour market as well as unskilled graduated students (Azizi, 2017). For this it is quite important to know how Iranian approaches towards connecting its higher education to industries is in the line with the most effective international traditions, policies and practices.

However, this study aims to analyse and compare the policies and practices of cooperation between the universities and industry in Iran and Sweden towards suggesting some practical strategies by which Iranian higher education could improve its ties with industries and the world of work.

2 Methodology

2.1 Research Method

As a comparative study, this study uses the 'triple helix' model of university–industry–government relations as the research conceptual framework based on which main university-industry cooperation indicators in Iran and Sweden were compared (Etzkowitz, 2008). Therefore, in order to compare the university and industry relations' policies and practices, the qualitative-comparative method was applied. Therefore, based on "different systems and different results" strategy, Iran and Sweden were chosen to be studied (Madandar arani & Kakia, 2019: 53-60 & 38-43).

2.2 Participants

Participants included 29: 14 participants in Iran and 15 in Sweden, higher education policy-makers and employers representing the industries in Iran and Sweden. The participants were selected purposefully via the snowball sampling method based on their field work experiences and expertise. Participants of Sweden were representing one company and four universities and of Iran were representing one company and two universities which had long lasting interactions and field collaborations.

2.3 Research Instrument

The data were collected via semi-structured interviews either in person or via phone interview. In order to confirm the validity of the data, the interviews were transcribed and sent back to interviewees to review, modify, and confirm their opinions.

The coding or categorization method was applied for analysing the data obtained from the interviews. The data was transcribed and coded using open coding, axial coding and selective coding methods.

3 Findings

Tables 1 and 2 illustrate participants feedbacks to the main research question of the study to compare the policies and practices of cooperation between the university-industry relationships in Iran and Sweden.

In Figure 1, the Paradigm model presented to improve the relationship between university and industry in Iran which is based on comparing this cooperation between Sweden and Iran, has been extracted and indicated. Conclusions

With the creation of the Europe 2020 programme, the European Union's (EU) growth strategy for the coming decade, and the higher education modernisation agenda, Europe is

embracing the need to create a more connected and functional relationship between government, business and HEI in order to increase employment, productivity and social cohesion[1]. If fostering UBC is understood as 'interactions' between HEIs and businesses for mutual benefit, then fostering UBC and extracting its value can help society face a number of issues. UBC helps universities to face the problem of decreasing public funds, helps businesses to gain and maintain their competitive advantage in today's dynamic international markets, contributes to the economic development on regional and national level[3]as well as meet the demands of the labour market to provide more relevant knowledge and skills and greater job prospects of students[4]. Additionally, there are substantial indirect outcomes of UBC including support in the creation of a knowledge economy[5], support for local business[6], creation of jobs[7], stimulation of economic growth and increased living standards whilst reducing hindrances to good living[8]. In this context, UBC creates mutual benefit for all parties involved, and wider, to society. Over the last few decades there has been a dramatic shift in the focus of HEIs and policy makers towards the HEI's so-called 'third mission'. Through this, HEIs have had their roles focussed to a greater extent on the need to contribute to society in a more meaningful way through knowledge and technology creation, transfer and exchange[9]. In recent years, the focus has been extended to recognise all the ways in which HEIs can contribute to society including Lifelong learning (LLL), Entrepreneurship or exchanges of workers with businesses as means to reach the third mission. Owing to this, the holistic extraction of value via UBC has become more important for the viability and relevance of HEIs as the benefits of closer and better cooperation between HEIs and businesses and the benefits for the students have been increasingly recognised. Universities' efforts to manage external stakeholder influences in a highly competitive globalizing world of higher education are reflected in various changes to their business models in recent decades. In the light of these developments university-industry relations and its emerging models evolved through a series of transitions to the content, structure and governance of universities' activities. Choice of a particular model, therefore, is mainly influenced by a university's strategic mission, vision, goals and actions, as well as areas of transformation. However, it should be also said that the future of universities relies on how successfully they interact with their numerous and diverse external stakeholders. In the "clients" category of external stakeholders, industry partners hold the second place by significance, just after students. University-Industry links from the perspective of intensity of their interaction in building relationship and doing work are usually based on 'triple helix' with particular reference to the C3 (Cooperation-Coordination-Collaboration) framework in which the interaction between university and industry initially starts via cooperation, followed by coordination, and finalized by collaboration as a purposeful deep and well-established dual engagement (Seres et al, 2019; Azizi, 2017).

Compared relevant policies and practices indicated that Iran and Sweden are applying two rather different models for bridging their universities to industries. Despite this, the variety of interactions between these systems in both countries can be considered as their similarities. The findings also indicate that despite the reported needs for close collaborations between the universities and industries in Iran, current policies, and practices, including training, laboratory application, and financial support, needs to be revised critically. Additionally, in light of our findings on the Swedish policies and practices for connecting universities and industries, some practical strategies have been suggested towards improving the universities' relations to industries in Iran.

Table 1

Similarities and differences of the model of the university-industry cooperation between Iran and Sweden

	Iran	Sweden
Involved institutes		
University	*	*
Industry	*	*
Government	*	*
Society		*
Environment		*
Government roles		
Facilitator	*	*
Encourager	*	*
Monitoring		*
rules maker	*	*
financial supporter	*	*
Evaluator		*
Planner		*
Variety of relations		
Projects, contracts, memorandum of understanding and research cores	*	*
Different types of training	*	*
Facilities, equipment, laboratories and workshops	*	*
Research services	*	*
Holding joint events	*	*
Training	*	*
Training as a job (having low salary)		*
Joint publications	*	*
Summer job		*
PhD student from both institutes		*
Postdoc projects		*
Establishing an institute for industry		*

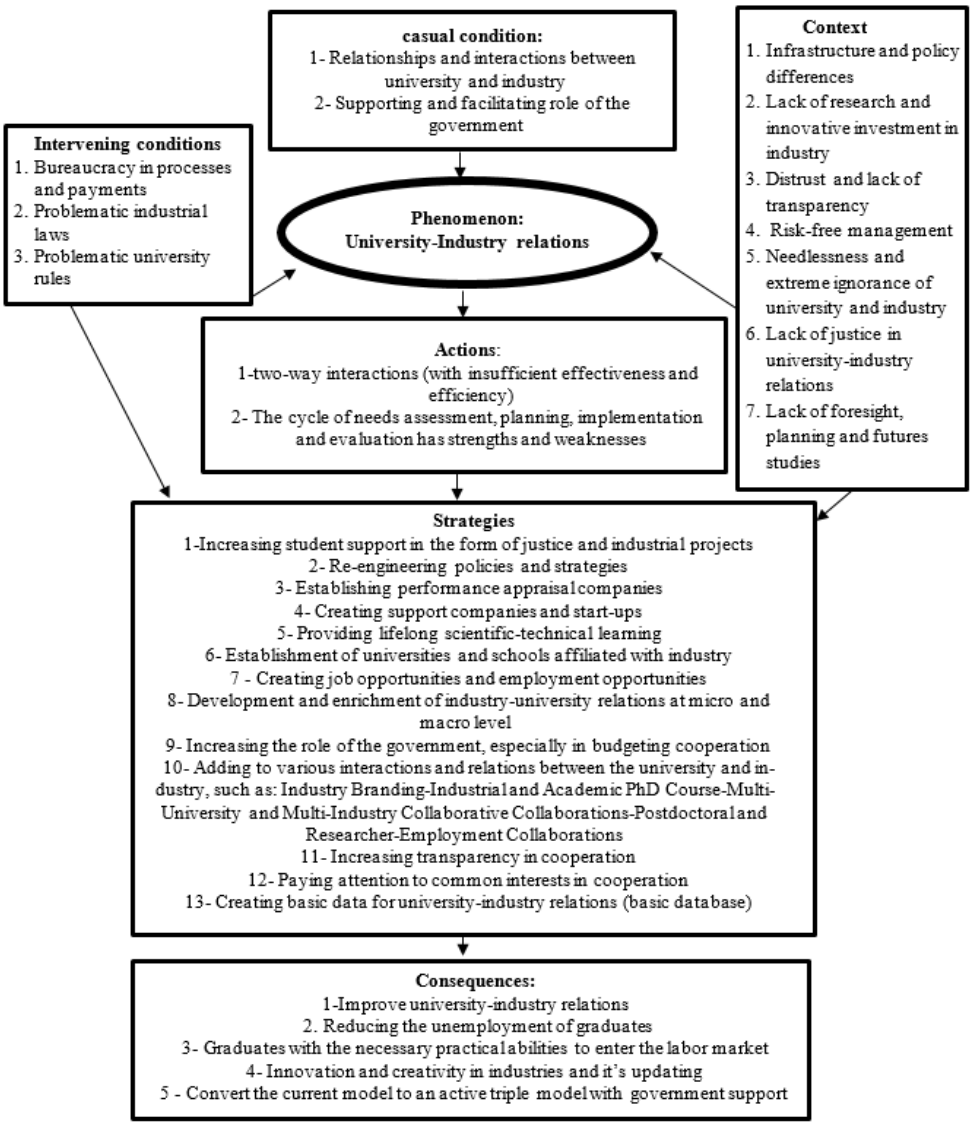
Table 2

Similarities and differences of the university-industry collaborations in Iran and Sweden

	Iran	Sweden
Strengths		
Relationship between university – industry is Strong		*
There is a strong planning, monitoring and evaluation cycle by the government		*
There is a strong planning cycle by the university and industry		*
Having variety of interactions	*	*
Having coherence interaction		*
Having two-way interaction	*	*
Having a futuristic vision		*
There is a hug fund and budget from both the government and industry		*
There is enough budget from industry	*	*
Institutionalizing a positive view of university-industry cooperation		*
Existence of job opportunities and possibility of employment		*
flexibility		*
Student support		*
industrial advisor		*
Development and enrichment of industry-university relations at micro and macro level	*	*
Two-way lifelong scientific-technical education		*
Lifelong learning in industry	*	*
Industry branding		*
There is a strong evaluation cycle at the industry	*	
Weaknesses		
The relationship between university and industry is Weak to moderate	*	
Lack of planning, monitoring and evaluation cycle by the government	*	
The difference between industry and university	*	*
The difference between the missions, goals and structure of the two institutions of the universities and industry	*	*
Lack of trust and confidence between the industry and universities	*	*
Taking low risk of industrial managers and fear of changing	*	
Negative effect of differences in taste and opinion of the CEO	*	*
Low awareness of the universities and industry about each other's needs	*	
Lack of priority in connection with industry in the programs of the Ministry of Science and Research	*	
Lack of proper cooperation and interactions between the universities and industry	*	
Lack of equal participations of all the universities, professors and students in the industry	*	
Problematic rules	*	*
Industry budget constraints	*	
Lack of foresight in the industry and universities	*	
Lack of strong evaluation cycle by the universities	*	*
Lack of strong evaluation cycle by the industry		*
Distrusting the cooperation can cause no more collaboration		*
Bureaucracy	*	*
Time-consuming rules	*	*
Having different objectives	*	*

Figure 1

Paradigm model presented to improve the relationship between university and industry in Iran



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Business Teacher Training Students in Austria: Their Study Choice and Learning Motivations

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Abstract

Context: The business education master's programme in Austria is characterised through its polyvalent career options and its pedagogical orientation. It differs from other business and economic master's programmes as well as other teacher training programmes offered in Austria. A lack of empirical data on this target group makes it hard to understand the students' motivations. Therefore, it is of interest how business teacher training students are motivated to choose their study programme and how they are motivated to learn in their studies. In this present study we analyse these motivational factors. Furthermore, we investigate how the motivation of business teacher training students differs from that of other master students at a university of business and economics and how it is related to student satisfaction.
Approach: In 2020, we conducted an online survey among 178 students in economic business master's programmes in Austria. 53 business teacher training students took part in the survey. In order to study the students' motivations for the choice of study (intrinsic and extrinsic career-oriented motivations), the motivation for learning (intrinsic, extrinsic career-oriented and extrinsic competition-oriented) and the student satisfaction we used validated scales.
Findings: Intrinsic motivation seems to be the most important for study choice as well as for learning for the business teacher training students. The results also imply that business teacher training students are more intrinsically motivated and less motivated through career options when choosing their study compared to other master students in our sample. Furthermore, the learning motivation of the teacher training students is on average more intrinsic than career-oriented or competitive. Finally, intrinsic motivation is significantly related to the student satisfaction of the business teacher training students, while extrinsic motivation is not related to their satisfaction. The study contributes to broaden the empirical evidence in this field. The findings are similar to other findings in the field of teacher training. The results show the importance of intrinsic motivation for choosing the study programme of business education as well as for student satisfaction as a factor of student success. Thus, recruitment should focus on measures of attracting intrinsically motivated students.

Keywords

business teacher training students, motivation for the choice of study, learning motivation, student satisfaction

1 Introduction

Due to historical reasons, several different pathways lead to the teaching vocation in Austria. Graduates from the master's programme of business education are entitled to teach business-related subjects in vocational upper secondary schools (Fortmüller et al., 2018, p. 110–111). Fortmüller et al. (2018, p. 119) describe the goals of the Austrian business teacher education programme as "the acquisition of content knowledge, pedagogical content knowledge, and pedagogical-psychological knowledge". These goals differ from other economic or business master's programmes, which in general focus on content knowledge in their specific subject area.

Another aspect that is unique to the business education master's programme in the Austrian teacher education system is the so-called "polyvalence". This implies that graduates can choose between becoming a teacher and working in other business-related vocations. Still, future teachers have to have two years of practice in an adequate business-related vocation before they are allowed to teach at an upper secondary school in Austria (Stock et al., 2019, p. 210). A study among graduates from the business teacher training study programme at an Austrian university shows that this polyvalence is next to the labour market and career-orientation and the interest in becoming a teacher an important motive to choose this study programme. The results of this study further indicate a negative relationship between the motive of having studied business education without having a specific goal and the motive of wanting to become a teacher. This supports the assumption that the decision for becoming a teacher is one that made consciously and is carefully considered (Stock et al., 2019, p. 205–206).

However, one major research gap is the lack of empirical data on the characteristics of the business teacher training students in Austria. Having more data helps to understand the target group better and provides insights for targeted recruitment measures and for curriculum development (Gössling et al., 2021, p. 1–2). Therefore, it is of interest how business teacher training students at an Austrian university of economics and business are motivated and how the motivations of these students differ from those that choose other business-related studies offered at the same university that do not offer the polyvalence described above.

2 Theoretical background and empirical findings

In this section the relevant concepts of this study are outlined and empirical findings are discussed. First of all, motivation in general as well as the motivation for choosing a study are defined and empirical findings are described. Then, learning motivation is defined and findings in the field of teacher training are presented. Additionally, findings from the specific target group of business teacher training students in Austria are outlined. Finally, the concept of student satisfaction is outlined, and research questions and hypotheses are derived.

In general, intrinsic motivation is defined as an incentive during a specific activity, that occurs because of the activity itself, whereas the extrinsic motivation is understood as the changes or occasions that are expected after the activity is completed successfully (Rheinberg & Engeser, 2018, p. 426). Thus, extrinsic motivation depends on the positive as well as negative consequences such as parents' or employers' reactions, bonus payments, recognition etc. (Korte, 2018, p. 3). Based on Blüthmann (2012, p. 147–148) extrinsic and intrinsic motivation for study choice is distinguished.

Transferred to teacher training, Künstling and Lipowsky (2011, p. 106) describe an intrinsic choice of study as a decision for a study because the activities spread joy, or are considered as being thrilling, interesting, or challenging. Extrinsic motivation in the choice of study is contrary to that defined through the positive consequences apart from the core activity such as future vocational safety or the avoidance of negative consequences such as failure in other study programmes. To clarify, extrinsic motivation is not related to the study content. Based on this theoretical background, the authors suggest that extrinsic motivation does not predict the

student satisfaction, whereas intrinsic motivation for the choice of study might do (Künstling & Lipowsky, 2011, p.106). To test these assumptions, Künstling and Lipowsky (2011, p. 105) conducted in 2011 one of the first longitudinal studies on study choice motivation and student success of teacher training students in Germany. This study is based on a sample of 844 first year students from primary school, secondary modern school and grammar school teacher training students (Künstling & Lipowsky, 2011, p. 105). The results show that the intrinsic choice of study predicts the self-reported learning strategy (e.g., cognitive- and resource-related strategies) and satisfaction clearly throughout all groups such as both cohorts and all the three study programmes. However, extrinsic motivation for the choice of study does not play a role as a predictor. This finding confirms the authors hypothesis that extrinsic motivation is not related to the content of the study programme itself, but to goals after finishing the study (Künstling & Lipowsky, 2011, p. 106–110). A high extrinsic motivation in the choice of study is also related to a higher probability for dropout during the study programme (Blüthmann et al, 2008, p. 412). Similar findings could be obtained in a study conducted by Wach et al. (2016). Based on the FEMOLA questionnaire ('Fragebogen zur Erfassung der Motivation für die Wahl des Lehramtsstudiums' = 'Motivation for Choosing Teacher Education Questionnaire') by Pohlmann and Möller (2010), the intrinsic motivation (e.g., educational interest, subject-related interest) and extrinsic motivation (e.g., utility, low difficulty of study programme) for choosing a teacher education were measured (Wach et al., 2016, p. 4). Student satisfaction was examined as one aspect of academic success in a German study with teacher education students. Students' satisfaction with their academic studies (SAS) was constructed on a concept with the three dimensions "satisfaction with study content, […] with the terms and conditions of the academic programme and […] with the personal ability to cope with academic stress" (Wach et al., 2016, p. 2). Through a sample of 620 students and two surveys with two years in between, the authors found out intrinsic motivation based on subject-specific interest partially predicts the satisfaction dimension content (Wach et al., 2016, p. 6). In contrary to that, the extrinsic motivation of low difficulty significantly contributes to the SAS-conditions, whereas none of the motivation scales leads to significant information on the satisfaction dimension coping (Wach et al., 2016, p. 8). Generally, this study sheds more light on the importance of the initial motivational aspect on the long term and discovers differences between satisfied and unsatisfied students regarding the academic studies already at the beginning of the study programmes (Wach et al., 2016, p. 10).

The same questioning module, FEMOLA examining the study choice motives amongst teacher education students, was used in a German study at 13 universities with 3,449 students (Retelsdorf & Möller, 2012, p. 7–8). These authors identified that in particular content-based interest is a relevant motivation for studying teaching programmes for grammar schools and pedagogical interest for enrolling in other teacher education programmes – both intrinsic motivations. Extrinsic motivation has contrary to that only a low prediction power for the choice of study (Retelsdorf & Möller, 2012, p. 11–15).

Furthermore, the learning motivation is another crucial aspect in this study. It is classified as personal characteristics and therefore seen as relatively stable in the long term (Hillebrecht, 2019, p. 90). Intrinsic learning motivation occurs when learning itself leads to positive experiences. The external learning motivation is the case when positive consequences want to be reached or negative ones want to be avoided (Schiefele & Schaffner, 2020, p. 165). According to the differentiation from Spinath (2018, p. 101) the difference can be exemplified through the learning target versus the performance target. Schiefele and Schaffner (2020, p. 164) attest students with a high intrinsic learning motivation more careful and in-depth study strategies. Subject-related and therefore intrinsic motivation goes along with higher probability of target achievement, which is not the case with external incentives (Blüthmann et al., 2008, p. 412).

In our study the two aspects career-oriented and competitive learning motivation are examined. Especially the competitive learning motivation can have negative effects on the self-efficacy belief and should be rather replaced by an individualistic comparison (Spinath, 2018, p. 89). Learning motivation is often researched in the context of dropouts, as it is one of the significant predictors: Dropout-students struggle significantly more with activating their learning motivation and show a lower level of resilience and self-discipline (Blüthmann et al. 2008, p. 411–412). A predominant extrinsic motivation such as career-perspectives or income goals also reinforces dropouts based on too high-perceived requirements in the study programme (Blüthmann et al. 2008, p. 425).

Stiensmeier-Pelster and Otterpohl (2020, p. 586) describe students' goals during studying as on the one hand aiming for personal and skills development and on the other hand avoiding negative influences on the self-esteem and the well-being. Alternatively, the learning motivation can be seen in the context of the factors willingness to take over responsibility, the individual expectations and negative associations such as in the study of Metzger and Schulmeister (2020). The learning intention finally results in low realisation of the learning process, when a learning motivation is based on fear of failure. Contrary, students with self-determined learning motivation are willing to take over responsibility for the learning process combined with high expectations regarding the efficiency, which leads to significantly higher results in realisation of the motivation phases to a proactive action until the action is completed as well as constant and effective pursuit of goals (Metzger & Schulmeister, 2020, pp. 243–244).

One of the few Austrian studies on business teacher education in the context of educational and vocational careers and perspectives was conducted recently at the University of Innsbruck with a sample of 75 business teacher students (Gössling et al., 2021, p. 6). Our interest in this study mainly lies in the motivations of the choice of study as the target group is within all the presented and described studies the most comparable one to our study. In both cases business education is a master's program. For this reason, the access to the study programme is defined via content criteria that have to be covered within the previous study programme e.g. a bachelor's programme. In the case of the university that this study is based on these criteria are defined as a minimum of 70 ECTS-credits in business administration and economics and from that at least 3 ECTS-Credits in information technology (Studienplan Wirtschaftspädagogik). The University of Innsbruck requires at least 100 ECTS-credits in business administration and economics in order to enrol to the business teacher programme (Universität Innsbruck, 2021). This means, that in both cases the business teacher students did a similar bachelor's programme as the students that are later enrolled in other business- or economics-related master studies.

Gössling et al. (2021, p. 13) identified the diversity in vocational opportunities as the main motivation for the choice of study. Contrary to that, hedonistic motives such as avoidance of effort during the study programme are clearly rejected. Furthermore, regarding a further profession in a teaching context the pedagogical interest as well as the self-efficacy belief correlate highly significant. These highly intrinsic study choice motivations as well as the subordinate role of extrinsic motivations also confirm earlier research (Gössling et al., 2021, p. 14, Stock et al., 2019, p. 205–206). Nevertheless, during studying the master's programme the private sector of the economy and public administration become more relevant as potential areas of activity beside the typical career within the school system as the vocational perspectives become more broadened during studying business education (Gössling et al., 2021, p. 16).

As an indicator for study success, student satisfaction plays a crucial role in the research field (Thiel et al., 2010, p. 7). While the grades of university entrance qualifications only show a low impact on student satisfaction (Blüthmann, 2012, p. 27), the study choice motivation based on subject interest as well as the grade of information before beginning a study programme do well influence students' satisfaction with only minuscule differences through

different study programmes (Blüthmann, 2012, p. 121–129). These results are confirmed in other studies as well (Wach et al., 2016, p. 9).

Based on these previous findings and the theoretical background the following research questions and hypotheses are analysed in this article:

1. What is the main motivation for choosing the master's programme business education?
   Hypothesis 1: Business teacher training students are mainly intrinsically motivated when choosing their study programme.
2. What is the main learning motivation for business teacher training students?
   Hypothesis 2: Business teacher training students are mainly intrinsically motivated when learning in their study programmes.
3. How do the motivations for choosing a study and for learning of business teacher training students differ from those of other students in economic or business master's programmes?
   Hypothesis 3: Business teacher training students are more intrinsically motivated than other economic or business master students.
4. How are study-choice motivation and learning motivation related to the satisfaction of business teacher training students?
   Hypothesis 4a: There is a significant positive relationship between intrinsic motivations and the satisfaction of business teacher training students.
   Hypothesis 4b: Hypothesis 4a: There no significant relationship between extrinsic motivations and the satisfaction of business teacher training students.

3 Method

In order to answer the research questions defined above, a questionnaire was developed based on existing items by Blüthmann (2012), Thiel et al. (2010) and Hillebrecht (2019), which we adapted for the target group of students in the field of business and economics. The questionnaire was validated through experts and students in order to ensure the quality of the questions. Finally, an online survey was conducted in the summer term in 2020. A sample of 668 students filled out the online survey. For this article, only master students were relevant. Overall, 178 master students filled out the questionnaire of which were 53 teacher training students. The other master students were from business and economic master studies such as for example business law (29), finance and accounting (33) or taxation and accounting (16). On average the students already achieved 81,35 ECTS (SD = 41). They are on average around 26 years old (SD = 5.13). 68.5 % are 26 or younger. 91.6 % do not have children. 50.6 % are female, while 29.8 % are male, 19.7 % did not answer this question. The population consists of 3,589 master students of which 386 are business teacher students according to official data in the winter term 2019 (Wirtschaftsuniversität Wien, 2020).

Study choice motivation was measured using items by Blüthmann (2012). Students rated each item on a five-point Likert scale (1 = completely agree; 5 = do not agree). The following Table 1 shows the subscale, example items, number of items, and Cronbach's alpha.

Table 1
Study choice motivation

Subscale	Item examples	n	M	SD	α
Subject-oriented study choice motivation (intrinsic)	I was very interested in the subject.	5	1.90	0.65	.64
Career-oriented study choice motivation (extrinsic)	The study offers excellent job perspectives.	4	1.98	0.77	.84

Learning motivation was measured using items by Hillebrecht (2019) and Thiel et al. (2010). It is distinguished in intrinsic learning motivation and extrinsic learning motivation, which is further differentiated into competitive learning and career-oriented learning motivation (Hillebrecht, 2019, p. 396). Students rated each item on a five-point Likert scale (1 = completely agree; 5 = do not agree). The following Table 2 shows the subscale, example items, number of items, and Cronbach's alpha. For career-oriented learning motivation and competitive learning motivation the Spearman-Brown Coefficient was calculated since only two items were used for the scale.

Table 2
Learning motivation

Subscale	Item example	n	M	SD	α/r
Intrinsic learning motivation	I study because I enjoy dealing with study related topics.	3	2.41	0.73	.76
Career-oriented learning motivation	I study in order to improve my job perspectives.	2	2.03	0.95	.84
Competitive learning motivation	I study because I want to pass exams better than others.	2	3.14	1.17	.85

Student satisfaction was measured through items by Thiel et al. (2010). The items consist of statements concerning the general satisfaction with the study and the university as well as statements if the students would choose the study programme again and if they can recommend the study programme. Furthermore, their intention to dropout is evaluated and how their interest changed in the course of study. As above, the students rated each item on a five-point Likert scale (1 = completely agree; 5 = do not agree). Key figures on the scale can be found in the following Table 3.

Table 3
Student satisfaction

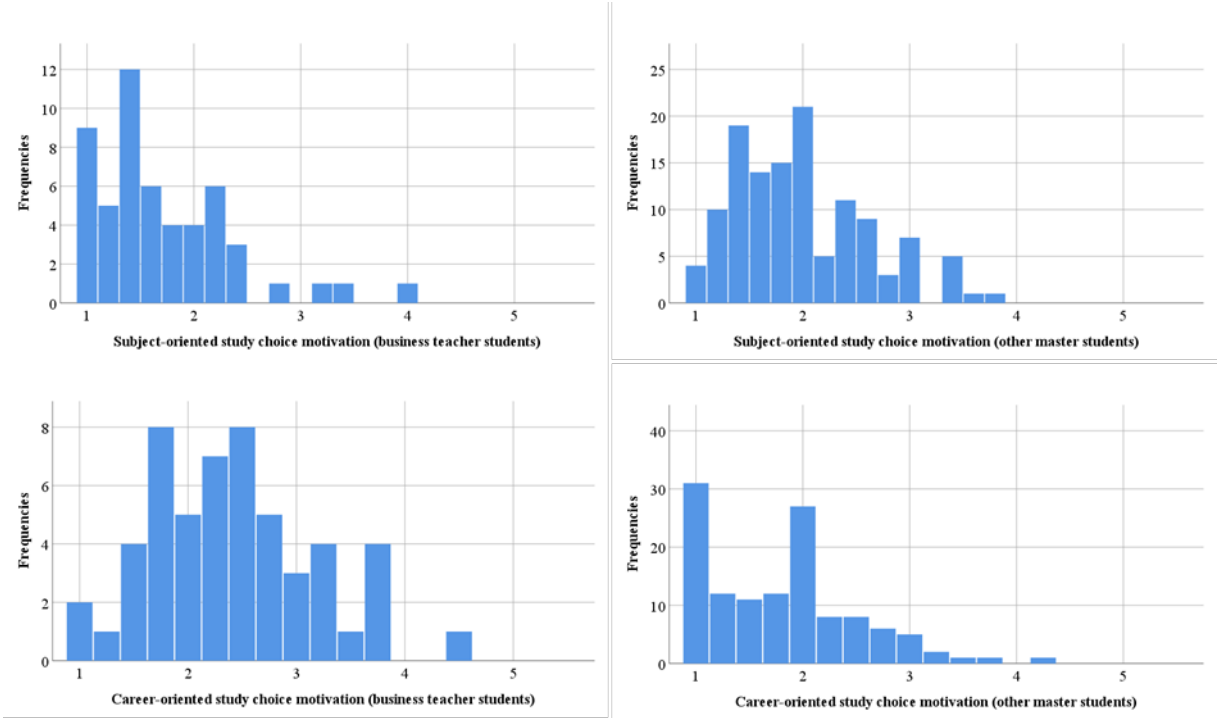
Scale	Item example	n	M	SD	α
Student satisfaction	In general, I am satisfied with my study programme.	7	1.97	0.86	.86

4 Results

4.1 Study choice motivation

The results of the descriptive statistics on the study choice are presented on the histograms in Figure 1 below. The data indicate that the subject-oriented study choice motivation is more prevalent among business teacher students than among other master's students. Other master students seem to choose their study more based on career-oriented motivation than business teacher students.

Figure 1
Study choice motivation (1 = completely agree; 5 = do not agree)

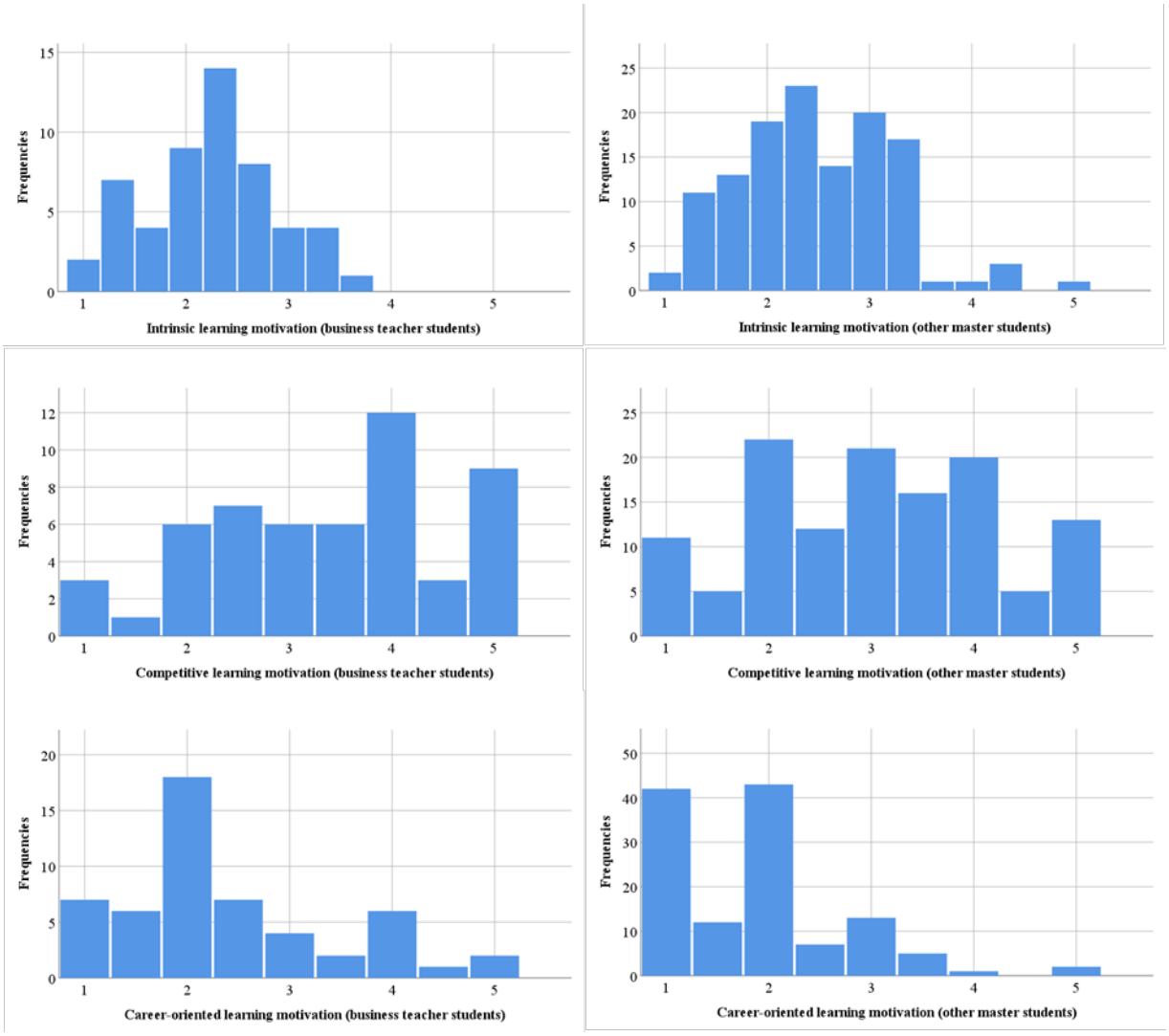


We conducted independent sample t-tests in order to further analyse the difference between study choice motivations of business teacher training students and other master students. The teacher training students showed a significantly higher subject-oriented study choice motivation (M = 1.71, SD = 0.65) compared to the other business and economic master students (M = 1.99, SD = 0,63), t(176) = -2.71, p = 0.01. Also a significant difference was found for the career-oriented study choice motivation between the business teacher training students (M = 2.41, SD = 0.76) and the other master students (M = 1.80, SD = 0.70), t(176) = 5.18, p = 0.00.

4.2 Learning motivation

The results of the descriptive statistics on the learning motivations are shown on the histograms in Figure 2 below. On average the intrinsic learning motivation seems more relevant to business teacher training students than the other two extrinsic learning motivations. No noticeable difference can be found between the intrinsic motivation learning motivations between the two groups. Only the career-oriented learning motivation seems to be more relevant for the other master's students.

Figure 2
Learning motivations (1 = completely agree; 5 = do not agree)



Business student teachers (M = 2.25, SD = 0.64) on average rate intrinsic learning motivation as slightly more relevant than the other master students (M = 2.48, SD = 0.76). The results of the t-test show that the difference is not significant, t(176) = -1.96, p > 0.05. Concerning the career-oriented learning motivation the business teacher training students (M = 2.40, SD = 1.06) on average agree less than the other master students (M = 1.87, SD = 0.86). Here the result of the t-test is significant, t(176) = 3.5, p = 0.00. When it comes to the competitive learning motivation, business teacher students (M = 3.39, SD = 1.16) on average agree less than to their colleagues in the other master programmes (M = 3.03, SD = 1.16). This result is, however, not significant, t(176) = 1.86, p = 0.06.

4.3 Motivation and student success

In order to test the relationships between motivation and student satisfaction a bivariate correlation was conducted among 53 business teacher training students. The results are presented in the Table 4 below. The results confirm hypothesis specified above. A significant positive relationship was found between the student satisfaction and intrinsic learning motivation (r = 0.308, p = 0.025) as well as between student satisfaction and subject-oriented study choice motivation (r = 0.530, p = 0.00). The correlation coefficients can be interpreted as moderate. No significant

relationships were found between student satisfaction and extrinsic learning motivations such as career-oriented and competitive learning motivation. Also, no significant correlation could be found between student satisfaction and career-oriented study choice motivation and the coefficients are low and even negative in two cases.

Table 4
Correlation between motivation and student satisfaction

	1	2	3	4	5	6
1 Intrinsic learning motivation		1				
2 Career-oriented learning motivation		.019	1			
3 Competitive learning motivation		-.052	.430**	1		
4 Career-oriented study choice motivation		.020	.654**	.389**	1	
5 Subject-oriented study choice motivation		.412**	.100	.014	.239	1
6 Student satisfaction		.308*	-.113	-.066	.186	.530**

*indicates $p < .05$; **indicates $p < .01$, $n = 53$

5 Conclusion

This paper aims at providing empirical evidence on the study choice motivations and the learning motivations of the specific target group of business teacher training students in Austria. In order to develop effective recruiting strategies, to gain impact for curriculum development and to support the learning of the student's universities needs to know what motivates their students (Stellmacher et al., 2020, p. 230).

The first research question dealt with the main motivation for choosing the masters programme business education. Here our findings are comparable with those other studies in the field of teacher education (Gössling et al., 2021, Retelsdorf & Möller, 2012, Stock et al., 2019). Hypothesis 1 can be accepted since subject-oriented study choice motivation is on average more important to the business teacher training students than a career-oriented study choice motivation. Future studies should collect data on a wider variety of extrinsic study choice motivations, focusing on one category only can be seen as a limitation of this study.

Our second research question focuses on the learning motivation of the business teacher training students. Again, we found that the intrinsic learning motivation is on average more important than competitive or career-oriented learning motivation. Consequently, hypothesis two can be confirmed. As the intrinsic learning motivation goes along with more in-depth and more careful study strategies, these crucial tools may in a future teaching career positively affect pupils' study strategies (Schiefele & Schaffner, 2020, p. 164). Regarding the general field of learning motivation, we distinguished between internal and external. Schiefele and Schaffner (2020, p. 180) recommend for further research to shed more light on the interdependencies from the different aspects within these two expressions.

The third research question investigates the difference between business teacher training students and other students from business or economic master's programmes at the same university. The results show that the hypothesis 3 can only partly be confirmed. Significant differences could be found in both study choice motivations. As predicted, business teacher training students are more intrinsically motivated and less extrinsically motivated when choosing their study as compared to the other master students. Concerning the learning motivation, only a significant difference concerning the career-oriented learning motivations could be found.

Thus, business teacher students are significantly less motivated to learn because of career options, the salary or promotion opportunities then the other master students in our study. The importance of intrinsic motivation is also found in other studies in the field of teacher education (Gössling et al., 2021, p. 14; Stellmacher et al., 2020, p. 220). The results are especially interesting when considering that graduates from the teacher training programme have similar career options than other business students due to the already mentioned polyvalent character of the study.

The fourth research question focuses on the relationship between the motivation and the student satisfaction. Here we can confirm previous findings (Künstling & Lipowsky, 2011, p. 105, Wach et al., 2016), which show that intrinsic motivation is significantly related to student satisfaction, while extrinsic motivation is not. Therefore, hypotheses 4a and 4b can be accepted. The satisfaction of students can be seen as one factor constituting student success (Thiel et al., 2010, p. 7). In order to increase student success and decrease dropout it seems relevant to attract students who are intrinsically motivated. One possible measure could be an entry exam or interview. Students who are extrinsically motivated might switch to another study in order to avoid such barriers.

Finally, it has to be pointed out that this study is based on a convenience sample. Thus, further studies should carry out a randomized sampling in order to increase the validity of the results.

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On the Development and Role of the Validation of Acquired Experiential Learning in France

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Abstract
Context: The validation of acquired experiences (VAE) of non-formal and informal learning outcomes constitutes alongside initial and continuing vocational education and training systems, the third pathway of access to vocational qualification certifications in France. It is connected to the national qualification framework and its directory RNCP (the national repertory of vocational qualifications) by allowing the VAE candidates to have access to the same qualifications accessible through the formal VET learning tracks. As it is practised at present, it allows any individual accumulating prior working experiences of at least one year in any type of activity connected with the domain of the targeted qualification, to apply for the validation of its required units/blocs of competences without undertaking any formal learning within the initial or continuing formal learning systems. The accreditation of the required units for the targeted qualification can be either partial or complete with an immediate award of the certification. In this context, this paper is an investigation into the background developments, the functioning mechanisms, performance and role of the validation of acquired experiential learning in VET and the whole educational and training system in France.
Methods: The adopted investigation methodology in this research is mainly based on recent scientific desk research, including documentation and performance evaluation reports and studies conducted and published by the stakeholders involved in the VAE. It is also based on the quantitative and qualitative analysis of the VAE related data obtained mainly through two main sources: First, the annual inquiries n°62 and n°67 conducted by the ministries of national and higher education; Secondly, the annual compilation of aggregated data from various ministries involved in the VAE process by the directorate for the animation of research, studies and statistics (DARES) of the ministry of labour.
Findings and conclusions: As a result, this investigation allowed for underlining the following outcome and concluding points: First, since its main reform undertaken within the framework of the Social Modernisation Act of the 17th January 2002, the accessibility flow of VAE candidates to a full validation and certification has been observed to register an important development with an average of 25,000 per year, including the confirmation of the VAE inclusive role in favour of initially low skilled beneficiaries. Secondly, the VAE has also been observed to contribute qualitatively to the promotion of professionalisation, employability, mobility and learning path fluidity and complementarity between the formal learning tracks and informal and non-formal experiential learning.

Keywords

certification, competences, experiential learning, vocational qualifications, validation

1 Introduction

The French educational system includes three basic pathways of accessibility to all levels and types of vocational qualifications registered within NQF directory: The initial vocational education training (IVET), which formally includes both the school-based IVET and the dominantly company-based apprenticeship, the continuing vocational training (CVT) and the validation of acquired experiences (VAE) of non-formal and informal learning outcomes. The validation of acquired experiential informal and non-formal learning gives the opportunity, especially to those who have no qualifications in connection with their undertaken prior activities to obtain a level of formal qualifications corresponding to their skills and competences. France can be considered as a leading country in this area as the validation of experiential learning under its present acronym VAE (*Validation des acquis de l'expérienc*e) has now been in place for 19 years. It is an integrated system which has been developed from a national perspective, strongly articulated to lifelong learning, training and employment policies. It is connected to the national qualification framework (NQF) and its directory RNCP (the national repertory of vocational qualifications) allowing VAE candidates to have access to the same qualifications accessible through the formal VET learning pathways. As it is practised at present, it allows any individual who accumulated (regularly and irregularly) a prior experiential learning for at least one year in any type of activity in a field related to that of the targeted qualification, to apply for the validation of its required units/blocs of competences without going through any initial or continuing formal learning and training programme. The accreditation of the required units/blocs of competences for the targeted qualification can be either partial or complete leading to an immediate award of the certification (Beaupère at al., 2020; Dif, Héraud, & Nkeng, 2009; Hawley-Woodall, 2019; Mathou, 2019; MEFR, 2021; Silvestru & Silvestru, 2019). Its introduction and development in scope and contents has been a gradual process. At first, only practitioners in the engineering field could have their prior experiential learning validated, leading to the award of the engineer's grade (1934 Act of July the 3rd). In the mid-eighties, the 1985 Decree (of the 23rd of August) extended it to include, at the university level, the supervisors, technicians and management executives. Then its generalisation via the 1992 Act (of the 20th of July) to all categories of working individuals was extended and enriched by the Social Modernisation Act (17 January 2002) to include, in addition to wok-based learning, other types of experiential learning acquired through charity work, social and cultural activities. The "VAE" functioning mechanism has been recently simplified and reinforced mainly via the 2016 Act (8th August) on "work, modernisation of social dialogue and securing professional career pathways" and the "VET Reform Act n° 2018-771 of the 5th September 2018 concerning the freedom to choose one's professional future" and through their VAE related implementation decrees. This paper is an investigation into the development, reforms, performance and role of the validation of acquired experiential learning in VET and the whole educational training system in France. The adopted investigation methodology is mainly based on recent scientific desk research, including documentation and performance evaluation reports and studies conducted and published by the stakeholders involved in the VAE. It is also based on the analysis of the VAE related data obtained mainly through the following basic sources: (1)- The annual inquiry n°62 conducted by the directorate for the evaluation, forecasting and performance (*DEPP- Direction de l'Évaluation, de la prospective et de la Performance*) of the Ministry of national education; (2)- The enquiry n°67 undertaken on a yearly basis by the department for information systems and statistical studies (*SD-SIED- Sous-Direction des Systèmes d'information et des Études Statistiques)* of the ministry of higher education, research and innovation; (3)- The annual compilation of aggregated data from various ministries involved in the VAE process by the directorate for the animation of research, studies and statistics (*DARES- Direction de l'Animation de la recherche, des Études et des Statistiques*) of the ministry of labour. The outcomes of the research investigation are analysed and presented through the following main sections:

(a)- background developments and reforms; (b)- functioning and accessibility mechanisms; (c)- observed role and performance; (d)- conclusions.

2 Background Developments and Reforms

The validation of acquired experiential non-formal and informal learning as a pathway of accessibility to formal (certification-based) vocational qualifications is not new to the French educational and training system. The first validation notion was introduced by the 1934 Act of the 10th July. In fact, this law provided the primary general conditions for accessibility to the award of an "engineer grade (diploma)" to individuals who accumulated at least five years of a working experience in the engineering field (Dif, 2007; Dif, Hearud & Nkeng, 2009; Lenoir, 1996). This pioneering development was followed during the 80s and the 90s by a stage of further intermediary developments and extensions within the validation procedure. The 1984 Act (of the 27th January) concerning the reform of higher education and its implementation 1985 Decree (of the 23 August) extended the notion under the name VAPP (V*alidation des Acquis Professionnels et personnels*- Validation of Acquired Professional and Personal experiences and competences) to allow adults over 20 years old to have access to different forms of formal learning programmes at the university level, leading to obtaining higher education degrees (except engineer's grade) starting from at least the NQF level 5 (EQF level 5). VAPP is still in use as a non (directly) certification-based validation instrument for promoting accessibility to higher education, especially among those adults without or with insufficient formal initial formal vocational qualifications but possessing strong professional working experiences. In parallel to VAPP, the Ministry of Labour created in 1986, a network of inter-professional centres for competences audits (*CIBC- Centres Interprofessionnels de Bilans de compétences*) to enable individuals to have their professional and personal competences and skills assessed by undertaking a non-formal competence audit (*BC- Bilan de compétences*) with the aim of allowing them to define or redefine their career and learning development projects. Then at the beginning of the 90s, the 1992 Act of the 20th July and its successive implementation decrees and regulations generalised the validation of acquired professional experiences under the acronym VAP (*Validation des Acquis Professionnels*) to all the NQF levels. It was designed to allow any individual who already accumulated (regularly or irregularly) a working experience of five years in at least one activity related to the field of the candidate's targeted diploma, to apply for the validation of all the qualification's required credit units but one (n-1). However, at this stage of its development, the validation system was observed to have in practice several insufficiencies, namely: (a)- its limitedness to exclusively work-based professional experiences, did not allow for taking into consideration all other forms of experiential learning; (b)- being based on a partial validation, it did not allow potentially successful candidates to have an immediate access to certification via the possibility of obtaining, through the assessment and validation process, a full validation of all the required credit units for the targeted diploma; (c)- the minimum accessibility requirement of an accumulated professional experience of five years, was observed to hinder young adults to have access to VAP during the process of their early career-learning development projects (Dif, 2007; Dif, Hearud & Nkeng, 2009; Lenoir, 1996; Terrot, 1997). The third major stage in its development was launched at the beginning of this century through the "Social Modernisation Act of the 17 January 2002" (and its consecutive implementation decrees) which introduced the present certification-based validation system via the introduction of four primary basic reforms. First, the scope of the validation was broadened to take into consideration all the candidate's prior experiential non-formal and informal learning outcomes, including those connected with charity work, socio-cultural activities under the new acronym VAE (*Validation des Acquis de l'Expérience*- Validation of Acquired Experiences). This also included the reduction of the required minimum experiential period for accessibility from five to three years. Secondly, with the aim of promoting the mobility of holders of national

and foreign formal qualification between different curricula and universities, the 2002 Act and its Decree of the 16th April 2002 introduced and implemented a specifically targeted validation instrument called *VES* (*Validation des Études Supérieures,* i.e. validation of educational studies in higher education). It allows any French higher education institution to grant a VES candidate, a partial or a full validation (in terms of equivalent credit units) to have access to one of its accessible degrees on the basis of the applicant's prior formal qualifications acquired within any public or private higher education institution in France or abroad. Thirdly, the creation via the 2002 Act implementing Decrees (616 & 617 of the 26th April 2002) of both "the National Commission for Vocational Qualification (*CNCP- Commission Nationale de la Certification Professionnelle*)" and "the National Directory of Vocational Qualifications (*RNCP- Répertoire National des Certifications Professionnelles*)" for referencing, registering and updating all vocational qualifications and titles equally accessible through the VET and VAE pathways. During the last two decades following its introduction in 2002, especially since the European Council recommendation of 20th December 2012 calling all Member States to establish (by 2018) arrangements for the validation of non-formal and informal learning, the VAE has undergone further development and reform actions, namely the following: (a)-The 2014 Act of the 5th March, extended the VAE accessibility to individuals without formal vocational qualifications equivalent to the NQF level 3 (EQF level 3) by taking into consideration, in addition to their prior experiential non-formal and informal learning, certain prior workplace training periods undertaken within the framework of VET system and labour market inclusion instruments. This included facilitating accessibility to funding through the creation of "the personal training account (*CPF- Compte Personnel de Formation*)" via the same Act. The notion of blocs of competences as a way to structure qualifications accessible through the VAE was also introduced through the 2014 Act ; (b)- The Labour Act of the 8th August 2016 brought several new developments within the VAE system, namely: (b1)- With the aim of making the VAE more attractive and accessible to individuals with low or without qualifications, the required minimum accessibility period of prior experiences was reduced from three to only one year; (b2)- In the case of partial validation, the validated parts of the targeted qualification are conserved for life instead of five years previously; (b3)- Strengthening the provided support to VAE leave by extending its automatic accessibility to employees on open-ended work contracts to those on fixed duration ones, including the extension of its duration for vulnerable candidates; (b4)- Reinforcing guidance provision (during the VAE information and counselling stage) via the creation of the professional development counselling (*CEP- Conseil en Évolution Professionnelle*). (c)- More recently, the implementation of set of reforms integrating within the framework of the 2018 Act (of the 5th September) for "the freedom to choose one's professional future", was launched at the beginning of 2019. This included namely the following: (c1)-The the creation of a national public body called "*France compétences*" to take in charge among its basic missions the governance of "the national directory of vocational qualifications (*RNCP- Répertoire National des Certifications Professionnelle*)" previously under the responsibility of "the national commission for vocational qualification (*CNCP- Commission Nationale de la Certification Professionnelle*)"; (c2)- Since 2019, each newly registered vocational qualification within the national directory of vocational qualifications has to be presented in blocs of competences *(blocs de compétences*) corresponding to its different parts/units (Art.31of 2018 Act of the 5th September); (c3)- Following the 2018 Act and as a replacement to the1969 five- level- NQF, a new national qualification framework was created via its related Decree n°2019-14 of the 8th January 2019. It is an eight- level- NQF comprising seven levels having their own descriptors referenced to 2-8 EQF levels.

3 Functioning and Accessibility Mechanisms

The VAE is an individualised right for access to the process of assessment and validation of acquired prior experiential informal and non-formal learning with the aim of obtaining formal qualifications. It allows any individual, who accumulated regularly or irregularly an experience of at least one year (full-time or equivalent) in at least one activity related to a targeted degree, to apply for the validation the required units/blocs of competences for obtaining the targeted qualification (certification). The validation can be partial or full with an immediate access to the certification. Therefore, the beneficiary can be an employee, a self employed individual, an unemployed job-seeker, an artist or even a charity worker. This is possible regardless of the employment status of the candidate at the moment of submitting an application for a certification-based validation of acquired prior experiential informal and non-formal learning. All accessed certifications via the VAE system are the same as those accessible through the VET formal learning pathways (Dif, 2007; Dif, Hearud & Nkeng, 2009; Mathou, 2019).

There are many stakeholders involved in the implementation and the funding arrangements of this permeability instrument. First, the social partners are involved (through sectoral and inter-professional consultative commissions on national and regional levels) in the design and updating of the occupational and certification referential standards of all certification-based vocational qualifications and titles (equally accessible via the VAE and VET pathways) referenced and registered within the NQF Directory (*RNCP- Répertoire National des Certifications Professionnelles)* through its national governance body "*France compétences*". They also participate in the assessment and validation of experiential informal and non-formal learning via the VAE jury. The VAE funding for its beneficiaries is usually secured through the the reallocation of employers' mandatory contribution to VET funding (including VAE such as VAE paid leave) via "the operators of competences (*OPCO- Opérateurs de Compétences*)" created by "*France Compétences*" national governance institution. The other important actors in this mechanism are the accredited validation and certification awarding bodies usually made up of the accredited educational and training provision intuitions (like, for instance, the universities for accessibility to higher education qualifications through the VAE). They implement the VAE procedure for candidature on individual basis through all its stages from information and guidance provision to the construction of a portfolio of competences to be submitted for the assessment and validation through the VAE jury. The regional authorities and sector bodies (such as Chambers) participate in the implementation process through their information and guidance provision stands (including accompaniment and financing in some cases).

The 2002 Social Modernisation Act, in its VAE related implementation decrees and the subsequent further enriching developments and reform actions, outlined the basic principles guaranteeing, in practice, the functioning and accessibility mechanisms to the VAE process through four main consecutive stages, namely: Information and guidance provision; feasibility assessment of the candidature; preparation of the candidate's portfolio of acquired competences, assessment and validation decision by a VAE jury (Dif, Hearud & Nkeng, 2009; Mathou, 2019; MT, 2021). The first stage in the process allows interested individuals in the VAE to have a direct access to many sources of information provision, guidance and even accompaniment on national, sectoral and regional levels. In addition to documentation standpoints, repertories and websites connected with national governance and funding institutions such as "*France Compétences*", different ministries and sector bodies. Each academy, local authority and educational institution on regional level is equipped, at least, with one VAE information and guidance provision centre/department and related website. The second stage consists of preparing and submitting a VAE feasibility request folder (called folder 1) to the candidate's chosen institution formally in charge of the process of assessing, validating acquired prior experiential learning and awarding the obtained targeted certification. This stage was designed to avoid committing candidates with highly reduced chance of success to go

unnecessarily through the remaining stages of the VAE process. This second stage is also a three-step process: pre-admissibility folder preparation (whose completion and submission usually goes through an individualised and accompanied feedback process between the candidate and the accompanying tutor), pre-admissibility reviewing and justified feasibility decision (in accordance with basic formal criteria such as the requirement of at least one year of prior experiences in at least one of the fields connected with the targeted certification). The third stage allows effectively the pre-admitted VAE candidate to explicit in more details (with the help of an appointed supervisor/tutor) his or her prior experiences in a formalised and structured way by preparing the VAE folder 2 usually called the "portfolio of acquired experiences and competences". As for assessment and validation process (the fourth stage), it takes place at an accredited institution for this purpose, which is usually the certification awarding institution such as the university. It is taken in charge by a jury which must be made-up and chaired in accordance with VAE related general regulations and those specific to each type of certification. In general, a quarter of its members must be from the qualified representatives of the relevant occupational sector. Half of them must be representing employers and the other half has to represent employees with an equal gender balance between men and women. The jury assesses, interviews the candidate, deliberates and takes a decision falling within one of the three possible cases: full validation and certification, partial validation or no validation at all.

Depending on the qualification awarding bodies, there are three main categories of accessible certifications: (1)- "National Vocational Certificates (diplomas)" delivered by the State through its different ministries automatically and permanently registered within the the national repertory of vocational qualifications (*RNCP- Répertoire National des Certifications Professionnelles)* of *"France compétences"*; (2)- "Vocational Qualification Certificates (*CQP- Certificats de Qualification Professionnelle*)" created and delivered by the professional sectors under the responsibility of social partners. Their registration (for 5 years) within NQF directory (RNCP) is requested by the concerned sector bodies and approved by the vocational qualification commission of *"France compétences*"; (3)- "Certificates and titles" delivered by chambers of commerce, public or private institutions under their own names. They can also be registered (for 5 years) within the national repertory of vocational qualifications (RNCP) at request and after the approval of the vocational qualification commission of "*France compétences*". All these types of accessible qualifications are also distributed, according to the new French NQF (Decree n°2019-14 of 8 January 2019), over the last six levels (3 to 8) given that the first two levels are devoted to basic knowledge acquisition with no related formal vocational certification awarding at the moment. Moreover, the process of their creation is based on a combination of two basic referential standards. The first referential standard (the "occupational referential") refers to the identification of the main missions and tasks to be performed by the future holder of the diploma, including the specification of the conditions under which they will be implemented. As for the second (i.e. the "diploma referential"), it requires establishing a list of the corresponding skills, competences and knowledge required effectively by the employment process itself (Dif, Hearud & Nkeng, 2009; Mathou, 2019; MT, 2021). The VAE financing is dependent on the candidate's employment status as follows: (1)-For employed individuals there are three open possibilities through the use of the enterprise's training plan, the personal training account (C*PF- compte personnel de formation*) and the VAE leave. (2)-For unemployed/job-seekers, the funding can be obtained via the employment centre (*Pôle emploi*), the regional authority (Regional council) or through the use of the personal training account (*CPF- compte personnel de formation*). (3)- For self-employed individuals, VAE is financed through the use of either the personal training account (*CPF- compte personnel de formation*) or the insurance training fund (OPCO) connected with its professional activity sector.

The VAE quality assurance is is basically taken in charge through the following existing mechanisms (Dif, Hearud & Nkeng, 2009; Mathou, 2019): (a)- A set of criteria set by the 2002

legislation and decrees concerning the introduction and the implementation of the VAE procedure including the composition and functioning of the VAE assessment and validation jury; (b)-The quality assurance regarding the organisation and the implementation of the VAE procedure is under the responsibility of each accredited certification awarding body, which is also expected to develop its own evaluation, review and follow-up of the implementation process on a continuous basis and to introduce the necessary improvements; (c)- Extending via the 2018 Act (of the 5th September) the quality requirements already in place for the training providers to the VAE support provision organisations (including the competence audit centres). (d)- In connection with the process of controlling both the quality and the use of vocational training funds, the control services connected with the Ministry of labour are also entitled to control VAE involved stakeholders; (e)-The existence of a referential framework of standards (common to all certification awarding pathways, including VAE), combining both the occupational and qualification (certification) standards for each type of qualification (certification) initially proposed by different certification awarding bodies examined and registered within the NQF directory (*RNCP- Répertoire National des Certifications professionnelles*) by the vocational qualification commission of the unique national governance body of the RNCP called "*France compétences*". All these qualifications (certifications) and their referential standards are designed and updated (every five years) by the advisory commissions connected with different accredited certification awarding bodies; (f)- A number of regional charters regulating the provided support to the VAE candidates are signed between the States and the regional authorities.

4 Observed Role and Performance

The VAE performance can be assessed in terms of its contribution to the achievement of two layers of interrelated objectives: (1)- The intermediary objectives specific to its effective implementation and functioning in practice, i.e. in terms of accessibility flow; (2)-The ultimate objectives such as its contribution, namely to: (2.1)- the individual beneficiaries' LLL, professionalisation, employability, flexibility and mobility in particular, and their socio-professional promotion in general; (2.1)- the development of learning-path fluidity and complimentary between formal and non-formal learning, (2.3)- improvements in the mode of human resource development and management for the employers.

4.1 Performance in Terms of Accessibility Flow

On the whole, the VAE has gradually gained during the last two decades an increasing real welcome and interest, particularly from individuals with insufficient initial formal qualifications. Since its creation in 2002, there has been a considerable increase in demand, especially from less qualified individuals seeking to take up this offer of a 'second chance' and to progress towards a higher level of qualifications. A total of over 428,928 certifications were awarded by different accredited certification awarding bodies connected with different State ministries during the period 2003-2019. These awarded qualifications which are national certifications (State diplomas) represent about 85% of all qualifications awarded via the VAE system. Certificates and titles awarded by the chambers of commerce, the public or private institutions under their own names and by the social partner such as the vocational qualification certificates (*CQP-Certificats de Qualification Professionnelle),* are not covered by the statistical data centralised trough the State ministries. The VAE accessibility flow development since 2002, allowed each year 25,000 VAE candidates on average to benefit from a full validation of the targeted qualifications with an immediate access to certification. In 2019, out of 55453 pre-admitted validation requests at different accredited certification bodies connected with all the State ministries, 36,094 were assessed by the VAE jury leading 21,888 VAE candidates obtaining a full validation and immediate access to certification. About 94.3% (20,641 out of 21,888) of all these obtained qualifications through the VAE are awarded through accredited certification bodies

connected dominantly with four ministries, namely: the Ministry of national educational and higher education (15,142 awarded certifications), followed by the ministry of health and social care (4,522 awarded certifications) and the ministry of labour (977 awarded certifications). 69.2% of all awarded qualifications and titles through the VAE in 2019, were delivered by the ministry of national and higher eduction alone. They are distributed according to the candidate's gender, age group, employment status, initial qualification level and finally the form and level of the most requested certifications and tiles via the VAE, as follows (DEPP, 2020; DEPP & SD-SIES, 2020; MEFR, 2017, 2020, 2021):

- First, according to the employment status, initial qualification level, age group and gender:
  - 80 % were working and only 19% were unemployed or job-seekers. Nine out of ten of them were initially holding a qualification at most equivalent to level 4 of the NQF (17% without any initial formal vocational qualifications);
  - 57.6% were part of the age group which usually includes individuals with enough working experience aged between 30 and 50 years old;
  - Over 2/3 of the beneficiaries were women, as the awarded certifications are connected with the activities of the service provision sectors (which are more gender biased in favour of women).
- Secondly, according to the most requested type and level of certification in a decreasing order of importance:
  - 42.5% of the NQF Level 5 certifications such as the most requested BTS (the high technician certificate) with 29.3%;
  - 24.8% of the NQF Level 4 certifications such as the dominating professional Baccalaureate with 16.1%;
  - 15.1% of the NQF level 3 certifications such as CAP (the professional aptitude certificate) with 14.1%;
  - 10% of the NQF Level 6 such as the dominant “professional Bachelor's degree” with 8.1%;
  - 7% of certifications of the NQF Level 7 and 8 such as the “professional Master's degree”.

4.2 Performance in Terms of Ultimate Qualitative Impacts

In terms of its contribution to the achievement of its ultimate objectives and missions mentioned above (i.e., the second set of performance evaluation criteria), the “VAE” has many advantages for the VAE beneficiaries, for the organisation and the integration between formal and non formal learning (Dif, 2007; Dif, Hearud & Nkeng, 2009; Mathou 2019). First, concerning the socio-professional impact on the the individual beneficiaries, the “VAE” has many interdependent advantages, namely: (1)- the social recognition and promotion of work as means of access to lifelong learning and certification-based qualifications; (2)- the promotion of socio-professional mobility, where via a continuing validation of acquired experiential knowledge, skills and competences and access to further learning, the individuals are more able: (2a)- to improve the quality and the level of their formal qualifications and have ultimately more open possibilities for functional and promotional mobility; (2b)- to develop and diversify the portfolio of their skills and competences; (2c)- to adapt to changes in employment requirements and working conditions. Secondly, in connection with its impact on the educational and training as a whole, the VAE contributes to its professionalisation and bridging the link between formal, informal and non-formal learning through basically its following interdependent fundamental roles, namely: (1)- Widening the scope of diploma delivery modes, whereby the traditional formal educational and training activity is no longer the unique mode of accessibility to formal qualifications. As a result, the validation of prior acquired experiential informal and non-formal learning constitutes now the third pathway of accessibility to formal qualifications alongside with the formal initial vocational education and training (IVET, including apprenticeship) and the continuing vocational training (CVT) system; (2)- Establishing, consequently, a new

dynamic and more coherent relationship between occupational activities and formal modes of certification; (3)- Facilitating the creation of a real self-initiated and directed matching between vocational education and training, employment requirements and the individual's needs for vocational identity and career development; (4)- Development of a learning path-fluidity and complementarity within and between different components of the educational and training system as a whole. Thirdly, for the employer, the “VAE” regime constitutes a new external indicator for human resources evaluation and development within the organisation. It is more objective performance indicator than the traditional internal performance evaluation procedures. Through a process which combines both "occupational referential" and "certification referential" standards, the organisation can develop a system which allows for the identification of reliable criteria to be used in optimising its recruitment/training policy and career development schemes for its employees. Always as complementary tool for human resource development, a company may also undertake the piloting of a collective VAE project for a group of its individual employees targeting the same or different certifications connected with the field of its activity (Beaupère at al., 2020; Mathou, 2019).

However, in spite of all these identified roles of the regime in favour of beneficiary individuals, employers and the educational and training system as a whole, the VAE is still not a shortcoming free instrument in practice (Dif, 2007; Dif, Hearud & Nkeng, 2009). First, VAE is still not a "pure" inclusion system as only 17% of VAE candidates obtaining full validation in 2019, were not initially holding any formal qualification. This is in spite of the encouraging measures undertaken during the last decade such as: (a)- extending via the the 2014 Act of the 5th March, the VAE accessibility to individuals without formal vocational qualifications by taking into consideration, in addition to their prior experiential non-formal and informal learning, certain prior workplace training periods undertaken within the framework of VET and labour market inclusion instruments; (b)- reducing, via the 2016 Act of the 8th August, the required accessibility period of prior experiences from three to only one year. Secondly, it does not practically cover all the fields of work-related learning. Some highly institutionalised and powerful “corporatist-type of occupational identities” are still rigid and not open to the implementation of the VAE system. This case can be found, for instance, in the medical, paramedical and pharmaceutical sector.

5 Conclusions

This investigation into the development and role of the VAE in the French context, especially since its reform through the Social modernisation Act 2002 under the present acronym “VAE”, allows for underlining the following basic outcome and concluding points: First, the VAE candidates' access to the formally awarded qualifications referenced within the NQF directory (RNCP) has been observed to register an important development, especially since the launch of the implementation of the main reform undertaken within the framework of the 2002 Act, by allowing each year about 25,000 VAE candidates on average, to benefit from a full validation with an immediate access to certification. Secondly, the VAE has also been observed to contribute throughout its development especially during this period to contribute to the promotion of professionalisation and bridging the link between the formal learning tracks and experiential informal and non-formal world-wide learning namely through the following roles: (a)-widening the scope of certification delivery modes within a unique common ground formal qualification and certification framework; (b)-establishing a new dynamic and more coherent relationship between occupational activity and formal modes of certification awarding; (c)-contributing to a competence-based learning outcome curricular modularisation in VET and higher education; (d)- facilitating the creation of a real self-initiated and directed matching between vocational education and training, employment requirements and the individual's needs for occupational identity and career development; (e)-development of a learning path-fluidity and

complementarity within and between different components of the educational and training system as a whole and work related experiential learning; (f)-reinforcing the quality assurance and the formative dimensions via the VAE working in practice and the effective implementation of the procedural requirements embedded in the assessment and the validation process undertaken by the VAE jury. Thirdly, the VAE" has also been observed to constitute for the firm, a new external indicator for human resource performance evaluation and development.

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Boundary-Crossing – a Tool for Developing Vocational Education?

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Abstract

This paper investigates how students at vocational education establishments in Denmark move between their school and workplace as boundary crossers. Action research is used to explore the process of developing practices from the students' perspective. The topic is analysed based on documents, observations and focus group interviews. The analysis shows that developments in the workplace are connected to co-workers and that students become more pragmatic and realistic at the end of a course of study.

Keywords

boundary-crossing, VET, teacher education

1 Introduction

The title of this short paper is an indirect quote from a chapter written by Tuomi-Grön, Engeström & Young (2003) in the book `Between school and work: New perspectives on transfer and boundary-crossing´. The book discusses different theoretical perspectives on boundary-crossing and how further research and new approaches to work and school are needed to contribute to the development of vocational education. This paper aims to contribute to this by analysing data from an empirical study.

The starting point is a teacher-training course for vocational teachers within vocational education and training (VET) in Denmark. The students on the course must contribute to the development of practice. Students move between their school and workplace and have to show the ability to develop practice in VET. Challenges are addressed by theories using notions such as transfer, transition and boundary-crossing.

The study is based on empirical data from four vocational educational courses at a university college in Denmark: the bachelor´s degree in social education, the bachelor´s degree of education, the bachelor´s degree in nutrition and health and the diploma in vocational pedagogy. This diploma is the teacher education for teachers within VET. The structure of the courses varies, but all state in their formal policies and executive orders that development of practice is part of the study goals. Internship is integrated as part of the studies for the bachelor programmes, but at diploma level, students are (often) employed within VET colleges and attend the diploma course on a part-time study basis. Since we know little of the challenges faced from the students´ perspective, we will try to understand these as they relate to the students' positions between workplace and school. Hence, we wish to contribute to developing the pedagogy at

university colleges by gaining these types of insights. We ask: in what way do students develop vocational education as boundary crossers?

2 Boundary-Crossing

Boundary-crossing is the notion of the movement between school and work as two different contexts. However, over time, theories about the relationship between the two contexts has been developed (Tuomi-Gröhn & Engeström, 2003). The early approaches can be characterised as a group of theories where "the notions of transfer is based on the transition of knowledge used in one task to solve another task" (Tuomi-Gröhn & Engeström, 2003, p. 33). Thorndike develops the theory of `identical elements´ and later, Judd contributes with the theory of `general principles´. In newer literature, there are theories that have a cognitive focus or different perspectives on the people involved. Two other theories are well known in VET research. They both focus on the social context instead of the person. The first is Wenger´s theory.

Wenger (1999) finds that "communities of practice are everywhere" (Wenger, 1999, p. 6). However, this definition is not very precise. He explains that in his social theory of learning the social system, there are shared resources "by which groups organize and coordinate their activities, mutual relationship, and interpretations of the world" (Wenger, 1999, p. 13). A `broker´ establishes the connection between different communities of practices. Brokering is "connections provided by people who can introduce elements of one practice into another" (Wenger, 1999, p. 105). Practices can be connected in different ways. One is by `boundary objects´ that he defines as "artefacts, documents, terms, concepts, and other forms of reification around which communities of practice can organize their interconnections" (Wenger, 1999, p. 105). In this theory, development is understood in the light of the individual placed in the social context. Learning is social and a person can have different positions in the community of practice. This can change over time. The notions of 'newcomer' and 'legitimate periphery participation' indicate these types of different positions.

The next theory is Engeström's third generation of cultural-historical activity theory. This also sees learning as taking place in a culture. In this theory, boundary crossing is connected to a third object where two interacting activity systems move from "a collectively meaningful object constructed by the activity system (..) to a potentially shared or jointly constructed object" (Engeström, 2001, p. 136). The actors participate from different positions and hence, there is multi-expression. Learning takes place as a collective process in places like 'boundary crossing laboratories', for example, where the object is analysed. For Engeström contradictions are important in the process of developing new models. Learning and development form a horizontal process and "constructs a complementary perspective rather than moving to a higher level as a vertical process" (Engeström, 2001, p. 153).

Akkerman and Bakker (2012) states in a review that the theories of Wenger and Engeström are important, and they unite different perspectives of the notion of boundary-crossing. They write, "A boundary can be seen as a sociocultural difference leading to discontinuity in action or interaction. Boundaries simultaneously suggest a sameness and continuity in the sense that within discontinuity, two or more sites are relevant to one another in a particular way" (Akkerman & Bakker, 2012, p. 131). They criticise the fact that "Many studies seem to use the term boundaries when discontinuities are expected rather than empirically detected. This can lead to a problematic conceptualization of boundaries, namely one that completely resides in the existence of sociocultural differences" (Akkerman & Bakker, 2012, p. 152). Understanding the relation between contexts in this way means that boundary crossing "refers to a person's transitions and interactions", and "boundary objects refer to artefacts doing the crossing by fulfilling a bridging function" (Akkerman & Bakker, 2012, p. 132). The actor crossing boundaries is placed in what they call a "sandwich effect" since the actor represents both contexts and the perspectives in these contexts (Akkerman & Bakker, 2012, p. 150). In their review, they find

that different terms such as identification, coordination, reflection, and transformation are used in a very similar way to learning. Hence, learning is "a process of establishing continuity in a situation of sociocultural difference" (Akkerman & Bakker, 2012, p. 152).

Guile and Young have some other important perspectives. They point out that knowledge can be understood in different ways in vocational education (Guile & Young, 2003). Furthermore, the school is dealing with a curriculum, which is not the case for the workplace. Therefore, the relation between the workplace and school is important as quoted at the beginning of this paper. The authors find that if students have to become boundary-crossers "teachers will need to give greater attention supporting students in relating the `situated´ knowledge of workplaces to the `codified´ knowledge of the curriculum" (Guile & Young, 2003, p. 80). Hence, the authors show the importance of processes while moving between two different contexts.

Heggen (2008) also finds that the processes are important and that the school must qualify students to become boundary-crossers. This qualification is a dynamic process related to the students´ biography. Therefore, he combines an individual perspective with a sociocultural-situated perspective. Hence, personal knowledge needs attention since learning is a lifelong process.

Summing up, the theoretical perspectives on boundary crossing differ. A vertical perspective is needed since educations at different levels contribute to ongoing knowledge building where students following each course must learn the knowledge defined in the curriculum. However, there is also a horizontal perspective when moving between the school and workplace. When students must contribute to development in the workplace, different actors in the social-cultural context play a key role in defining the possibilities and obstacles for the student who is learning as a person and as a part of the learning community.

The school and workplace are different contexts with different perspectives on knowledge and action. While crossing boarders, the actors can be brokers and boundary-crossers. Wenger talks of different connections. However, as said by Engeström, the actors in the contexts can collaborate and construct a third object. Therefore, such a dynamic process might lead to learning. Learning can, in this way, be expanded by using laboratories and as stated by Wenger, the role in the community is important. However, the notion of a community of practice is not very well defined.

From the early theories of transfer up to contributions by Guile and Young (2003) and Heggen (2008), the students are given different potentials and challenges related to their action and development. As stated by Akkerman and Bakker (2012), students are in a sandwich position between contexts – this might be more complex than being a broker. Therefore, a broad learning perspective might be important without neglecting the cognitive approach, biographical approach and sociocultural approach. We use this broad perspective in the inductive analyses that are divided into three paragraphs. The first paragraph focuses on development, the next on workplace and school as different contexts and the last on the actors in the workplace.

3 Method

The study is based on empirical data from four vocational educational courses at a university college in Denmark: the bachelor´s degree in social education, the bachelor´s degree in education, the bachelor´s degree in nutrition and health and the diploma in vocational pedagogy.

In these programmes, students alternate between formal education at a university college and professional practice in a workplace. The students are obliged to train in and reflect on the development of practice. As part of the three bachelor programmes, the students are at different workplaces during the course, but for the diploma, they are (often) employed at a VET school and attend the course part-time as part of their job. However, the design of the study is quite similar in all courses, although participation is integrated in a redesigned programme for the diploma students.

The methodological approach is action research striving to facilitate development, learning and change in the workplace. From a democratic and participatory perspective, a process is chosen that focuses on both student-to-student communication and teacher-to-student communication, as well as the relationship between these (Madsen, 2009). This approach gives access to knowledge of the students´ processes and reflections.

Students taking part in each programme are invited to participate. They are informed of the objective of the study and the obligations if they choose to participate. As part of the bachelor´s degree in social education and in nutrition and health they are invited to participate in extra-curricular activities involving reflective dialogue. As part of the bachelor´s degree in education, the reflexive dialogues are integrated into the ordinary lessons.

As part of the diploma, participation involves a full-scale change in the type of teaching. All students attending a final module were invited to participate, but only four chose to take part in the study. The module started in August 2020, ended in December 2020 and included four days, each with five hours of teaching from 9 am to 2 pm. The ordinary module and the research module were separate. In the research, teaching and guidance were integrated – focusing on student actions and development within VET. The students had access to online material, with short oral presentations building on ideas of blended learning. The students´ questions and comments were the starting point for teacher presentations in lessons. The lessons also included reflective dialogue focusing on one student at the time. Other students facilitated and mirrored the reflections of the student in the "hot chair". The teacher who was also a researcher in the project took part in these sessions. Another researcher in the research project observed the lessons. The observer took field notes and the teacher made notes later on as a participating observer (Gold, 1958). As part of the bachelor programmes, field notes were taken during the four sessions of reflexive dialogue. As part of the bachelor´s degree in social education, this took place in autumn 2020, while the other programs started in 2021.

After the oral exam, the students took part in a focus-group interview lasting about one hour (Barbour, 2007). The semi-structured interview was transcribed (Bloor, 2001). At the bachelor´s degree in social education, the interview with three students was carried out online due to the coronavirus crisis. One student was not able to participate in the online focus group interview and was therefore interviewed separately. Interviews were also conducted as part of the other bachelor programmes, but this paper only presents results from the diploma and the social education bachelor's programme. The analytic approach combines an inductive and a theory-inspired approach. The analysis of the processes is based on the field notes from the observations, since they contribute to insights in the processes the students were going through. The written papers are read as documents, with the knowledge that these focus on goals and assessment within the school. The focus group interviews are more reflective, looking back at the processes now knowing that the exams have been passed. The paper shows how development has taken place as seen from the students´ perspectives.

3.1 The Programmes

The diploma is the mandatory teacher education within VET in Denmark. The programme entails 60 ECTS and the last module has 15 ECTS. The assignment combines a final thesis and an oral examination. The study involved part-time students who were employed in VET or related professions. This teacher training course for vocational teachers within vocational education and training (VET) must contribute to the development of practice. This is also the case at other higher education establishments and at university colleges in Denmark.

As part of the bachelor programmes, students move between schools and workplaces and must show the ability to develop practice during an internship. The students taking part in the bachelor´s degree in social education take three and a half years to complete the course and the students in the research project are in their final year, which is when they have to pass the last

internship. Students are evaluated at the end of the internship and have to pass an assignment based on an essay submitted and an oral examination. After this, they write their final thesis.

4 Findings

The findings are presented in three paragraphs. The first is about development in the workplace showing how different students initiate and take part in development in different ways. The second is on the importance of the school and workplace as two different contexts to show a variation as time goes by and the assessment is getting closer. The third focuses on the central actors in the workplace that can support or challenge the intended development.

4.1 Development in the Workplace

Two of the students on the diploma course have initiated new practices in their teaching as part of VET. They have been able to design this and find time to try out the initiatives. One student has taken several initiatives in her teaching in different VET programmes offering the same subject. The different programmes reflect a variation in the pupils´ ages and vocational experience. The student did not have a systematic design but developed a process during time using the existing opportunities. Another student has developed new initiatives by working closely together with a colleague. The two other students had a vison to change the ways of doing things in the organisation. One of the first-mentioned students has also made small changes but the student's ambitions are not clearly formulated and it seems more as if the initiatives succeed in gaining a broader perspective by chance. Change depends on other internal or external actors in the school and barriers are seen during the process.

Such barriers for change are also seen in the bachelor's programme. Some of the students want to change practice because they dissociate with the actions they observe in the internship. Their ideas are developed as a process during internship. Other students want to initiate activities based on knowledge learned at school. Such intensions are based on codified or personal knowledge, but students from the diploma are also concerned about problems they have met within the workplace and already know.

Summing up, choosing a development project has different starting points for the bachelor students and diploma students. However, they are all in a boundary setting where they have to play the role as brokers to implement their ideas. Diploma students initiate new practices or have visions for change in the workplace they already know. Bachelor students depend on opportunities in the new internship they find themselves in.

4.2 Workplace and School as Different Contexts

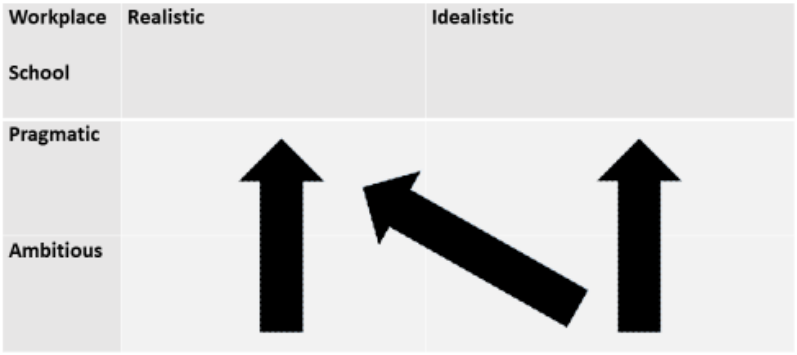
Field notes show how all the students´ perspectives vary from the beginning to the examination stage. Most of them are ambitious at the beginning of the module and they are concerned with getting good grades. Therefore, they are aware of the importance of choosing the right focus for development in the workplace. No students start in a pragmatic position where they explicitly mention limitations such as time, resources or cognitive-related problems and challenges.
Some students - as mentioned above - have a kind of vision. They want to change things in a radical way. This involves or has consequences for other actors, e.g., co-workers and managers. Often, the student's drive is to improve the conditions for pupils within VET (at the diploma level) or vulnerable citizens in different kinds of institutions (as part of the bachelor programme). We name this type of student as the idealist (see table 1). Another position taken by the students is to look at what is actually possible in the workplace. Students want to make changes going in this direction. They do not intend to realise the vision at full scale but hope the development will go in the direction of their vision. Some students do not express visions.

They want to do a good job within the framework of their tasks and obligations at work or internship. We call these students realistic.

Table 1 sums up the positions found in the data. Students can be realistic or idealistic about change at the workplace. At school, students can be ambitious in wanting high grades or pragmatic by focusing on what is possible according to different kinds of resources. During the time of the study, when getting to the deadline for handing in their essays and finishing their internship, they move from their initial position. This is illustrated in table 1. The arrows show the movements we have seen. Students starting at the ambitious-idealistic position move against a more pragmatic position. For some it involves a more realistic position in the workplace. For students starting in an ambitious-realistic position, they move in the direction of a more pragmatic position at school.

Table 1

Students' positions in relation to development at the workplace and school. The arrows indicate the movement during the time of study.



It might seem understandable that students attain more realistic and pragmatic positions over time. However, one could ask if this shift could be seen as related to supervisors, managers, and co-workers in the workplace. This is the theme for the next section. All the students find the learning process hard to go through at a personal level, so students might benefit from getting support in the workplace in this process.

Summing up, the data indicates that as boarder-crossers, students adjust to what seems to be the most important element. This can be conditions either at the workplace or in school, but since the bachelor students must pass in both contexts and the students taking the diploma are employed, the contexts can play different roles. However, the students taking the diploma have limited time as they must often juggle both a family and a job. The students taking part in the bachelor programme also have families, but they are students who will have to apply for a job in the near future. Having stressed these differences between students at the diploma and bachelor levels, we will now take a closer look at the actors from the workplaces mentioned by students.

4.3 Actors in the Workplace

The study process for students at the diploma level shows different patterns concerning actors mentioned during the reflective dialogues. Two students do not mention any at the beginning of the four meetings, but one mentions a co-worker during the third meeting. The paper from the exam shows that colleagues are involved in the processes. This is either during shared teaching in a class or as partners in discussions and reflections about the subject.

For the other two students, actors outside the workplace seem important in the beginning. One is discussing policy and the other wants a dialogue with actors at workplaces where pupils

are placed as part of internships. To do so, she needs to gain acceptance from a manager, which might be problematic. For the aforementioned two students, access to actors and structures seems to be a barrier. At the end of the process, they have both succeeded in making contact and minimising barriers for achieving their goals, getting closer to what they mentioned as visions. They end up being involved in development activities at the workplace.

As part of the bachelor programme, the four students find barriers in the workplaces when it comes to implementing their intended development project. These are related to co-workers, their ways of addressing the clients or ways of implementing different treatments. Some of these barriers seem nearly impossible to overcome in the beginning of the process, but over time, they scale down their plans and ambitions to be able to make some progress. They are concerned with passing the internship. They are also annoyed with the contradictions of knowledge from school and knowledge at work. Students are discussing and questioning their own future in the profession. However, some of them hope that the initiated development project will continue.

Summing up, the students participating in the bachelor programme find challenges in the workplace related to actors, actions and knowledge. Since they must pass exams, they adjust their development projects. They are well aware of the demands from the school and of having to write an essay and pass. They are also concerned with being judged by co-workers at work and the chances of passing their internship. Using Akkerman and Bakkers phrase, they appear to be in a sandwich roll. Students studying for the diploma do not discuss the profession and their own professionalism in the same way. They are mainly concerned about the final thesis and the oral assessment, but they all seem happy about having started processes in their workplace. They express their intentions of carrying out these processes in the focus group interview.

5 Conclusion

The research question we asked was in what ways do students as boundary crossers develop vocational education. The findings are that this depends on the context in the workplace and that co-workers play an important role in this. Some co-workers in the diploma take part in the development process and during time, the students find a way to connect with external or internal actors. This gives some opportunity of hanging onto a vision. However, time and resources make them more pragmatic. From the beginning, their development projects are concerned with work-related problems.

Students participating in the bachelor programme are in a sandwich position and have to pass exams related to internship and the curriculum. Their starting point is codified knowledge and co-workers are often connected with barriers to implementing the development project. Like the students completing the diploma, they move from ambitious and realistic positions towards pragmatic positions. However, they become disillusioned about the profession, questioning their own belonging in this context. They do develop, but on a smaller scale and in different ways than they intended. Students taking part in the diploma find a kind of development track that they intend to carry out.

As shown by Akkerman and Bakker (2012), Guile and Young (2003) and Heggen (2008), boundary-crossing is vertical and horizontal. It is related to cognition, the students biography and the social context. Hence, students as boundary crossers develop vocational education, but the development process relates to the context and the co-worker as actors. Our main conclusion is that the eight students showed different patterns and that they started out in one position, but during the process they moved towards pragmatic and realistic positions. Some find a track for development in the future while some question the profession and their future in this.

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Bridging Vocational with Upper Secondary and Higher Education: International Developments

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Abstract

Bridging between vocational education with upper secondary education and higher education is increasing worldwide. Based on a completed study with eight case studies, we were able to observe a total of four trends, which on the one hand all create bridges between the educational sectors, but on the other hand also differ significantly. These trends are namely upgrading vocational education and training (VET) to the level of higher education, combining VET and a higher education entrance qualification, higher education combined with learning at VET schools, as well as higher education combined with working in companies. In this article, these four trends are described with examples from Germany, Austria, the Netherlands, and Australia, and theoretically classified using the neo-institutionalist concepts of "path dependency" and "myth".

Keywords

relation between vocational and higher education, permeability, international comparison, neo-institutionalism, path dependency, myth

1 Introduction

The historical gap between vocational education and training (VET) and upper secondary as well as higher education is shrinking. Around the world, it can be observed that elements for bridging the gap were or are about to be implemented: vocational education at the level of higher education, combined forms of vocational education and university entrance qualifications, apprenticeships up to the Master's level, and modularised vocational training that can be partially recognised towards a university degree are signs of a fundamental change. The historically differentiated subsystems of vocational, upper secondary, and higher education cannot (or no longer) be distinguished clearly (cf. for the whole paragraph Frommberger & Schmees, 2020, p. 375).

Our paper draws on the results of a project where eight case studies were analysed (cf. Frommberger, 2019b), in which models for bridging vocational and upper secondary education as well as vocational and higher education were analysed. The study participants selected elements in different education systems that can be, in a way, regarded as best practices for increasing permeability between the different sectors of education. As a result, the Australian

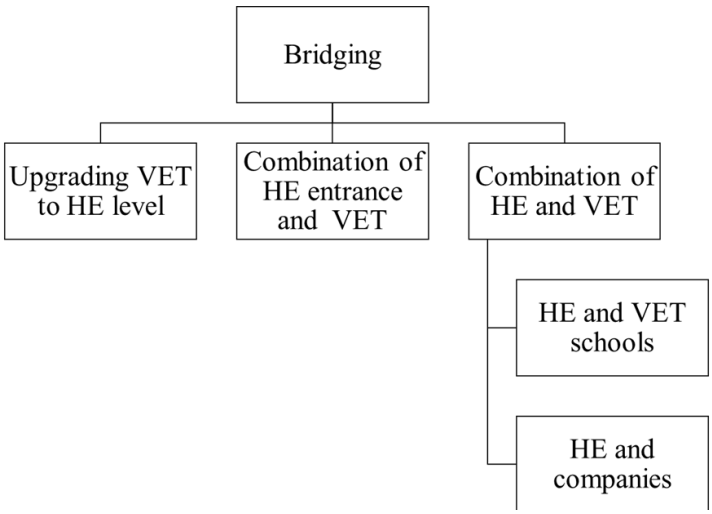
qualification framework (Schmees et al., 2019a), higher VET in Austria (Frommberger & Schmees, 2019a), co-operative education in Canada (Deißinger, 2019), the higher apprenticeship in England (Schmees et al., 2019b), the dual study programmes in Germany (Frommberger, 2019a), the permeability agenda of the Netherlands (Busse 2019), the qualification framework in conjunction with the credit point system and modularised VET in Scotland (Pilz, 2019), and the vocational baccalaureate and higher VET in Switzerland (Frommberger & Schmees, 2019b) were selected.

Out of these eight case studies, four different trends can be derived: (1) upgrading VET by e.g. mapping vocational qualifications alongside higher education qualifications within a national qualification framework, (2) developing hybrid qualifications to combine VET with a higher education entrance by an additional test or permissions to the VET qualification, (3) hybrid qualifications for linking VET and higher education in a way that higher education institutions collaborate (a) with (higher) VET schools or (b) with companies—both implemented subsequently or in parallel (cf. Frommberger, 2019, further developed in Frommberger & Schmees, forthcoming).

The conceptual framework is presented in the following section (section 2). Subsequently, four concrete examples out of the above-mentioned case studies, namely those from Germany, Austria, the Netherlands, and Australia, are presented linking the empirical findings with the theory (section 3). At the end, we give an outlook for future applications of the developed framework (section 4).

Figure 1

Trends for bridging vocational and upper secondary as well as higher education



2 Theory[1]

From a theoretical point of view, these above-mentioned developments can be explained using neo-institutionalist theory. Assumptions about institutions, which are understood as relatively stable structures of expectation whose validity is assumed *per se* and remains unquestioned (cf. Krücken, 2005, p. 5), serve as a fundamental theoretical building block. Within neo-institutionalism, three (cf. Hall & Taylor, 1996) or four (cf. Schmidt, 2010) currents can be distinguished, each of which explains the emergence of institutions differently. To explain the new forms of re-combinations between vocational and higher and upper secondary education, the myth

[1] The version in this article is based on Frommberger and Schmees (2020, pp. 375–377). There, an extended version in German can be found.

concept from sociological neo-institutionalism and the concept of path dependency from historical neo-institutionalism are used.

In sociological neo-institutionalism, which is particularly suitable for explaining globally diffusing reform ideas, the myth concept describes an "assumed causal connection" (Koch, 2009, p. 113). Therefore, the dissolution of formerly separate educational sub-sectors outlined here can be interpreted as a response to two internationally circulating demands, according to which the number of university graduates must be increased (e.g., BKR, 19.01.2015) and equal opportunities in or permeability between education systems must be guaranteed (e.g., OECD, 2018, pp. 145–148). Bridging the gap between educational sub-sectors provides a solution to both demands. The assumed causal connection is that the convergence of the education sectors actually fulfils the desired consequences of more students and a more permeable education system. The political implementation of the convergence is based on the assumed effects and is therefore usually interpreted as a necessary, legitimate, and rational decision. The more countries implementing these reforms, the more necessary, more legitimate, and more rational the decision becomes for the remaining countries.

If one follows this implied explanation, identical reforms should be observed in all education systems worldwide. However, the responses of national education policies differ from each other. The influences of the internationally raised demands are thus limited, because the concrete design of the solution on the ground depends on several factors, which are also, and above all, dependent on the prevailing historical contexts, which differ from one another. The concept of path dependency (cf. Hall & Taylor, 1996, p. 954), borrowed from historical institutionalism, can be used to explain these differences. Accordingly, reforms of any kind necessarily build on what already exists and can only be understood as further developments of it (cf. Zohlnhöfer, 2008, pp. 163–164).

3 Case Studies

In the following, we present four case studies on Germany (Frommberger, 2019a), Austria (Frommberger & Schmees, 2019a), the Netherlands (Busse, 2019), and Australia (Schmees et al., 2019a). However, additional resources were also considered.

3.1 Upgrading VET in Germany

The reformed German Vocational Training Act ("Berufsbildungsgesetz"), which essentially regulates the company-based training of dual apprenticeships, and which appeared in its current version as of 2020, provides a separate so-called higher-qualifying vocational training. It offers three distinctly differentiated levels of further training that correspond to qualification levels 5, 6, and 7 of the European qualification framework.

The first advanced training level is thus called "Certified Occupational Specialist for X" ("Berufsspezialist") where X stands for the vocation. The prerequisite is the completion of initial vocational training. At this level, which correlates to a minimum of 400 hours, skills, knowledge, and abilities from initial vocational training are to be both deepened and supplemented. The further training at the first level should lead to a qualification at the second level.

The second level of further education is called "Bachelor Professional". The prerequisite is either the completion of initial vocational training or the completion of the first level of further education. The second stage, which requires at least 1,200 hours of training, focuses not only on technical but also on leadership skills. The aim is to prove that management processes of organisations can be controlled and carried out independently and that employees can be managed.

The third level of further education is called "Master Professional". As a rule, the prerequisite is a qualification at the second level. The third level, which requires at least 1,600 hours, provides for the deepening of skills, knowledge, and abilities from the second level, as well as

those required for the responsible management of organisations or for dealing with new, complex tasks and problems such as the development of processes and products.

It is important to emphasise that the new designations—depending on the legal situation—may also be accompanied by other designations. For example, in many areas it will still be customary to use the title "master craftsman" ("Meister") instead of the title "Bachelor Professional". Furthermore, adapting the designation and suggesting a proximity to academic degrees does not facilitate the transition to higher education. This is because despite the linguistic proximity to a Bachelor of Science, Bachelor of Arts, or Bachelor of Education, it is not possible to progress to an academic Master having a Bachelor Professional. To date, there are no changes in the content of these higher vocational education programmes aimed at higher education. This is a formal upgrading of existing degrees exclusively.

The linguistic alignment or establishment of a higher-qualifying vocational training segment with three levels does not result in any increase of permeability in practice. In addition, it must be stated that the further education levels only apply to those programmes regulated under the Vocational Training Act. Further education and training programmes in the health sector that are regulated by federal laws (such as midwifery) or those that are regulated by the school laws of the states do not generally fall within the logic presented here. However, these further training courses are also classified in the German qualifications framework along the levels 5, 6, and 7.

3.2 Combining VET and Higher Education Entrance in Austria

The Austrian VET system is characterised by its "dualistic structure" (Lassnig, 2011, p. 417) where full-time school-based VET stands alongside dual apprenticeships. The full-time school-based VET system consists of "VET schools" ("berufsbildende mittlere Schulen", BMS) and "VET colleges" ("berufsbildende höhere Schulen", BHS). The dual apprenticeship system is called "Lehre" in Austria.

From all three paths, it is possible to combine the VET qualification with an access to higher education. Two examinations in particular are central for this purpose. The "Berufsreifeprüfung", which enables the transition from the BMS as well as the apprenticeship into the higher education sector, and the "Reife- und Diplomprüfung", which opens up the possibility of higher education studies for students of the BHS. These two options, notwithstanding numerous other possible transitions, for example from BMS to the higher education sector (cf. Dorninger & Gramlinger, 2019, pp. 87–88), are presented below due to their importance on the one hand and due to their direct link to higher education on the other hand.

The "Berufsreifeprüfung" is an option for students of the BMS as well as dual apprenticeship trainees to gain general access to higher education. Both training programmes conclude with a qualification that is classified at level 4 in the European qualifications framework (cf. Dorninger & Gramlinger, 2019, p. 86).

It consists of four partial examinations: German, mathematics, a foreign language, and a vocational specialisation (cf. Frommberger & Schmees, 2019, p. 2). The preparatory courses for the "Berufsreifeprüfung" take place at very different institutions, partly also at VET schools (cf. Dorninger & Gramlinger, 2019, p. 5).

The "Berufsreifeprüfung", which was established in the 1990s, was closely related to the introduction of the University of Applied Sciences sector in Austria: it was intended to open up an alternative path from VET to higher education and thus increase the attractiveness of VET (cf. Frommberger & Schmees, 2019, p. 5). As for the dual apprenticeship, it can be stated that its status suffered from the reputation of the school-based VET, particularly the BHS (cf. Dorninger & Gramlinger, 2019, pp. 80–81).

Especially for apprenticeships, the "Berufsreifeprüfung" offers a variety of options. It is possible to take the examination after the apprenticeship, for example, in order to follow up

with a higher degree programme. This option is also available for graduates of the BMS. In addition, there is also the possibility to complete the apprenticeship and the "Berufsreifeprüfung" in parallel. The parallel track ("Lehre mit Matura") is particularly relevant as it allows the combination of the dual apprenticeship with a higher education entrance exam without loss of time. For the integrated model, the approval of the training company is required, as the trainee is released from work for the expenses incurred, while also an extension of the training period is also possible (cf. Frommberger & Schmees, 2019, p. 2).

Through the BHS, it is possible to directly enter higher education. After a period of five years the students will take the so-called "Reife- und Diplomprüfung" which allows the access to higher education and is also recognised as a vocational degree at level 5 of the European qualification framework (cf. Dorninger & Gramlinger, 2019, p. 86), which is to be recognised as a tertiary degree. As the name already makes clear, it is a double examination: The diploma examination is possible in the engineering, commerce, care work ("Humanberufe"), agriculture and forestry, as well as elementary pedagogical fields (cf. Dorninger & Gramlinger, 2019, pp. 82–83). The "Reifeprüfung" is the guarantee for university entrance. Since May 2016, the "Reifeprüfung" at BHS has been standardised in the examination subjects German, English (or foreign language currently in use), and applied mathematics (cf. Dorninger & Gramlinger, 2019, pp. 83). After the "Reife- und Diplomprüfung" is passed, graduates have completed 13 school levels by the age of 19 and the highest possible vocational recognition possible in Europe after this period of education and training (cf. Dorninger & Gramlinger, 2019, pp. 86).

All in all, the two examinations discussed here are examples of possible transitions and links between VET and an access qualification to higher education. A special feature for the case of Austria is that the bridging applies to all higher education institutions including universities. Particularly noteworthy are the transitions via "Lehre mit Matura" and the "Reife- und Diplomprüfung", as here a vocational qualification and a higher education entrance qualification are acquired in parallel.

3.3 Hybrid Qualifications for Linking VET Schools and Higher Education in the Netherlands

The vocational education and training system in the Netherlands provides for four levels of vocational qualification in the secondary vocational education ("middelbaar beroepsonderwijs", MBO), which can be approached successively or directly. Higher vocational education ("hoger beroepsonderwijs", HBO) is assigned to the tertiary sector of the education system. However, it has strong links to the MBO. Graduates of level 4 of the MBO are entitled to access the HBO without an additional exam (cf. for the whole paragraph Busse et al., 2016, p. 95). This system offers a seamless transition to higher education. To avoid challenges within the transition from MBO to HBO, numerous projects have been launched in recent years to build bridges between the systems. Within three of these projects in particular, the cooperation between VET schools and the HBO is particularly relevant and therefore discussed here.

In the Netherlands, in addition to recognition programmes between regional vocational training centres and higher education institutions, there are also bridging programmes in which there is increased cooperation between vocational schools and higher education institutions. In addition, VET centres and higher education institutions work closely together within the framework of associate degree programmes. These three options are presented below.

In principle, recognition of achievements from the MBO in the HBO is possible with the aim of shortening the study period. However, the discretionary scope for recognition lies exclusively with the higher education institution. There are great local differences (cf. for the whole paragraph Busse et al., 2016, pp. 68–69). This method is least standardised and entirely ruled by the higher education institution of the HBO.

Reductions in study time can also be achieved through so-called bridging programmes, which are formally established and offered to students at level 3 and level 4 in the regional VET centres. The cooperation agreements between the centres and the higher education institutions make it possible to offer programmes to shorten study time already during vocational education and training. Some of the bridging programmes already take place at the university of applied sciences itself. As an example, for technical subjects the bridging programme includes additional courses in mathematics and physics (cf. for the whole paragraph Busse, 2019, p. 7).

Below the Bachelor's degree in the HBO, a so-called associate degree was introduced, which can be used either as a separate degree or as its intermediate examination towards the Bachelor's degree. Specifically, this is a two-year course of study at the end of which a certificate is awarded. A subsequent Bachelor's degree would take another two years. The degree was tested in a pilot project from 2005 to 2011 and has been part of the Dutch higher education system since 2013. What is special about the degree is that the associate degrees, which are recognised as higher education degrees, can be offered under the joint responsibility of the MBO and the HBO. Accordingly, the course of study can take place both at the vocational training centre and at the university (cf. for the whole paragraph Busse, 2019, p. 8).

The three examples of transitions show indirect or direct possibilities of cooperation between vocational schools and institutions of higher education. The associate degree is particularly noteworthy, as a tertiary level degree is partly provided by an institution that is assigned to the upper secondary level.

3.4 Hybrid Qualifications for Linking Companies and Higher Education in Australia

Australian Apprenticeships are offered continuously up to the tertiary level, whereby those at higher education levels are also referred to as Higher Apprenticeships. In this context, Australian Apprenticeships are not necessarily an initial training opportunity for young people, but are also gaining in importance as further training (cf. Dumbrell & Smith, 2013, p. 162, as cited in Deißinger et al., 2017, p. 81). A characteristic feature of Australian Apprenticeships is the contractually defined training programme in which nationally recognised vocational qualifications are achieved in accordance with the Australian Qualification Framework (AQF) – the contracting parties are, in addition to the apprentice, a company and a registered training organisation (RTO) such as a technical and further education (TAFE) college (cf. Deißinger et al., 2017, p. 80).

Australian Apprenticeships are usually offered as Certificate II, III, or IV. These certificates each form distinct levels in the AQF. In total, the AQF has 10 levels, with the arrangement of vocational and higher education qualifications being relatively separate. Vocational qualifications determine the lower four levels (Certificate I to Certificate IV) and higher education qualifications the upper four levels (Bachelor's degree up to the Higher Doctoral degree). Only the levels 5 and 6 overlap and cannot be directly associated with one of the education sectors: On the one hand, the vocational diplomas Diploma and Advanced Diploma are classified here, which both can be acquired in both the vocational and higher education sectors (cf. Deißinger et al., 2017, p. 43). Furthermore, the academically oriented associate degree is also classified at level 6. It is precisely this area that is crucial for the establishment of the Higher Apprenticeship.

The Australian apprenticeship system extends from Certificate II, to Certificate III and IV, to the Diploma and the Advanced Diploma, thus covering a total of five of the ten levels of the AQF. Accordingly, Higher Apprenticeships are defined as a "program of structured on-the-job training with formal study, with the study component leading to the award of a VET qualification at the Australian Qualifications Framework level 5 (Diploma) or level 6 (Advanced Diploma)" (Commonwealth of Australia & States and Territories, 2018, p. 12). The Higher Apprenticeship is to be distinguished from alternative pathways that open up from the Apprenticeship system but are not themselves Apprenticeships in the sense described above (cf. NCVER,

2019, p. 9). Rather, these are programmes in which employment in a company is already expected or is integrated into the educational programme in the form of practical phases. These two options will be briefly presented below.

The Higher Apprenticeship can be offered as a Diploma at level 5 or as an Advanced Diploma at level 6 of the AQF. Like regular Apprenticeships, a contract is entered into between three parties and the apprentice is given a contract of employment. The application is usually made to a company. A special alternative is an employment with a Group Training Organisation, which takes the apprentice under contract, but carries out the actual apprenticeship with a host company.[2] The cooperation then takes place between the RTOs and the participating companies.

The second option is educational programmes, which are also part of the Apprenticeship Pathways, but do not themselves meet the above definition of Apprenticeships. In concrete terms, apprentices usually attend an educational programme at an RTO only, within which practical phases are integrated or which already presupposes employment with a company. The direct transitions from the classic apprenticeship system result in pathways that lead to the Advanced Diploma and can be completed exclusively in the vocational training sector.[3]

In summary, it can be stated that cooperation between companies and institutions in the tertiary sector is established in the Australian system. This can either be in the form of a formal cooperation within the framework of a higher apprenticeship, or in the form of an integrated cooperation in which the education provider interacts directly with the practice partner. The former option still appears to be a marginal solution in the Australian education system (cf. NCVER, 2019).

4 Conclusion

The starting point of our analysis was observations that four different trends can be observed that are supposed to bridge the gap between vocational education on the one hand and upper secondary as well as higher education on the other hand. Four examples from different countries were presented to support these claims: The upgrading of vocational education and training in Germany, the double qualifications in Austria, the cooperation between universities and vocational schools in the Netherlands, and the cooperation between universities and companies in Australia.

Theoretically, these developments can be explained both with the myth concept from sociological institutionalism and with the concept of path dependency from historical institutionalism. While a basic trend can be observed, the manifestations differ from country to country. It should be noted, however, that not every country implements only one of these trends. In Germany, for example, the dual study programme ("Duales Studium") is a system in which universities cooperate with companies as well. But it is also true that not every country has only one VET system. The three forms of training according to Greinert (2004), namely the dual, full-time school-based and the purely company-based training model, can be observed in almost all countries. Accordingly, it would be a question to be clarified whether the trends discussed here are concentrated in certain vocational education and training systems. These studies would also provide clues to explaining the facts presented here.

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[2] https://www.aapathways.com.au/job-hunting/finding-jobs?gclid=EAIaIQobChMIp9XN39qb8gIVSrrVCh2u0gGmEAAYAyAAEgLbSfD_BwE

[3] https://www.aapathways.com.au/job-pathways/chart/community-services-chc/ee3680a3-5ef7-41cc-b981-51784e5422e6). This can be exemplified by the occupation of XX

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How Researchers use the Academic Publication System for Research Communication – Results from the Research Project "Open Access in Vocational Education and Training Research"

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Abstract

Context: The research project "Open Access in Vocational Education and Training Research" investigates the significance of the Open Access (OA) publication model from the perspective of authors in vocational education and training (VET) research.
Methods: The research project combines group discussions and an online survey to explore conditions for the use, acceptance and dissemination of OA among VET authors.
Findings: First results from the project indicate that respondents prefer to disseminate their publications digitally and free of charge. Respondents also attach particular importance to digital and permanent access to literature, both with regard to the dissemination of their research and the use of publications for their academic work. Major selection criteria identified by respondents when using literature as readers are reputation, academic rigour and direct availability of publications. Only a third state that they search specifically for OA publications. Just over half of the respondents also do not notice whether the literature they access online is available OA. The majority of respondents find that they do not receive less recognition for their digital publications than they do for their printed works. Moreover, less than half agree with the statement that printed works symbolise a higher value than digital publications.
Conclusions: The article shows that the visibility of OA in the community of VET researchers can still be increased. The results of the research project provide several possible approaches to address this task.

Keywords

open Access, vocational education and training research, VET, academic publication system

1 The "Open Access in Vocational Education and Training Research" Project

The research project "Open Access in Vocational Education and Training Research" explores the following research question: Which technical and structural, policy-related and normative conditions, as well as conditions inherent in the academic research system influence the acceptance, dissemination and use of Open Access (OA)?

Acceptance means that authors understand, approve of and support the OA publication model by publishing OA. *Dissemination* refers to the various models used for OA publications (e.g., green OA, gold OA). *Use* means that authors use OA publications for their own academic research (even if they view the OA model critically). *Technical and structural conditions* include factors such as storage, archiving, distribution and findability of OA publications, e.g. through online repositories. *Policy-related and normative conditions* concern legal foundations of OA and licences, such as Creative Commons licences. *Conditions inherent in the academic research system* describe quality assurance processes, e.g., academic peer review and the academic reputation system.

OA is not a uniform concept. Within the scope of this research project, however, OA relates to three essential aspects. Access to academic literature should be free of charge, licensing should offer the maximum degree of openness and OA publications should be as easy to find as possible. The project draws on an analysis of existing research related to OA. In addition, it is based on a sociology of knowledge and media theory approach to identify, describe and reflect upon developments in the field of research communication and OA. These developments include knowledge as a production factor, knowledge as a commodity and a change in formal academic communication over time. The project team particularly considered thoughts of Luhmann regarding the academic publication and reputation system because obtaining a reputation is of particular importance to both publishing houses and academic researchers (for detailed information on the background to this, cf. Getz et al., 2020, pp. 10-14). Considering this theoretical framework, the research project explores attitudes, experiences and inhibitions regarding OA from the point of view of VET researchers in their role as authors.

2 The Empirical Database

The research project used a mixed-methods-design combining qualitative and quantitative research methods. As a first step, the project team explored the relevant technical and structural, policy-related and normative conditions, as well as conditions inherent in the academic research system influencing the acceptance, dissemination and use of OA in VET research through four structured group discussions. Built upon the analysis of the group discussions, the project team designed an online survey and sent it to approximately 5'000 academics from VET research who were also authors. From this, a broad empirical basis for further analysis was established.

2.1 Group Discussions

The project team conducted four group discussions at VET research institutes at universities in Germany during the second quarter of 2019. Since attitudes on OA, views, experiences and OA work practices may be influenced by academic experience, group discussions comprised VET researchers of differing academic statuses. Overall, 26 researchers took part in the group discussions, which were conducted as focus groups by the project team. Discussions were

structured through a set of open questions. This enabled participants to bring their perspective to bear whilst ensuring that important theoretical aspects were covered.

Evaluation of the Group Discussions

Group discussions were analysed using qualitative content analysis in accordance with Mayring (2015). The following section summarizes the main thematic areas the project team identified to be particularly relevant.

a) Outreach of publications and addressing target groups

This thematic area mainly deals with remarks made by group discussion participants regarding their own publications and the issue of preparing information and research results appropriately for the intended audience.

b) Peer review and transparent quality assurance procedures

In the group discussions, participants emphasise the utility of transparent quality assurance procedures and structures in ensuring equal opportunities between authors. Nevertheless, even though peer review is often not entirely transparent, participants view it as a crucial component of academic quality assurance.

c) Reputation and ranking of publication media, persons and OA

With regard to their own publication choices, participants prefer journals and publishing houses that are recognised in the academic community, even if these publishing houses do not offer the OA format. Participants mention that collaboration with renowned authors and publishers is more reputable and therefore, desirable. In order for authors to foster their own academic career and gain a reputation, they place their publications strategically in relevant closed access journals rather than in possibly less reputable OA journals.

d) Literature research strategies and invisibility of OA

When it comes to literature research and retrieval, the group discussions show that OA is not a selection or search criterion for the participants. Instead, they view access possibilities and relevant research topics as being much more crucial in this process. Participants use various databases to search for the desired literature. Moreover, they often benefit from the convenient retrieval of literature through institutional affiliations. Here, OA is often invisible to participants because they are using the licences of their employers to access articles that are normally retained by a pay wall. Participants state that an increasing information overload is one of the drawbacks of the digital availability of literature. Literature research is becoming more complex and particular strategies are required to search for literature and remain up to date.

e) Work practices and changes to academic research communication

One recurring topic in the group discussions is the change in academic work practices brought about by the digital format of (OA) literature. Participants explain that, often digital texts are immediately available, which is helping VET researchers save time. In addition, digital texts are available from any location, which also facilitates remote work. Participants state that they can easily share and edit digital texts and view this as a strong advantage of the digital format of literature. However, despite the benefits of the digital format, participants express an appreciation for books, for reading texts on paper and for the look and feel of working with print outs.

f) Financing of OA

As far as the financing of publications is concerned, the covering of article processing charges (APCs) by employers or third parties is important to participants when publishing in OA. Participants also state that the financing of OA should be integrated into research project plans from the start.

g) Licensing models and legal conditions

Participants frequently mention that they are not fully familiar with the different licensing models from which authors can choose in the publication process or which are offered by

publishing houses. Participants wish to have better opportunities to obtain information on the various licences for authors. They also remark that it is important to protect the rights of authors and to counter the illegal dissemination of copyrighted texts.

In summary, the group discussions outline that OA has become an established topic in VET research, but they also show that an information deficit regarding individual aspects of OA (e.g., copyright, licensing and financing possibilities) exists within the VET research community.

2.2 Online Survey

Drawing on the thematic areas distilled from the analysis of the group discussions, the project team designed an online survey that it sent to approximately 5,000 authors of VET research papers in 2020. Of 1'644 (33%) respondents who participated in the survey, 1'108 completed the questionnaire fully. This represents a response rate of about 22%, which allows for representative conclusions.

Evaluation of the Online Survey

The following section presents selected results from the online survey. These include descriptive statistics, as well as results from an exploratory factor analysis. Our results outline VET authors' attitudes towards the dissemination and use of academic publications. Moreover, we display data relating to the information resources and databases used by authors within the context of their own academic work. Finally, we outline authors' attitudes towards print versus digital publications.

a) Authors on the dissemination of their publications

In the online survey, we asked how important certain aspects were to respondents regarding the dissemination of their own academic work. In the following, the number of respondents will be stated for each individual item. If items are presented together, we use the form of n = xx to xx to display the overall number of respondents for these items. Overall n = 1'145 to 1'221 answered the selected questions in this chapter.

47.4% of respondents consider it "quite important" for their publications to be read by as many interested parties as possible and 46.6% feel that this aspect is "very important", representing a total of 94%. Respondents also believe that it is important for their publications to be easily accessible online at any time. This is considered "quite important" or "very important" by 46.9% and 43.1% of respondents respectively, adding up to a total of 90%.

50.1% find it "quite important" that their publication becomes available in a digital format, whilst 28.9% find this "very important", representing a total of 79% of respondents. Finally, 43.5% of the respondents consider it "quite important" and 22% "very important", that their publication is reproduced both digitally and as a print publication, representing a total of 65.5%.

When asked: *"How important is it to you that your publication appears as a printed work?*, 13.3% of respondents are of the opinion that this is "not important at all" and 42.5% consider this "quite unimportant", adding up to 55.8% who do not deem it important for their publication to be published as a printed work.

49.4% of the respondents "tend to agree" and 33.8% "agree fully" with the statement: *"My publication should be available free of charge."*, representing a total of 83.2% who agree that their publication should be available to readers without a pay wall.

b) Authors on the use of publications

In our survey we also asked participants about the importance they attach to certain aspects regarding the use of publications for their own research and reading purposes (n = 1'135 to 1'151). When they are working on a publication, 43.8% of respondents consider it "very important" and 46.1% believe it to be "quite important", for the publication they are reading and

using to be permanently available and easily retrievable. This amounts to a total of 89.9% of respondents.

19.6% of the respondents find that it is "not important at all" for literature which they are seeking to be available as a printed work and 43.3% are of the opinion that this is "quite unimportant". These figures represent 62.9% in total. Accordingly, respondents seem to find it more important that literature they wish to use is accessible in a digital format. 50.2% of the respondents find this "quite important" and 33.6% consider this "very important", representing 83.8% in total. In addition, an overwhelming majority of 91.4% prefers literature to be easily available and accessible online at any time with 43.7% of the respondents finding this "quite important" and 47.7% finding this "very important".

Results of an Exploratory Factor Analysis on the Use of Publications

As part of our analysis, we also selected variables relating to the use of literature for an exploratory factor analysis. The exploratory factor analysis is a suitable multivariate method for uncovering unknown structures and relationships in our data. The analysis also contributes to a reduction of large data sets.

The overall question regarding selected variables for our factor analysis addressed literature selection criteria of VET authors. The question was "*If you are working on a publication yourself, how important is it to you that the publication you are reading and using for this purpose ...?",* providing respondents with a set of possible publication selection criteria as available responses. Responses were presented in the form of a four-level Likert scale comprising specificities ranging from "not important at all" to "very important". We expected to find relationships between these items and structures connecting them. Therefore, we used our analysis to uncover latent variables, relating to attitudes or properties that cannot be measured directly.

Preliminary theoretical assumptions and the results from the group discussions, prior to the online survey, make a convincing case for the factors we found as a result of the factor analysis. These are "reputation as a key selection criterion for publications", "academic rigour as a key selection criterion for publications" and "direct availability as a key selection criterion for publications". The three factors will be described in the following.

Factor 1 – reputation as a key selection criterion for publications: Variables relating to factor 1 are all referring to academic reputation. Respondents orient themselves towards reputable publishers, publishing houses and authors already known to them. Respondents also tend to use recognised periodicals, which, from their point of view, are reputable and well known.

Factor 2 – academic rigour as a key selection criterion for publications: The variables relating to factor 2 revolve around the ascribed academic rigour of the selected texts. Respondents may ascribe this rigour to a publication through quality assurance processes that have been successfully completed by its author or through their own critical reading. An (assumed) academic ethos also serves as a criterion. Compared to the other factors, openness to lesser known authors, publishers and publishing houses seems to be an aspect of this factor. Additionally, direct availability of literature is not a paramount criterion.

Factor 3 – direct availability as a key selection criterion for publications: The variables relating to factor 3 describe direct possibilities of accessing digital publications and preprints free of charge. Respondents prefer publications to be instantly available. Access needs to be possible at the very moment the research is taking place. The focus here is on digital publications above all others.

The results of our factor analysis confirm that respondents prefer direct and digital access to literature. The analysis also demonstrates that the reputation of publications and respective stakeholders, as well as the ascribed academic quality of publications are selection criteria for the use of academic publications.

Descriptive Evaluation

The online survey also covered questions about the use of information resources, closely linked with the main thematic area "literature research strategies and invisibility of Open Access", from the group discussions. Particular focus was placed on the immediate access to literature with the question *"How often do you make use of the following provisions of databases in order to search for literature?"*

The project team assumed that library catalogues, unspecific search engines (such as Google and Bing) and academic search engines (e.g., BASE and Google Scholar) would be frequently used. These assumptions were indeed confirmed. 26.6% of respondents (n = 990 to 1'072) stated that they "always" use the (online) library catalogue of their own institute/university library, while 33.1% stated that they do this "often". This amounts to a total of 59.7% of respondents. 24.8% "always" use unspecific search engines, whereas 42.6% use them "often" is. This adds up to a total of 67.4%. We covered two specific academic research search engines in the online survey: 18.4% of the respondents stated that they make use of Google Scholar "always" and 28.1% stated that they use Google Scholar "often". This represented a total of 46.5%. The second specific academic research engine included in the survey was BASE – the Bielefeld Academic Search Engine, which respondents use significantly less than the other library catalogues and search engines mentioned above: 85.4% of the respondents state that they "never" use BASE.

Respondents' infrequent use of library repositories as compared to library catalogues and search engines came as a surprise to the project team. Even though library repositories include more specialist literature and directly available full texts than library catalogues and search engines, respondents make only little use of these repositories. A lack of desired resources can only form part of the explanation for this. Since VET research is an interdisciplinary research area, the project team expected a much more frequent use of all academic repositories.

Equally surprising was the infrequent use of collaboration platforms in the social sciences, such as Academia and ResearchGate, and possibly the Zenodo platform, which may also be considered to be a collaboration platform. ResearchGate, for example, is "always" used by 6.4% and "often" used by 24.7% of respondents respectively, meaning that a total of 31.1% use it on a frequent basis. 51.1% stated that they "never" use licensed databases, which is also a much lower figure than the project team expected. Only 7.5% of the respondents stated that they "always" use licensed databases and 14.3% do so "often". Given that these databases usually account for a high proportion of library budgets, it would be interesting to explore this further.

Besides questions about the use of specific information resources, we also asked respondents about their approach to literature research. To take attitudes towards OA into account in this context, respondents were asked whether they agreed with the following statements: *"When I am conducting literature research, I often do not notice whether the publication I have found is Open Access."* (n = 954*).* 9.7% of respondents agree "fully" with this statement, while 47.6% "tend to agree", adding up to a total of 57.3%. Over half of respondents are therefore frequently unaware of whether they are working with an OA publication or not. Interestingly, this invisibility of OA does not disappear when authors state that they are have access to full texts through their university or institution. Irrespective of whether respondents answer "yes" or "no" when asked: *"Do you have access to licensed full texts (incurring a charge), e.g. through your university or library subscription service?"*, approval ratings change only slightly with respect to whether respondents notice whether a publication they have found is Open Access or not.

Only a total of 31.8% of the respondents "agree fully" or "tend to agree" with the statement: *"I actively search for Open Access publications."* (n = 1'007). In contrast, 30.4% "do not agree at all" and 37.8% "tend to disagree". This means that a total of 68.3% do not actively search for OA literature. Interestingly, irrespective of whether respondents answer "yes" or "no" when asked: *"Do you have access to licensed full texts (incurring a charge) e.g. through your*

university or library subscription service?" approval ratings also change only slightly with respect to whether respondents have access to licensed databases through their institutions. Consequently, access to licenced databases, or a lack thereof, does not automatically mean that respondents will be more or less likely to actively search for OA publications.

The group discussions conducted prior to the online survey revealed that participants made a distinction between digital and analogue or printed formats rather than between OA and "not available digitally". Here too OA was "invisible". Instead, participants discussed the benefits and drawbacks of digital and printed literature in relation to reading habits and to the reputation associated with each format. Because this made up a large part of the group discussions, these topics were included in the online survey.

A total of 63.6% of respondents either "fully agreed" or "tended to agree" with the statement: *"I devote more concentration to reading printed works and hard copy publications than to reading digital publications on a screen"*. In contrast, 57.7% of respondents "tended to disagree" or "did not agree at all" with the statement: *"I am easily distracted by the computer when I read digital publications"*. Between these two items, we found a positive correlation between those who state that they concentrate more when reading printed works and those who state that they are easily distracted when reading from a screen ($r = 0.371$, contingency table $n = 1'108$). Hence, there appears to be a relationship between a preference to read printed work and a difficulty to focus when reading from a screen.

A total of 58.4% of respondents do not agree with the statement: *"Printed works symbolise a higher value than digital publications."* Here, 22% "do not agree at all" and 36.4% "tend to disagree". Accordingly, 65.9% of respondents disagree with the item: *"My digital publications give me a lesser degree of recognition than my printed works." Here,* 26.7% "do not agree at all" and 39.2% "tend to disagree". Only 34.1% either "tended to agree" or "fully agreed" that their own digital publications lead to less recognition than their printed works.

3 Conclusion

First results of our study show that authors consider it crucial to provide their research to readers both digitally and free of charge – and that, as readers, they prefer literature to be directly available, from well-known sources and in line with principles of academic rigour. Furthermore, authors do not search specifically for OA publications, regardless of whether they have access to publications through their university or institution. While respondents display varying reading preferences regarding digital and print publications, the majority of respondents do not consider digital publications less reputable than print publications.

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Black Tiles and Silence: Going Digital. Voices from a Further Adult Vocational Education (FAVE) Interdisciplinary Community of Practice (CoP)

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Abstract

Context: Since March 2020 and the global pandemic, our 'new normal' is comprised of emerging COVID-19 variants, intermittent national lockdowns, restricted social interactions, and a continuation of remote online teaching and working from home. FAVE professionals have engaged with digital technologies, and related pedagogies and practices, in response to the need to deliver of their programmes through Emergency Remote Online (ERO) teaching.
Approach: This qualitative case study examined the perspectives of an online Community of Practice comprised of eight FAVE educators. The study took a methodological approach where each participant served as a case, representing a unique aspect of the 'remote' digital educator experience.
Findings: The experience of creating and sustaining ERO teaching as described by the participant-researchers is both challenging and rewarding. Findings establish the importance of developing an educator digital mindset that is proactive, rather than reactive; and characterised by particular behaviours and attitudes that are agile, collaborative, curious, and "tech savvy". Finally, relational learning and the importance of a supportive online CoP can be useful not only

to FAVE teachers and trainers, but also to other educational and training organisations promoting remote and online digital teaching and collaborations.
Conclusions: Challenges to developing an educator digital mindset and an identity as a digital practitioner arose from unexpected and difficult 'online' workplace relationships and demands, in addition to the unexpected impacts on boundary management between work-life and home-life. When the unexamined assumptions and frames of reference were brought into question, they resulted in disorienting dilemmas. The online supportive CoP relationships provided a safe space where critical reflection and dialogue could occur. Current understandings of the influence of ERO teaching on practitioner engagement with digital technologies, provide a contextualized understanding of how to support and facilitate the creation and development of these educator digital mindsets. This research has implications for developing digital teaching-learning environments (dTLEs) in FAVE programmes. Further research is required to provide a deeper understanding of how FAVE educators engage with digital technologies and develop an educator digital mindset.

Keywords

personal engagement, perspective transformation, identity self-states, digital mindsets,

1 Introduction

European research on digital education identified tensions between the needs of various stakeholders, specifically teachers, learners, educational organisations, employers, industry and society. Furthermore, institutional barriers included: (1) the digitisation of education and industry; (2) changing assessment and examination approaches and regulations; and (3) lag times with textbooks, materials and available technologies (Deitmer et al., 2018). FAVE educators worldwide have been adapting to and engaging with new pedagogical responses to a rapidly emergent digital transformation in the delivery of their programmes. Evidence that these 'new' digital pedagogical responses were effective are limited (Zilka et al., 2019; Cagney et al., 2020).

In response to the recent pandemic, FAVE educators have been tasked with delivering their programmes as ERO classes. An examination of these experiences is relevant to FAVE educators and trainers, but also to other educational and training organisations promoting remote and online digital teaching and collaborations. Two questions guided this study:

1. How do FAVE teachers describe their experiences in providing ERO digitalised teaching-learning environments (dTLEs)?
2. How do FAVE teachers develop and maintain an evolving professional identity as critically reflective digital practitioners?

The answers to these questions help provide an understanding of how individuals engage with digital technologies and develop an educational digital mindset. This study adds to the current knowledge base on the nature of an evolving FAVE educator digital mindset and teacher identity as critically reflective digital practitioners.

2 Literature

First, we draw on the literature related to the psychological conditions of personal engagement and disengagement at work (Kahn, 1990); transformational learning that identifies and challenges underlying assumptions, prompting changed perspectives leading to new roles and actions (Mezirow, 1997); and identity self-states that incorporates 'possible' and 'ideal' selves' theory (Markus & Nurius, 1986). Thus, this literature highlights the importance of and interrelation of notions of identity, concept, emotion and agency (Beauchamp & Thomas, 2009;

Beijard et al., 2004; Rodgers & Scott, 2008; Hamman et al., 2010). Exploring these processes will inform how an online FAVE CoP impacted on professional identity and agency (Cranton, 2006; Boylan et al., 2018; Cagney, 2020).

Second, the study draws on extant literature that identifies three competencies that are fundamental to developing and supporting a digital mindset (Benke, 2013). Jansen et al. (2009) refer to digital knowledge as comprising: (1) differentiation (a breadth of knowledge about ICT, internet, media, information and digital literacy); and (2) integration (how that knowledge is absorbed or included into an existing life context). Digital skills include operational and technical competencies, in addition to strategic ICT skills that enable the achievement of more specific professional and educational goals rather than just for personal entertainment (van Dijk, 2005; van Deuersen & van Dijk, 2009; Ilomäki et al., 2011; Ferrari, 2012). Digital attitudes are based in the affective domain and are strongly influenced by cognitive, emotional and behavioural elements.

In summary, little is known about how FAVE educators' engagement in their online teaching role influences their knowledge of digital technology and their use of digital technology skills. With this overall lack of empirical attention, the purpose of this study was to contribute to current knowledge of the impact of the ERO teaching-learning environment on the development of FAVE educators' digital mindsets and identity.

3 Methodology

The realities of an ongoing pandemic and extended shutdown severely impacted on the CoP and their availability to continue with the study as originally planned. The study was re-designed as a qualitative case study (Simons, 2009). Each participant in this study served as a case, representing a unique aspect of the 'remote' digital educator experience. Using this design, we collaborated as participant/researchers, and sought to answer the research questions through in-depth and online interaction and communication.

Methods included: online focus group sessions via Zoom; collaborative idea-generation using Padlet; and individual reflective papers/notes uploaded and shared via Padlet for the group to read and add comments, ideas and reflections.

Consistent with qualitative methodology, the data were analysed using a combination of inductive and concept coding (Saldana, 2016, pp. 40, 153). This approach enabled a holistic examination of individual experiences and facilitated a comparison of experiences across the data set. This hybrid approach allowed us to capture moments of importance and patterns that were driven by the data and to relate the data systematically to the research questions and theoretical framework, which became significant for the discussion section below.

4 Analysis of Findings

The experience of creating and sustaining ERO teaching as described by the participant-researchers is both challenging and rewarding. Specific to understanding how individuals engage with digital technologies and develop an educational digital mindset, our analysis generated two primary themes to explain how ERO teaching provided FAVE professionals with an opportunity to accommodate the development of an evolving educator digital mindset. They were: (1) coping with personal and professional change; and (2) pre-existing and emerging digital mindsets.

4.1 Coping with Personal and Professional Change

Anxiety emerged from the data that reflected the shock and horror at the devastation of the COVID-19 pandemic, combined with a realisation that national and international lockdowns, and online teaching were inevitable and necessary, at least in the short term. The seismic mid-

semester shift in March 2020 from a traditional face-to-face and blended learning context to a completely ERO teaching-learning environment was disorienting for the members of the CoP.

Identity, role and status emerged with a particular focus on professional competency, boundary management and headspace. One participant shared their feelings related to competency as a teacher in the new environment: 'I have learned to talk to the wall [of black tiles that indicate participants' cameras are turned off]'. Professional priorities were identified: 'We push ourselves to be as professional as we can be . . . the show must go on . . . the show must go on'. Boundary management emerged from the data in a variety of ways. Online working from home experiences were described as: 'Digital Groundhog Day of days, weeks, weekends, no separation – morphed together while trapped in an online world.' For another person, their changed circumstances started with: 'Wake up. Dress. Make Coffee. Walk to Home Office. Repeat'. All members reported working from home had fundamentally changed with a corresponding unwelcome invasion of the home and life world: 'This [home office] was my space, my sanctuary. Now it is my portal to the outside word, a door that others enter, daily, in a succession of meetings and collaborations, of work and play that affords no respite or relief.'

Social and technical support, and changed working practices also featured. The normal day-to-day social interactions of a physical work environment were gone. The online CoP replaced these with opportunities for sharing professional experiences with other educators in a supportive environment. Technical support was provided in many ways including Zoom and Teams training and consultation sessions, and self-help videos on organisational learning platforms like Moodle and Blackboard. However, some individuals found that they were left very much on their own in sourcing and accessing online information to assist them in learning and understanding how to use the various technologies.

Changes in working practices moved meetings online and compounded the perception of increased demands, irritation and stress. Some staff were under pressure to 'look busy' and a culture of 'management by meetings' and monitoring 'online time' became a reality. One stated: 'I truly believe that my schedule and workload has exponentially increased, with multiple, daily video meetings and emails that require responses in less than usual time.'

4.2 Pre-existing and Emerging Digital Mindsets

Prior knowledge and previous experience of digital technologies and openness to new digital knowledge and approaches were articulated in various ways within this group.

First, behaviour and attitudes to digital technologies changed from a personal freedom of choice and pace, to an organisationally imposed 'no choice'. One said: '… people were forced to use these technology platforms which provided, in the main, some exceptionally good experiences for some people, but I have talked to people that have had some bad experiences'.

Second, challenges and concerns related to the volume of technological choices and information: 'New frontiers – Sucked into the digital data vortex – information overload' and 'Apps Apps and more Apps'. For another: 'The multitude of media and platforms is discombobulating. More than once (sometimes more than once) a day I am in the "wrong room". Platform panic ensues. Someday, I am sure, I will end up in Hogwarts – it's as real as anything else on my screen'. Concerns regarding privacy, data information, storage and access, GDPR, and cost all featured in various posts. Also, concerns were expressed regarding the potential for digital technological knowledge and competence to influence opportunities in education careers and progression. Self-consciousness and vulnerability were expressed in relation to being seen and seeing themselves on screen while working and teaching. Finally, exposure of the home world (private life and family) combined with new ways of working caused significant concern and uncertainty for all, including where this online experience was going and what it would mean for future work contexts and demands.

Third, digital competencies formed an important category of the data set. Knowledge of digital technology consisted of: (1) breadth of knowledge, which for most participants was general rather than specific; and (2) integration of knowledge, which was reported only in relation to professional contexts. Coming to terms and making sense of new language and information was difficult for both those with pre-existing and emerging knowledge of digital technologies. Use of digital technology skills featured only in relation to operational and technical competencies in the achievement of professional and educational goals. For one participant, challenging the 'black box' syndrome was experienced as: 'Now you see me, now you don't; now you hear me, now you don't.' For another, 'Beam me up Scotty' became a mantra when sending students to Zoom break-out rooms for groupwork. Another perspective on the use of digital technology skills was: 'what was innovative in online teaching/support is now common place and day to day, so now we have a new mountain to climb - not sure where it is or how big it is, but it's not the same mountain we climbed this past year'.

5 Discussion

Being an education professional requires ongoing development of oneself as an adaptable, self-reliant learner on the one hand; while at the same time having a commitment to supporting and facilitating a high quality learning environment for one's students. All participants created opportunities to learn, collaborate and pursue (online) professional opportunities in order to provide the best contexts they could for their students and colleagues. For some, the learning curve was a steep and frightening one: learning to teach in an online environment while also learning how to use the technology is a little bit like designing the plane while flying it.

Those with pre-existing or better developed digital knowledge and skills, found it easier to explore new options, increase their knowledge and skills, and take chances with new tools and software. They also tended to have more pre-existing and established relationships with other digitally orientated educators. However, even for these participants it was not always plain sailing. Evidently, ERO teaching is a highly individualised experience.

Participants identified that interactions between members within the CoP determined the quality of learning for the individual and the knowledge produced by the group (Imel, 1999). The organic and emergent CoP on which this research paper is based was created at a specific time, and in response to a mutual need to create knowledge collaboratively. While individual motivations may have differed, the group continued the process of learning and working together (Hansman & Mott, 2010) and in this way worked to 'learn from and with one another as they pursue interests, opportunities, and challenge' (Watkins & Marsick, 2010, p.66). Thus, this framework underpins the core focus of the study by providing a guiding lens to understand how an online CoP was sustained and how members developed as critically reflective digital practitioners, in their common need to navigate a pathway through a completely online and remote educational landscape.

6 Conclusions

Challenges to developing an educator digital mindset and an identity as a digital practitioner arose from unexpected and difficult 'online' workplace relationships and demands; 'black tiles and silence' of disengaged participants during online classes; and the demands of founded and unfounded expectations of organisational support and resources. Additionally, there were unexpected impacts on boundary management between work-life and home-life. When the unexamined assumptions and frames of reference were brought into question, they resulted in disorienting dilemmas. Changed relationships in all aspects of life during shutdown led to disorienting dilemmas, but it was through relationships that participants were able to begin to make sense of their experiences.

This research has implications for the future directions of online teaching provision and the development of digital teaching-learning environments (dTLEs). Findings establish the importance of developing an educator digital mindset that is proactive, rather than reactive; and characterised by particular behaviours and attitudes that are agile, collaborative, curious, and "tech savvy". Finally, relational learning and the importance of a supportive online CoP can be useful not only to FAVE teachers and trainers, but also to other educational and training organisations promoting remote and online digital teaching and collaborations.

Further research is required to provide a deeper understanding of how individuals engage with digital technologies and develop an educator digital mindset.

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From Worksheets to Web-Based Learning During COVID-19 in German Nursing Schools: Exploring Teaching Practices With Worksheets in Changing Educational Ecosystems

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Abstract

Within the context of digital change of teaching and learning in nursing schools, the full potential of web-based learning has not yet been developed. While web-based learning offers interactive, multimedia and social learning with digital platforms, traditional paper worksheets are still widely used by nursing teachers. Our approach is to analyse and develop potentials of web-based learning activities as a transformation of worksheet teaching practices in German nursing schools. Accordingly, this mixed method study explores the context of teaching and learning with worksheets during the rapid change to distance learning in the COVID-19 pandemic in Germany. Drawing on the educational ecosystem metaphor for schools, the digital change represents a holistic transformation of teaching and learning practices including authoring, sharing, collaboration and use of content by teachers and learners. We collected and explored 119 use cases of worksheets in German nursing schools during the pandemic lockdown in 2020. The results show that worksheets are self-authored by teachers, shared among teachers and distributed partially using digital media. But according to their content, they appear fragmented in the learning process. As a conclusion, the study identifies main challenges in (a) developing a holistic and learner centred school culture of teaching with digital tasks and activities and (b) enabling teachers to author digital learning tasks focussing on thinking in cases than reproducing knowledge facts.

Keywords

worksheets, nursing education, web-based learning, COVID-19

1 From worksheets to web-based learning in nursing schools

The digital change of schools offers potentials for learner-centred teaching. In transforming and changing teaching practice, educational technology can be used to focus learner control, interactivity of learning media and social interaction. A long history on research on learning with multimedia highlight the potential for learner controlled and learner centred environments with

digital contents and technology (Lawless & Brown, 1997; Mayer, 2017). Web-based learning activities, especially those activities relying on Web 2.0, complement multimedia learning by social interaction, interactivity, community and ownership (Buchem et al., 2020; Chatti et al., 2008; Rahimi et al., 2014). But beside digital skills for teachers, the change of teaching practices to web-based learning in schools requires an infrastructure to author and edit web-based learning resources and activities. Learning Management Systems (LMS) are a part of those infrastructures as they support multimedia course materials and resources as well as collaborative workspaces and activities for students (Foreman, 2018). During the face-to-face education restrictions while the COVID-19 pandemic, many nursing schools in Germany acquired LMS and started using them for distance teaching and learning.

In the continuous spectrum of changing teaching practices between traditional practices and technology enhanced and learner-centred approaches, worksheets represent a traditional, less digital, but learner-centred teaching practice. Worksheets are frequently used teaching and learning media in various educational areas since a long time. They combine information, assignments and instructions and hereby foster learning activities (Lee, 2014). In aiming at learning activities using traditional paper media, the process of worksheet authoring, distribution and use often rely on digital technology. Bridging analogue and digital practices of authoring and distribution, worksheets can be authored by teachers using digital authoring tools like text processing software. They can be used in traditional face-to-face teaching and learning scenarios as well as in distance learning scenarios.

Teachers and trainers in German nursing education often practice worksheets in classrooms and off-school environments. But little research has been done so far concerning the use of worksheets in the specific field of nursing education in Germany. As a three-year training, nursing education in Germany consists of an in-school and an off-school part both using worksheets. The off-school part focuses on trainings for different care-settings in health care institutions. Even though practice instructors mentor learners in off-school settings, worksheets are used to connect in-schools and off-schools learning settings. Both traditional paper-based and digital worksheets are common for this purpose. Beside off-school trainings, worksheets are also common in classroom teaching during lessons.

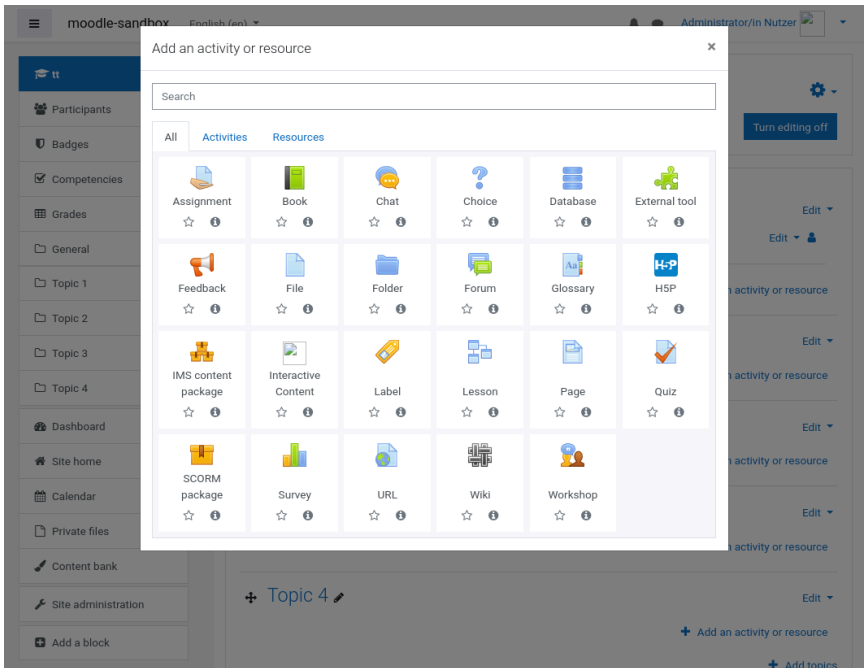
The group of nursing teachers in Germany is currently a heterogeneous group with regard to their teaching education. According to the current educational regulations, it is common for nursing teachers to re-qualify for working in schools after their professional nursing exam by completing a Master's degree in nursing education ("Pflegepädagogik"). Because the current educational regulations are still quite new, not all nursing teachers in schools have the currently required Master's degree but nevertheless work as teachers. As the German nursing education regulation fall into the legal field of health care instead of public education, the whole process of qualification of nursing teachers is sparely integrated into public higher education institutions. This also explain why textbooks and text-based teaching media for nursing teachers have a different tradition compared to the teaching media in the general education. Experiences with nursing teachers show that it is uncommon to use templates from textbooks as worksheets but to prepare worksheets as teacher-authored learning media.

Beside nursing education, only a few studies unveil the use of worksheets in general school. An elderly study on the use of worksheet copies in German elementary schools, conducted in 1988, show that worksheets are widely used and often self prepared by teachers and shared with colleagues. The use of worksheets in classroom at this time is concomitant with using overhead projectors (Schümer, 1991). Since then, the popularity of worksheet use in school appears to be still unbroken. A secondary data analysis of an international survey on mathematics and science achievement of students in selected schools at grades 4 and 8, conducted in 2011, unveil that on average across 32 countries only 2% of students did not use worksheets at all (Lee, 2014).

Even if paper worksheets cannot implement the entire spectrum of web-based learning media, they can, to a certain extent, represent similar media. As instructional media combining information and assignments, they may be absorbed by LMS and enriched with web-based resources. LMS offer various tools for individual and social construction in web-based learning scenarios (see figure 1). Some of these tools can also be implemented in a rudimentary way with paper-based worksheets. From this perspective, practices of teaching and instruction with traditional paper worksheets to a certain extent resemble to characteristics of web-based learning, but at the same time need to be developed and extended to hold the full potential of web-based learning. Even if web-based learning activities do not resemble worksheets by their shape, they do provide, keep as well as change functions and practices of worksheet use in face-to-face teaching. Regarding authoring, web-based learning activities can sill be authored by teachers like worksheets are authored and created by teacher. Most platforms like the LMS Moodle contain editors to write learning activities and arrange as well as mash-up digital resources within the activity. Authoring meaningful learning instructions and assignments is a challenge for traditional as well as for web-based teaching practices. They can further be shared like worksheets among colleagues. LMS offer the possibility to export, share and import learning objects like activities or even whole courses. Accordingly, teachers can collaborate on web-based learning activities, test and revise them.

Figure 1

Screenshot from the LMS Moodle showing the available web-based learning activities of this platform.



2 Shaping digital teaching and learning environments as ecosystems

Approximating teaching and learning from the perspective of ecosystems draws on a term having its origin in describing a system of a biotic community within a physical environment at a specific place (Pickett & Cadenasso, 2002). Applying this term to digital environments not necessarily means that the components of the ecosystems are all digital components, as the approach of Briscoe et al. (2007) considers. Especially the description of educational environments benefits from the interplay of humans teaching and learning with components like technology or media, which all may be considered as components of an ecosystem. Accordingly,

Chang and Guetl (2007) shapes a general learning ecosystem as a system that "consists of the stakeholders incorporating the whole chain of the learning process and the learning utilities, the learning environment, within specific boundaries, which we call learning environmental borders" (p. 441). Narrowing this shape to learning situations with digital technology shapes a definition of digital learning ecosystems.

Applying an ecosystem perspective on learning situations with digital technology underline certain dynamics of technology enhanced learning processes. First, learning is considered as a flow and transformation of information and data within a system of humans acting and authoring on digital artefacts like content or assignments (Chang & Guetl, 2007). This shows learning as well as teaching to be social activities of reception, creation, sharing and revising of different kinds of content and artefacts. Learning and teaching in a school is an interplay of humans, contents, tools and other entities. The school as an ecosystem further underline the school's ability for self-organization within the spectrum of its freedom to change and its selection pressure to meet certain external demands, like legal requirements or educational demands (Briscoe et al., 2007; Jeladze & Pata, 2018). Also, the digital change of schools is an aspect of this freedom. Different ecosystems tend to cultivate different teaching and learning practices. This change relies on the specific conditions and place of the ecosystem. Finally, an ecosystem describes a specific evolution while it changes (Chang & Guetl, 2007). The development of schools regarding digital technology can be considered as an application of a perspective of change of an ecosystem (Jeladze et al., 2017).

As the ecosystem lens highlights learning with digital technology as a holistic and socio-technical process (Chang & Guetl, 2007), it is not only restricted to learning but also includes a broader view on teaching, the process of authoring resources and the school as an organization. The model of a digital teaching and learning ecosystem combines both teaching and learning and describes its interplay (Reyna, 2011). Further, the model of an informational ecosystem focuses on authoring, sharing and distribution of content for teaching and learning as closed or open educational resources (Kerres & Heinen, 2015). These examples demonstrate that ecosystems as conceptual metaphors for learning highlight learning occuring in a relational context. Hence, the ecosystem lens decenters the individual learner and focus the complex relations of learners and teachers within a certain environment (Hecht & Crowley, 2019). The conceptual metaphor explains relational practices of cooperation among teachers like sharing and authoring teaching materials collaboratively with digital tools influences the actual learning situation with these materials. On the other side, the kinds of interactions of learners with teaching artefacts is connected with revising these artefacts by teachers before the next usage.

Analysing the stages of digital development of schools, a broad ecosystem perspective shows the role of knowledge practices and technology-mediated artefacts. It is argued that digital transformation processes of schools constantly move by enabling and changing knowledge practices with shared digital objects (Jeladze & Pata, 2018). Empirical cluster analysis shows higher level of using digital resource provision in schools with developed ICT use for teaching and learning (Jeladze & Pata, 2018; Jeladze et al., 2017). This highlights the relevance of practices with digital artefacts.

Even if ecosystems represent a fruitful metaphor for analysing the digital development of schools from an environmental perspective with connected, interrelated and heterogeneous agents and practices, this metaphor is limited with respect to pedagogical intentions. In general, design research for technology enhanced learning focuses on educational practices and aims at improving these practices by educational technology (Wang & Hannafin, 2005). But detailed analysis shows that considering digital technology as pedagogical neutral overlook the implicit pedagogical assumptions of design processes (Friesen, 2004). Therefore, aiming at designing digital teaching and learning ecosystems must become aware of pedagogical intentions. Within this design process, a contextual study explores the socio-cultural context of learning in order

to define preliminary design aspects (Leinonen, 2010). Using a preliminary empirical exploration of the context, the current study develops pedagogical intentions for designing digital educational ecosystems (Laanpere et al., 2014).

3 Methodology

Aiming at supporting a digital change in German vocational nursing schools, practices of authoring, sharing and using worksheets by teachers during COVID-19 are exemplary for understanding current teaching and collaboration practices. As a preliminary study, this investigation explores use cases of worksheets to further develop empirical based and pedagogical engaged design suggestions for digital teaching and learning ecosystems. As a mixed method and exploratory study, the investigation draws on a quantitative survey as well as a qualitative artefact analysis (Froschauer & Lueger, 2018). The survey explores authoring, sharing and use of a certain worksheet using question items and further requires the teachers to upload the worksheet itself. Accordingly, the artefact analysis is based on authentic worksheets.

The study focuses on the following research questions:

1. In how far do nursing teachers and trainers collaborate in authoring worksheets?
2. What kinds of media do nursing teachers and trainers use in conjunction with worksheets in face-to-face environments as well as in online teaching environments? What are established usage pattern?
3. What are qualitative characteristics of worksheets regarding the didactics of nursing education?

During the pandemic situation in June and July 2020, we collected 119 worksheet use cases in German vocational nursing education schools. Beside a copy of the workshop itself, the survey comprises items regarding practices of authoring and collaboration of teachers while creating the worksheet and characteristics of the worksheet use like accompanying media. For analysis, a quantitative description of survey item responses shows collaboration practices (research question 1). Further, a Pearson's correlation matrix of accompanying media unveils patterns of media used in conjunction with worksheets (research question 2). Pearson's correlation is used in a wide range of applications to reveal linear relationships between two variables in a data set and visualising relation structures (Patil, 2021). Applying it to accompanying media of worksheet use cases aims at exploring pairs of media used together with regard to multimedia learning. Further, a qualitative artefact analysis on a sample of 14 selected use cases unveil characteristics of the authoring and the content of the worksheet (research question 3). As a conclusion, design suggestions are discussed.

4 Results

We mostly collected use cases of worksheets applied by experienced teachers. Accordingly, 55 collected use cases are applied by teachers with nine or more years of professional experiences (46.22%). The other cases spread to less than one year of professional experience (n=11, 9.24%), one to three years (n=21, 17.65%) and three to six years (n=20, 16.81%). Regarding the age of the teachers, teachers of 39 use cases are 40-50 years old (32.77%), teachers of 34 use cases are 50-60 years old (28.57%) and 6 are 60 or older (5.04%). This comprises two third of all collected use cases, younger ages are less present in the sample (20-30 years: n=11, 9.24%; 20-30 years: n=29, 24.37%). Further, the sample mostly includes use cases in North Rhine-Westphalia (n=53, 44.54%), which is by population the largest federal state in Germany.

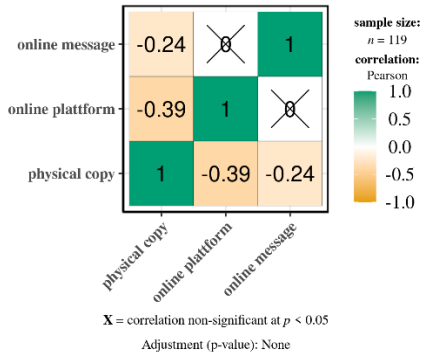
Like previous research points out, worksheets are self authored media and shared by teachers. This study underlines these characteristics of worksheets. Accordingly, most worksheets of the collected use cases are fully self-authored by one teacher (n=84, 70.59%). A minority is

revised from textbooks (n=16, 13.45%), online repositories (n=5, 4.20%) or from colleagues as well as collaborative edited (n=6, 5.04%). Another minority are unedited copies from textbooks without changes (n=5, 4.20%) or unedited copied from the internet without changes (n=2, 1.68%)[1]. In 52 use cases the worksheet is shared with colleagues after revision or use (43.70%).

The survey was conducted during the first lockdown due to the COVID-19 pandemic in Germany. Face-to-face teaching in classrooms was restricted to reduce infection rates. Accordingly, the investigated worksheet use cases should include distance teaching and learning scenarios. But still, the most used distribution type is a physical copy. The survey offered the possibility to combine multiple distribution types. Accordingly, 37 use cases draw on online platform for unique or supplementary distribution (31.09%) and 26 use cases draw on online messages for unique or supplementary distribution (21.85%). Using online messages like e-mail or instant messaging maybe a sign that a nursing school doesn't have access to an online platform, as messages like e-mail do not rely on those infrastructures. A Pearsons correlation matrix is used to further unveil the relation of these three types of distribution (see figure 2). It shows negative significant correlations between the distribution of physical copies and the online distribution. Although the correlation coefficient is low, this shows a slight tendency to avoid online distribution in case of physical copies as well as to avoid physical copies in cases of online distribution like messages or platforms. Hereby, the correlation coefficient is interpreted as a measure of linear relationship that further indicates a positive or negative relationship between variables (Goodwin & Leech, 2006; Rodgers & Nicewander, 1988).

Figure 2

Correlation matrix of distribution types of worksheets



Beside types of distribution, the survey focuses on types of media used together with the worksheet in online as well as offline use scenarios (see figure 3A). Regarding significant ($p<0.05$) pairs of worksheet accompanying media we found positive and significant correlations between data projectors and films ($r=0.21$, $p=0.02$) as well as blackboards and overhead projectors ($r=0.2$, $p=0.03$). As the correlation coefficients are low, this shows a slight tendency in the data set to use these media together in worksheet use cases. Data projectors and films have a certain similarity as projectors may be used to show presentations as well as films. This describes workshop use cases together with digital media as teaching practice. The weak correlation between overhead projectors and blackboard represents a teaching practice of combining traditional media. Many classrooms still have overhead projects for transparencies as well as blackboard.

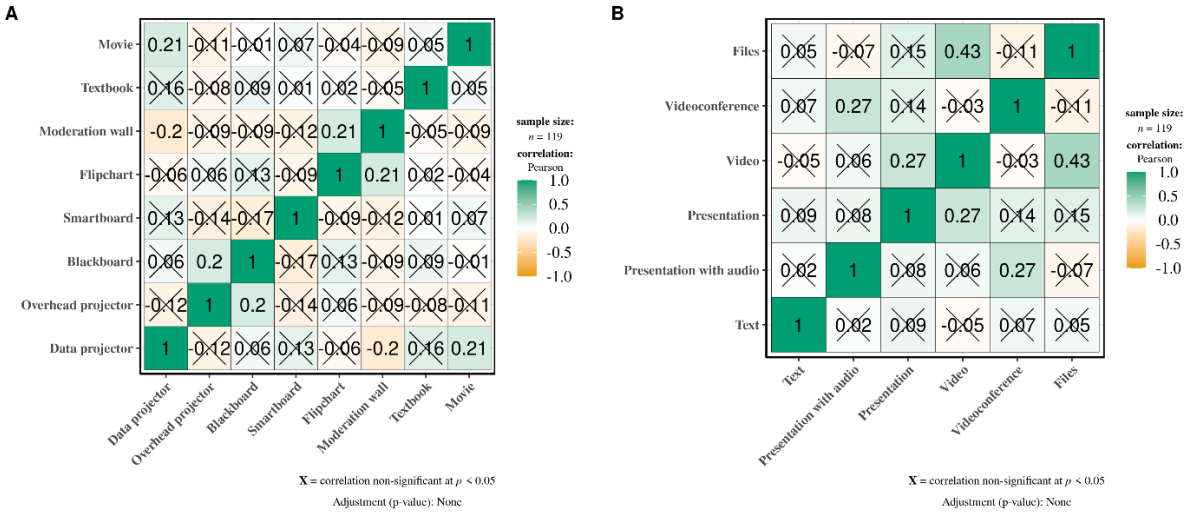
[1] In this multiple-choice question about the source of the worksheet, one reply in the data remains uncategorised (n=1, 0.84%).

Concerning the use of supplementary media in online learning scenarios (see figure 3B), we found correlations between audio-presentations and videoconferences (r=0.27, p=0.00), simple powerpoint slides and videos (r=0.27, p=0.00) as well as videos and arbitrary files (p=0.43, p=0.00) in the data set. This correlation analysis of supplementary media use in online learning environments is limited due to the low correlation coefficient, but it again emphasizes common teaching practices in online scenarios. Combining presentations containing audio tracks with video conferences illustrate a teaching practice alternating online media for self-regulated learning and virtual classrooms. Combining simple powerpoint presentations and video replicates a teaching practice of classrooms in online learning scenarios. Further, using videos and arbitrary files together with worksheets in online learning scenarios refers to use cases with a high number of digital media for self-regulated learning.

A limitation of the previous data exploration with Pearsons correlation are the low correlation coefficients. This indicates that the emphasized teaching practices with worksheets in the dataset remain tendencies and there are also use cases that differ from these tendencies. As another limitation, the use of Pearsons correlation to explore structures and relationships in the data set only unveils linear correlations.

Figure 3

Correlation matrix of accompanying media of worksheet use cases in classroom scenario (A) and online scenario (B)



The qualitative artefact analysis on a sample of 14 selected use cases unveil the linear learning sequence and the schematic knowledge representation of the worksheets. Even distributed in digital form as PDF files they represent the common format of a paper sheet. Worksheets often combine textual and pictorial elements. Logo of the school and name of the teacher are often put on the top or the bottom of the page. Worksheets tend to give explicit hints on how and wherewith learners should work on tasks. Worksheets also contain links to online resources like websites, video platforms etc. or refer to textbooks. The qualitative investigation shows a tendency of worksheets to address learners as recipients of knowledge and not as learning subjects. For example, they show a tendency to focus on rules and factual knowledge. Worksheets further hold a focus on knowledge transfer and reproduction instead of supporting self-regulated and personal acquiring of contents and resources by learners. They focus on a knowledge stock, that is as verifiable and retrievable by learners. Although the worksheets are used in nursing training, they often do not contain explicit references to nursing topics or curricular units. Accordingly, the worksheet itself doesn't inform about the learning or teaching aims. They do not give

any instruction on how to continue after finishing the sheet. Although nurses mostly operate in teams, the worksheets usual require learners to work alone.

5 Discussion

Collaborative practices like authoring and using worksheets indicate a flow of information and experiences in a teaching and learning ecosystem and represent a kind of self-organisation of teachers. The study underlines that collaborative editing and sharing of worksheets is a common practice among nursing teachers in Germany. Reworking worksheets of colleagues as well as sharing worksheets with them are kinds of collaborations on worksheets. Considering collaboration networks as professionalisation of teacher (Rehm & Notten, 2016), this collaboration is interesting for a pedagogical engaged design of educational ecosystems. Overcoming the limitations of paper-based worksheets, digital worksheets as well as web-based learning activities can be considered as education resources. This shapes a digital ecosystem of using, revising and sharing open educational resources (Kerres & Heinen, 2015).

The combination of different kinds of media highlights the role of worksheet to enable relations between entities and resources of an educational ecosystem. The tendency to combine worksheets with other learning media like movies in classroom scenario or videos in online scenarios shape worksheets as precursor of web-based learning activities. Worksheets in nursing schools are used in classroom scenarios as well as in online scenarios and not only rely on textbooks, but also draw on audiovisual media. As the accompanying media in worksheet use cases suggest, they feature characteristics of active and self-organised learning. But unlike web-based learning activities, movies in classrooms doesn't offer the possibility for learners to individually forward or repeat passages of videos. Accordingly, to develop the learner-centred potentials of web-based learning activities, teaching practices with worksheets need to move further towards individual, multimedia and interactive learning resources. Web based learning activities offers a rich amount of interactive learning activities.

Focussing on the content, worksheets appear fragmented in the larger context of learning processes. Regarding digital platforms, this tendency might be complemented by collaboration among learners and improved by more embedding them into learning sequences and learning units. Further, the tasks in worksheets primary address rules and facts rather then central concepts of nursing didactics (Dütthorn, 2013), e. g. an hermeneutic perspective on nursing recipients through case studies. This neglect might be revealed and discussed in a protected online exchange environment for nursing teachers as part of a digital educational ecosystem. Finally, worksheets tend to focus on results and feasible knowledge. This might be complemented by competences and processes of discussions and communications in learning processes. Accordingly, digital educational ecosystems might include abilities for statements, comments and discussions on learning artefacts.

Transforming paper-based worksheets into web-based learning tasks distributed by LMS is a challenge for nursing teachers. Our study suggests the necessity of change in task culture in nursing schools. The main challenging topics can be seen in (a) developing a holistic and learner centred school culture of teaching with digital tasks and activities and (b) enabling teachers to author digital learning tasks focussing on thinking in cases than reproducing knowledge facts.

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Competency Models for the Digital Transformation and Digitalization in European SMEs and Implications for Vocational Training in Learning Factories and Makerspaces

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Abstract

In Europe, SMEs account for the majority of businesses and are important contributors to job creation and global economic development. The digitalization of business processes of manufacturing companies offers enormous potentials in terms of productivity. Nevertheless, the digitalization level of SMEs is low compared to large enterprises, as SMEs lack in resources in terms of time, money, and personnel. Another reason is, that SMEs are lacking in qualified workforce for the digital transformation. Learning factories and makerspaces offer valuable learning environments to transfer competencies for the digital transformation and digitalization. In this paper the results of an interview study with SMEs are presented that included the investigation of required competencies of the workforce in this field. Moreover, the didactical transfer of one of the required competencies is shown and implications for trainings in learning factories and makerspaces are derived. In conclusion a structured analysis of available and required competences should be performed in order to provide tailored, modular training programs using digital infrastructures like learning factories and makerspaces.

Keywords

learning factory, makerspace, digitalization, vocational education and training

1 Introduction

Manufacturing companies in Europe are currently facing major challenges, such as volatility and uncertainty (Würzburger, 2019). Digitalization is offering multiple opportunities, especially for the manufacturing industry. By implementing digital technologies, it is not only

possible to increase productivity and efficiency in the value chain, but also to meet the challenges in a volatile business environment (Schuh et al., 2017). Several studies show that small and medium-sized enterprises (SMEs) in particular are still clearly behind large companies in terms of digital transformation and the use of digital technologies (Hölzl et al., 2019). SMEs in Austria are struggling to take advantage of the opportunities presented by digitization in the value chain (Arthur D. Little, 2017; Gangl & Sonntag, 2020). It was found in research studies (Lindner, 2019; Hölzl et al., 2019) that this might be due to the fact that SMEs have limited time, financial and personnel resources and the management as well as employees lack in competencies regarding the digital transformation and digitalization. As a result, it is of particular importance to investigate the competencies needed in order to support the digital transformation and the use of digital technologies along the value chain (Buer et al., 2020). (Digital) competencies can be subsumed in competency models. Lucia and Lepsinger (2003, p. 211) define a competency model as "a descriptive tool that identifies the competencies needed to perform a role effectively in the organization and help the business meet its strategic objectives". Prior to the interview study, several competency models and relevant digital competencies in SMEs were analyzed (e.g., Buer et al., 2020; Eller et al., 2020). It can be concluded that there is a lack of focus on current challenges in SMEs, such as volatility and uncertainty. Moreover, these models do not take into regard the value adding process but they primarily focus on leadership. It has been shown that competency requirements of workers of SMEs differ from the demands of larger companies. In larger companies the usage of technologies is in the focus of attention. The workforce in SMEs needs to have more knowledge on process and data analytics (acatech et al., 2016). Nevertheless, most trainings found in a literature analysis are either independent of company size or focus on larger companies. Furthermore, there are only few practical training courses that concentrate on the practical implementation of digitalization (Block et al., 2018). Traditional teaching methods show lower effectiveness in terms of developing competencies of students as well as of the workforce for the current and future value creation processes, compared to trainings in learning factories or makerspaces (Abele et al., 2015; Cachay et al., 2012).

The goal of this paper is to derive required competencies of the workforce in SMEs based on 12 expert interviews with Austrian SMEs and demonstrate how these competencies can be developed in learning factories and makerspaces.

Therefore, the following research questions are defined:

RQ 1. Which are important competencies for digitalization and digital transformation in the value chain of small and medium-sized manufacturing enterprises in Austria?

RQ 2. What are implications for the vocational training in the field of digital transformation and digitalization in learning factories and makerspaces?

In the following, competency models in general and the transfer of competencies in SMEs are discussed. In a next step, learning factories are presented as learning environments in vocational training. Another chapter is devoted to an interview study with the goal to collect requirements for employees in the context of digital transformation and to contextualize the resulting data with an adequate competency model. The derivation of a competency is used as an example to demonstrate how sub-competencies can be described and how these can be transformed into concrete actions.

2 Competency Models

Following Lanza et al. (2018), the actors' competencies determine the structure for a volatile orientation of companies in dealing with tasks that Industry 4.0 places on them. The aim of the

project "Voladigital"[1] is, on the one hand, to define the digital and volatile challenges of SMEs and, on the other hand, to model the necessary, primarily digital competencies of employees and to evaluate them accordingly. It is first necessary to gain a uniform understanding of competencies for this work in order to develop a competency model focusing digital competencies that is adequate for SMEs. The inflationary use of the term "competency" poses a dilemma with regard to systematization and the development of a problem context and problem differentiation (Moser, 2014, p. 18). Rolf Arnold and Ingeborg Schüßler (2008) differentiate (1) the subject orientation of the term, thus distinguishing it from the term "qualification", which is socially determined; (2) the holism, because the term brings together cognitive, evaluative, and emotional-motivational aspects of action (Erpenbeck & Heyse, 1996, p. 55); and (3) self-organization (Reetz, 1990; Erpenbeck & Heyse, 1996), because operational task assignments require workers to take on organizational and dispositive tasks that go in the direction of self-organized action. The term "competency" is associated with the problem-solving and orientation skills that enable people to succeed in open, complex and unpredictable situations (Erpenbeck & Heyse, 1996). Based on the understanding of competency described above, competencies should relate to employees, i.e. to the holistically perceived human being. In this sense, context-specific activities and tasks are to be described, which can be mapped in Industrie 4.0 domains. The challenge of a competency model is to define structures and characterize levels (Klieme & Leutner, 2006, p. 883). In this context, it must be clarified which and how many competency dimensions can be differentiated, and which concrete situational requirements people can master at which level of a competency. With regard to the degree of specification, Gessler (2010, p. 54 ff.) describes three categories of competency models, which are presented here.

Table 1
Competency models following Gessler (2010)

	General Competency Models	**Enterprise-specific Competency Models**	**Domain-specific Competency Models**
Term	One-size-fits-all	Multiple-job approach	Single-job
Specification	Non-enterprise-specific	Medium level of abstraction, non-specific to the profession, formulated in rather general terms, but enterprise-specific	Work processes are analyzed and competency requirements are described by means of studies, necessary competencies in the work process are recorded
Example	Kompetenzatlas Heyse & Erpenbeck (2004)	Arises discursively, example see below	Competency model for electronics technician for automation technology (e.g., Link & Geißel, 2015)
Development	Mapping of general competencies	Description of competencies required in the enterprise due to current and future requirements, discursive emergence	Larger-scale surveys in occupational fields

General competency models (one-size-fits-all) are constructed unspecifically for enterprises. The competency atlas by Heyse and Erpenbeck (2004) can be cited as an example, which divides competencies into four main dimensions (personal competencies, social-communicative competencies, technical and methodological competencies, activity and action competencies) and further differentiates these into 64 subdimensions. The problem with this model lies in the largely incoherent selection and unclear assignment of the sub-competencies to the main

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dimensions. In addition, some of the subdimensions overlap. Nevertheless, the model offers a plausible framework for classifying context-related competencies. Enterprise-specific competency models (multiple-job approach) have a medium level of abstraction. Based on abstract dimensions such as personal competencies, social competencies and professional competencies, company-specific guidelines are discursively related to these as "cross-sectional dimensions". The advantage of this model lies in its discursive emergence, whereby the demand for competencies, as are subject orientation, self-organizational ability and holism, can be met. Possible risks of this model are lengthy and uncontrollable processes of consensus building regarding descriptions of competencies, domains and levels. Domain-specific competency models (single-job) are described as the most specified models. Work processes are recorded and analyzed, and competencies required for the work process are derived from them. The rigidity of the task descriptions can be seen as a disadvantage, making situational flexibility and self-organized development of the actors difficult. Based on an extensive survey process, which will not be discussed in detail in this article, the "Voladigital" project will identify the competencies of employees required for SMEs and map them in a model. In order to integrate competencies in the context of Industrie 4.0 into this model, the "multiple-job approach" model appears to be promising because it has a medium level of abstraction, which offers openness for company-specific objectives. Based on a competency model yet to be fleshed out in the project, the next step is to provide effective learning environments that enable the development of employee competencies in SMEs. Learning factories and makerspaces, as demonstrated in the following chapter, support the development of competencies as described above.

3 Learning Factories and Makerspaces as Learning Environments

The term learning factory was first introduced in 1994 in the course of a research grant to the Penn State University, with the aim of creating an infrastructure at the university for interdisciplinary, interactive projects with a strong industrial connection. In recent years, however, the term has been strongly developed by European universities and initiatives such as the "Conference on Learning Factories". In the new understanding, the term learning factory is used for systems that include elements of learning or teaching as well as a production environment (Wagner et al., 2012, p. 110). Learning factories can take on a variety of configurations, but the processes and technologies used are chosen to be close to the reality (Abele et al., 2017, p. 2), making them a suitable approach to education and training in realistic manufacturing environments (Abele et al., 2015, p. 804). Due to the practical teaching concept, they offer the potential for competency development in a self-directed learning process (Müller-Frommeyer et al., 2017, p. 307).

The term makerspace is closely linked to the Maker Movement and its individuals, the makers, who are generally groups or individuals who produce objects based on their own ideas. The focus here is not on economic advantages, but rather on the interest in creating new products or individualizing existing products (Friessnig et al., 2016, p. 48). A makerspace is the center or also the workspace where a group comes together to work on projects (Hatch, 2014, p. 18). Besides knowledge exchange with like-minded people and social aspects, makerspaces also provide low-threshold access to digital production facilities. The offer in typical makerspace facilities varies and ranges from digital production machines (e.g., 3D printers, laser cutters, vinyl cutters) to woodworking equipment (e.g., CNC milling machines for wood, saws, drills) and metalworking equipment (e.g., welding machines) to electronic equipment (e.g., soldering stations) or textile machines (e.g., sewing machines, textile printing machines) (Böhm et al., 2015, p. 4).

A learning factory as a learning environment has authentic, multi-station processes, a changeable setting that corresponds to a real value chain, a physically manufactured product, and a didactic concept that enables learning through one's own actions on site. In general, the

purpose of a learning factory is to enable learning in production environments, and it is not only aimed at students as a target group but is also explicitly available for advanced training of industry employees (Abele et al., 2017, p. 809). This offers an ideal learning environment for teaching competencies relevant to production environments and is adaptable enough to also cover digital and future-relevant topics. Usually, the teaching concepts of a learning factory are oriented towards experiential learning as well as active action-oriented learning. Thus, instead of a mere reproduction of information, the focus is on developing understanding of the concepts taught (Crawley et al., 2014, p. 22). Research shows a positive effect of learning factories in terms of knowledge retention and transfer opportunities, especially compared to traditional teaching methods (Cachay et al., 2012, p. 1151).

Makerspaces pursue a similar teaching and learning concept and focus on learning experiences through active "making" or "building" of tangible objects and products. They have developed into new centers of learning and, in addition to their own infrastructure, rely primarily on a worldwide network for the exchange of knowledge and experience, on low-threshold access to (production) tools, on openly accessible project libraries and on a broad range of training and support (Böhm, 2018, p. 80).

4 Methodology

The study presented is a part of the project "Voladigital". In the first step of the research project, the analysis phase, challenges, and competency requirements with regard to digitization were investigated on the basis of knowledge from previously conducted projects as well as a qualitative preliminary study. During this study, experts from consulting firms and companies in the manufacturing industry were interviewed. Based on this, a questionnaire was developed, in which competency requirements and challenges were investigated. These were evaluated with the help of descriptive statistical methods. In the solution development phase, it was evaluated how these competencies can be taught. Theoretical training contents were created, which are to be made available to all SMEs free of charge in future on an intelligent e-learning platform. This will teach how digitization can be used and implemented sensibly. In addition, knowledge about digital technologies and other skills will be determined, depending on the survey. Based on the individual requirements, the intelligent learning system can personalize modules with teaching content as well as quizzes. In the practical part of the training concept, theoretically learned content is presented in the LEAD Factory, a learning factory, and the Schumpeter Laboratory for Innovation. Both infrastructures are used to cover the spectrum from product development (Schumpeter Laboratory for Innovation) to (serial) production (LEAD Factory).

5 Interview Study

First, a literature review was performed on the competencies and the competency models regarding digitalization and the digital transformation in the value creation process in the manufacturing industry. Thereby, 30 literature sources were identified and analysed. This literature review was the basis for the development of the interview guideline. In order to select suitable interview partners, the procedures of theoretical and purposive sampling were performed. Theoretical sampling is an iterative process in which data gathering and data analysis alternate while the sample size has not been determined in advance (Birks and Mills, 2012). It was decided to interview general managers from SMEs in Austria. When selecting the sample, care was taken to ensure that companies from different industries, with different numbers of employees and with different levels of sales were included. Concerning the business branches, following industries were included: metal production and processing, manufacturing of fabricated metal products, manufacturing of computers, electronic and optical products, manufacturing of electrical equipment, manufacturing of motor vehicles, trailers and semi-trailers and other transport equipment. The number of employees of the interviewed SMEs ranged from 15

to 180. The turnover is between € 2 Mio and € 45 Mio. The interviews were performed from June to September 2020 using videoconferencing software. One interview partner was interviewed personally. The length of the interviews ranged from 0.6 up to 1 hour.

The interview guideline was created according to the SPSS procedure of Helfferich (2009). **S**: In order to create a guideline, it makes sense to first collect a large number of questions in an open brainstorming session. **P**: If there is a large pool of questions, the questions have to be reduced and must be checked for suitability; all points that do not fit must be deleted. **S**: The remaining questions have to be sorted by content/theme as well as by open-ended narrative prompts, maintenance questions, and specific follow-up questions. **S**: Finally, the checked and sorted questions must be subsumed into a guideline, i.e., classified or subordinated. The guideline was structured in different types of questions according to Helfferich (2009).

- Leading questions: This serves as a narrative prompt/stimulus and is formulated very openly: "Please tell me how …?"
- Up-keeping questions: It does not provide a new topic, but maintains the narrative flow or provides impulses for associative thoughts e.g. "What else can you think of?"
- Concrete follow-up questions: Here, follow-up questions can be formulated about aspects of content that have not yet occurred in the conversation.

The interviews were analyzed qualitatively with the help of the software MAXQDA according to the qualitative content analysis of Mayring (2010). The coding system was based on a combined deductive and inductive system. Categories include, amongst others, general competencies, competencies in production and competencies in product development. As a result, the competency model for digitalization and digital transformation can be derived. As a last step, the implications for vocational trainings in learning factories and makerspaces are derived. The term learning factory is composed of "learning" which stands for the overall objective, the development competencies, and "factory" for the replica of a realistic production site. A learning factory is a special learning environment in which (value creating) processes and technologies are modelled based on a real industrial company. The didactical concept of learning factories grounds on experimental and problem-based learning. Participants are able to improve processes and experience the improvement in the learning environment (Abele et al., 2015). Makerspaces are places where makers can come to use tools alone or together or to carry out projects. Moreover, they are suitable learning environments in the field of product development and innovation (Peppler et al., 2016). The findings are based on a study and on experiences in makerspaces designed and operated by the Graz University of Technology.

6 Findings

In the literature, competencies are described in connection with digitization that the workforce of the future should have, whereby creativity, flexibility, agility, the ability to innovate, the exchange in networks, working in a team and the implementation of ideas are mentioned above all. The most relevant technical competencies include interaction with digital technologies, data and information processing and analysis, and ICT competencies. To cluster these competencies according to Erpenbeck and von Rosenstiel (2007) proved to be suitable. Several competencies were derived that are required in SMEs for digitalization and the digital transformation. These competencies are listed in Table 1 and explained. Moreover, they are categorized in the competency model of Erpenbeck and von Rosenstiel (2007).

Personal competencies **(P)**: As the disposition of a person to act reflexively in a self-organized manner. Self-assessment, productive attitudes, value attitudes, motives, motivation to develop and learn creatively in the context of work and outside it. Activity- and implementation-oriented competencies **(A)**: As the disposition of a person to act in an active and holistic self-

organized way and to direct this action towards the implementation of intentions, plans and intentions. This disposition thus captures the ability to integrate the own emotions, motivations, abilities and experiences and all other competencies into one's own will drives and to successfully realize actions. Professional-methodical competencies **(M)**: As the disposition of a person to act in a mentally and physically self-organized manner when solving factual-objective problems, i.e., to creatively solve problems using technical and instrumental knowledge, skills and abilities, and to classify and evaluate knowledge in a sense-oriented manner. Social-communicative competencies **(S)**: As the disposition to act in a communicative and cooperative self-organized manner, i.e., to cooperate creatively with others, to behave in a group- and relationship-oriented manner, and to develop new plans, tasks and goals.

Table 2
Required competencies of employees in SMEs

Competency	Explanation of the competency	Category of competency (Erpenbeck & von Rosenstiel 2007)
Flexibility	Employees need to show personal flexibility in terms of work time, type of work and what technology they work with.	P
Working with sensors	In order to gain value through data, data needs to be collected. Therefore, basic knowledge on sensors and how to apply them are required of employees.	A
Work with data	Collected data needs to be analyzed and interpreted in order to gain value (improved processes, higher productivity etc.).	A
Digital production planning and controlling	Employees should have the ability to perform production planning and controlling digitally and need to be able to work with the corresponding software.	M
Process understanding and process analysis	There is a need to be able to understand the process as this is the basis for process improvements. Therefore, employees need to be able to analyze the value creation process from innovation to services.	M
Basic knowledge regarding digital technologies	There needs to be a basic knowledge on state-of-the-art digital technologies. Employees need to know about the availability and area of application of various technologies.	M
Problem solving	Methods of problem solving need to be known and applied by employees in order to overcome problems in the value creation process.	M
Development of a digital strategy/roadmap	Employees need to be able to develop a digital strategy/roadmap in order to be able to implement digital technologies purposefully.	M
Interdisciplinary collaboration	Employees need to be able to work with software and hardware developers. In the company, people need to be able to work together at different hierarchical levels and also with other departments.	S

In the following an example demonstrates the didactical transfer of the competency “Problem solving” according to Tisch et al. (2015).

Table 3
Didactical transfer of competency problem solving

	Subcompetencies	Actions	Knowledge Base
Process understanding and process analysis	Participants are able to describe a problem.	Participants describe a problem occurring in the learning factory.	Basic knowledge on how to describe a problem Methods e.g. 5W2H
	Participants have the ability to define a target.	Participants define a target state.	Basic knowledge on target formulation (SMART Targets)
	Participants have the ability to analyze a problem (Root Cause Analysis).	Participants perform a Root Cause Analysis on the problem.	Methods of Root Cause Analysis (5 Why's, Fishbone diagram)
	Participants have the ability to solve a problem (with the help of digital tools).	Participants perform solving (with the help of digital tools).	Problem Solving Methodology (A3)
	Participants have the ability to create an action plan.	Participants create an action plan.	Brainstorming Multi-Criteria Analysis Portfolio chart
	Participants are able to define standards and perform basic knowledge management.	Participants define a standard and have plan for knowledge management.	Definition of standards Basic knowledge of knowledge management

7 Answering the Research Questions and Conclusion

RQ 1. Which are important competencies for digitalization and digital transformation in the value chain of small and medium-sized manufacturing enterprises in Austria?

From our qualitative interview data, we derive competencies which are mapped in Table 2. These were categorized according to Erpenbeck and von Rosenstiel (2007). An example of the didactical transfer of a competency was shown. RQ 2. What are implications for the vocational training in the field of digital transformation and digitalization in learning factories and makerspaces? The goals and potentials of digitalization and the digital transformation in SMEs are meeting customer needs, creating new (digital) business models to generate more revenue through services and new innovations, increasing productivity in manufacturing, and increasing flexibility and agility. Concerning challenges regarding digitalization and the digital transformation, a lack of resources (money, time, and personnel), missing competencies and a missing strategy needs to be pointed out. Interviewees of SMEs were also asked regarding requirements for trainings. The following implications for trainings in learning factories and makerspaces can be derived.

- It is important to communicate in the trainings, why digitalization and the digital transformation are important for the company. Therefore, there is a need to show value creation improvements from innovation (makerspace) to the learning factory (production) based on digitalization, with the requirement that both the learning factory and also the makerspace need to be adaptable in terms of processes.
- Another requirement is that best practice examples need to be included.
- Trainings need to include all steps of the value creation process for a better process understanding. Therefore, it is important to include makerspaces as well as learning factories. Also the interface between the two infrastructures – from innovation to production (ramp-up management) – needs to be incorporated in trainings.

As SMEs lack in resources (time, money, personnel) it is important that trainings suit the companies. Therefore, trainings in learning factories and makerspaces need to be modularized and based on requirements. These modules need to be chosen for individual trainings. In a further step, the competencies derived from the interview will be analyzed and based on that, trainings in learning factories and makerspaces will be developed.

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An Intermediate Conclusion – Potentials of Artefact Analysis for the Field of International VET Research

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Abstract

Context: Sometimes international Vocational Education and Training (VET) research has to delve deep into cultural context in order to understand the reasoning and action of individuals related to training and work. The project Cultural Practice of Non-Academic Work in Mexico (KuPraMex), funded by the German Federal Ministry of Education and Research (BMBF), explores social representations of non-academic work in Mexico using the analysis of non-visual and visual cultural artefacts (Bohnsack, 2008; Lueger, 2010; Lueger & Froschauer, 2018). This approach is currently discussed by disciplines such as the social sciences. Although the analysis of artefacts, within the scope of sociological theory formation, is rather a marginal phenomenon (Lueger & Froschauer, 2018), its relevance for theorising cannot be negated (Lueger, 2010). Artefacts are put into the material world by people and therefore represent the practices through which they were created. On the other hand, their creation is not without effects on the social world (Lueger & Froschauer, 2018).
Approach: For this reciprocity, artefact analysis seems an attractive way to analyse complex interactions between individuals, social structures, and cultural contexts in foreign societies. Within the project KuPraMex a comprehensive analysis of visual as well as non-visual artefacts is carried out, related to the cultural context of Mexico, in order to analyse prevailing connotations, images, etc. of non-academic work. In the words of Moscovici (Moscovici, 1988), the aim is to identify the circulating social representations. On the grounds of this, the potential of artefact analysis for cultural sensitive studies in foreign VET-systems like Mexico will be discussed.
Findings: In the context of the above-mentioned project, it was possible to get an impression regarding the central core of social representations (Abric, 1993) of non-academic work by analysing artefacts such as tele-novelas, films, memes, murals or novels. With the help of theoretically-based analysis schemes about social formations of labour, as well as open minded search for *in situ* findings, the international project team was able to extract core hypotheses about social representation of non-academic work in various working fields.
Conclusion: The core hypotheses about work deduced from circulating narratives and representations found in cultural artefacts proved to be very helpful for the next steps in the project. Especially in pandemic times when it is impossible to travel to a country to get familiar with the research context, the analysis of reports, scientific literature and cultural artefacts can be helpful to familiarise oneself with a unknown context. This way of approaching a (partly) unknown research context seems to open up a more holistic view of a cultural context. Due to this multi perspective approach a certain degree of cultural awareness for the scientist can be

expected. Moreover, it can support the development of meaningful survey instruments. However, as each method has its limits, it makes sense to combine artefact analysis with other methods, such as interviews. Overall, it can be concluded that the analysis of artefacts holds great potential for culturally sensitive international VET research and – in combination with other methods – it contributes to a deeper understanding of culturally shaped meanings and values.

Keywords

vocational education training, VET, non-academic work, cultural artefacts, social representation

1 Introduction

Investments in technical and vocational education and training (TVET) pay off for national economies – this is shown, for example, by the effects of TVET on the reduction of youth unemployment, the reduction of transaction costs in personnel recruitment, or on the integration of labour into the formal labour market. At the same time, positive effects can be observed at the micro level, such as higher income and employment security (Almeida et al., 2015; Cáceres-Reebs & Schneider, 2013; Fuchs et al., 2020; Icardi, 2021; OECD, 2019; World Bank, 2019). Due to the aforementioned advantages and the positive experience already gained with dual training, the area of vocational education and training in Mexico was expanded after a pilot phase to include the so-called Modelo Méxicano de Formación Dual (MMFD). The MMFD is based on the German model of dual training, although it has been adapted or "tropicalised" to the cultural context (Cáceres-Reebs & Schneider, 2013). It has already been implemented in some regions of the country (Fuchs et al., 2020; Wiemann, 2020).

Although TVET programmes are seen as having great potential, the demand for vocational education and training among the Mexican population is relatively low. According to the Organisation for Economic Co-operation and Development (OECD), the enrolment rate in TVET programmes in Mexico is 38.2%, below the average of 45.7% (OECD, 2019). The question therefore arises as to the possible reasons for the low demand for such non-academic[1] training programmes.

The project Cultural Practice of Non-Academic Work in Mexico (KuPraMex), funded by the Federal Ministry of Education and Research (BMBF), focuses on the socially shared and culturally anchored notions, images, ideas, theories, perceptions or ‘social representations’ (Moscovici, 1988) of work. Social representations can manifest themselves in narratives, practices of action, but also in cultural artefacts (Schützeichel, 2007). Thus, in the context of the project, different data are included and examined. In addition to interviews, cultural artefacts such as pictures, books, films, etc. are also analysed.

In recent years, the relevance of cultural artefacts for the generation of theories has been thematised and discussed in various scientific disciplines, such as the social sciences. Accordingly, methodological approaches to their analysis have been developed (Froschauer, 2009; Lueger, 2010; Lueger & Froschauer, 2018). Existing methods within the framework of the so-called ‘visual turn’ (Boxenbaum et al., 2018), such as the documentary method, were also expanded to include the possibility of examining films and photos (Bohnsack, 2008).

Although the analysis of cultural artefacts is said to have great potential because the method is applied where language-based procedures, such as qualitative interviews, reach their limits, Lueger and Froschauer (2018) note a certain reluctance to use this methodological approach in the social sciences. In the field of German-language VET research, there are initial studies that

[1] In this context, work in production, agriculture, health, tourism and other services or administration that requires competences not acquired at universities is included under the umbrella term of non-academic work.

examine the influence of series and new media on the career aspirations of young people (Berding et al., 2020; Jahncke et al., 2020). However, such studies are currently still the exception. This applies accordingly to international VET research. This paper will therefore outline the methodological approach of KuPraMex and explore the question of what potential the analysis of cultural artefacts holds for international VET research.

2 Cultural Artefacts and the Social World

There is no definitional agreement on the concept of culture, but it always refers to what has been created by humans – in the entire diversity of forms of expression (Nünning, 2009). Accordingly, objects created or processed by humans are also part of the respective culture. As a consequence, a cultural artefact can be understood as objectified cultural capital (Bourdieu, 1983) due to its materiality. Its creation, use or modification occurs - consciously or unconsciously – through human practices (Lueger & Froschauer, 2018). Accordingly, cultural artefacts are "[...] materialised products of human action that represent objectifications of social relations and social conditions" (Lueger, 2010, p. 92; translated by author).

Given this, cultural artefacts reveal something about the circumstances of their production. Once placed in the material world, cultural artefacts, due to their diversity and omnipresence, have effects on the social world. In this context, we can therefore also speak of a reciprocity of subject and object, whereby the reading of cultural artefacts depends on the incorporated cultural capital of the recipients (Bourdieu, 1983). Thus, socially shared notions, images, ideas, theories and perceptions or 'social representations' which is the term the social psychologist Moscovici (1988) would apply in this context.

Moscovici's concept "[…] concern[s] the contents of everyday thinking and the stock of ideas that gives coherence to our religious beliefs, political ideas and the connections we create as spontaneously as we breathe. They make it possible for us to classify persons and objects, to compare and explain behaviours and to objectify them as parts of our social setting" (Moscovici, 1988, p. 214).

He considers social representations as a part of social organisation that also frame individuals' perceptions of social structures and performative actions. Moreover, these are also always context-dependent and an expression of cultural beliefs, symbols and values. Social representations are dynamic entities that are actualised through performative acts. simultaneously, they have a certain degree of autonomy regarding the production of meaning (Moscovici, 1988; Schützeichel, 2007). In different wording, social representations to some extent "have a life of their own" (Moscovici & Duveen, 2001). Furthermore, social representations are said to have the function of transforming the unknown into the known, which refers to the process of "anchoring" (Moscovici, 1988; Araya Umaña, 2002).

Against the background that social representations combine contradictory characteristics, the concept sometimes appears paradoxical. These are rigid and fluid at the same time, which is why Abric (1993) split them into peripheral elements and a central core. Peripheral elements are related to individual experiences and characterised by fluidity, instability, etc. In addition, the peripheral elements form an interface between the outside world and the central core, while at the same time acting as a protective shield, preserving the central core from change to a certain extent. For example, repeated experiences or profound influences that differ from the central core can change it. In an overall sense, though, the central core of social representations is marked by relatively stability. Therefore, KuPraMex focuses primarily on the central core of social representations, which is assumed to manifest itself in cultural artefacts. Thus, from the analysis of cultural artefacts, clues to their circumstances of origin can be derived and the core of social representations can be approached. In view of this, and because of their diversity, reciprocity and omnipresence, the analysis of cultural artefacts seems particularly attractive, which is why a possible approach is presented below.

3 Methodological Approach to Artefact Analysis

The analysis of cultural artefacts is qualitatively oriented and – unlike document analysis – focuses less on texts than on objects. Due to their reciprocity, diversity and omnipresence, cultural artefacts offer significant advantages for social science theory building. At the same time, the aspect of omnipresence of cultural artefacts presents researchers with the dilemma of selection. Although cultural artefacts are objects created by human practices, they are considered "natural" data in the research context. This is because cultural artefacts find their way into the material world without any influence on the part of the researchers. Moreover, due to their physical presence, they are characterised by permanent availability, which favours a circular process of interpretation (Froschauer, 2009).

In terms of conducting high-quality artefact analysis, Lueger and Froschauer (2018) postulate the following conditions of successful research:

- group interpretation
- comprehensive interpretation of meaning with a critical attitude
- avoidance of time pressure
- consideration of reflection loops
- circular research process
- consistent integration of further artefacts

In addition, they distinguish seven different levels of artefact analysis (see Table I). However, these cannot be stringently separated from each other, as there tends to be overlaps in practical application. Accordingly, the systematisation of the levels of analysis represents a heuristic instrument to consider as many facets as possible as well as the complexity of an artefact (Lueger & Froschauer, 2018).

Table I

Levels of artefact analysis (Lueger & Froschauer, 2018, p. 65; translated by author)

Levels of Analysis of Artefacts		
Research Context of the Artefact Analysis	Research Interest Integration into the Research Process Specification of the Artifact Analysis	
Conditions of Existence of the Artefact	Reasons for Existence Conditions for Existence	Core Scope of Interpretation
Descriptive Analysis	Materiality Inner Structure Contextual Characteristics	
Everyday Contextual Embedding of Meaning	Social Meanings Involved Actors Situated Context Analysis	
Distanced-Structural Analysis	Production Artefact Handling Effects & Functions Scenic & Social Integration	
Comparative Analysis	Comparable Artefacts Typical Artifact Contexts Linkage with Further Analytical Procedures	
Summary of the Artefact Analysis	(Re-) Construction of the Artefact Context with Regard to the Cognitive Interest	

With regard to the levels described, Lueger and Froschauer (2018) formulate numerous exemplary questions that can be addressed to a cultural artefact. However, the authors emphasise that the proposed methodological approach is a generalisation. Consequently, further

specifications or adaptations are required in accordance with the respective research project. Therefore, the concrete implementation of KuPraMex is outlined below.

4 Concrete Implementation of the Artefact Analysis at KuPraMex

With regard to the concrete implementation of the artefact analysis in the KuPraMex[2] project, the questions formulated by Lueger and Froschauer (2018) partly functioned as orientation frames, whereby the focus was primarily on questions of the core scope of interpretation.

The analysis of cultural artefacts was carried out using four work steps, whereby recurrent phases of group interpretation were established and institutionalised (Froschauer, 2009; Lueger, 2010; Lueger & Froschauer, 2018). On the one hand, group interpretation and the joint reconstruction of the symbolic meaning were intended to meet the challenge of making the different approaches comparable in view of the diversity of the artefacts. On the other hand, interpretation in groups is considered a quality-assuring feature in qualitative social research (Reichertz, 2013). Finally, the perceptual structure of each individual depends on the respective context of origin, socialisation, social positioning as well as secondary characteristics such as age, gender, etc. (Bourdieu, 1987). In this context, we also speak of situatedness, whereby the instrument of group interpretation serves to reduce the so-called blind spots as much as possible (Kleemann et al., 2009).

4.1 Work step I

In the first work step, a pre-selection of cultural artefacts was made by the individual project members. In this context, those cultural artefacts were selected that contained narratives or representations about non-academic work, such as films, memes, etc., tools from work contexts were not included in this analysis. However, the research was not limited to any specific type of artefact, as there was uncertainty before the research began as to whether and to what extent the topic of non-academic labour would be included in Mexican cultural artefacts. Related to the research on cultural artefacts, Mexican film rankings, studies, etc., were included and checked to see if they made work the subject. In this context, cultural artefacts were reviewed, discussed, selected and pre-interpreted within the binational research group to ensure that only significant artefacts were analysed for the purpose of the study.

Particularity:

Already in the first step, the researchers noticed that the artefacts that seemed relevant were mainly produced by male persons, which is why a male perspective on the topic opened up.

4.2 Work Step II

In the second step – as suggested by Lueger and Froschauer – a further phase of narrowing down and selection along the lines of the research question was carried out. In addition to general non-academic activities, work in the areas of administration, gastronomy, tourism and metallurgy was to be focussed on. Another selection criterion related to the production of the respective cultural artefact. According to the criteria established in the project, the producer of the object had to be from Mexico or very familiar with the cultural context. This was to ensure that the mode of representation and narratives about non-academic work were framed according to the cultural context. Other selection criteria applied to the analysis material are listed below.

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[2] In addition to the author, Prof. Dr Ute Clement, Prof. Dr Stefan Gold, Prof. Dr Lydia Raesfeld, Dr Paola García Fuentes, Francisco Padilla Reyeros and Allistair Fritz López Mercado are involved in the project as an interpretation group. In the following, we will refrain from a comprehensive presentation of the results and instead refer to the article "Social Representation of Non-Academic Work in Mexico in the Light of Cultural Artefacts", which will be published by IJRVET.

The artefact:

- has a certain range[3],
- recurs in other contexts (recurrence),
- contains intertextual passages[4],
- is up-to-date, and/or
- occupies a place in collective memory[5].

Not every single one of these criteria were visible in all the artefacts studied, but they had to be at least predominantly fulfilled in order to justify the integration of an artefact into the study corpus.

Particularity:

In the course of this work step, it became apparent that some fields are surprisingly little represented in cultural artefacts, such as metallurgy. The cultural artefacts found usually only touched on the field of metallurgy or referred more generally to the role of the industrial worker. Moreover, they were often not very topical, while the administrative field, for example, was frequently addressed in a variety of ways. The great differences in the quantity and density of the narratives and representations contained in cultural artefacts is due to the characteristic of 'naturalness'. Finally, researchers do not influence the production of cultural artefacts.

4.3 Step III

Due to the diversity and heterogeneity of the cultural artefacts included, it seemed necessary to develop different patterns of analysis in the third work step (see Table II). The development of the analysis patterns was oriented – as already indicated – to the guiding questions proposed by Lueger and Froschauer (2018), but also to the German vocational concept of *Beruf*, which functioned as a contrasting foil to non-academic work (Clement, 1999; Kutscha, 2008; Matthes & Vicari, 2018). This narrowing of the content was done, on the one hand, against the background of the question posed at the outset about the relatively limited reach of dual training concepts in Mexico, but also because the German model of qualified skilled work and vocationality seemed analytically promising. The aspects associated with professionalism in Germany refer to aspects of work that also play a structure-forming role in classical professions or academic work. In this respect, we believe they are also suitable for systematically recording and mirroring social representations of work from other cultural backgrounds.

In addition, the conceptual considerations of Pries (2019) on the (power) field of gainful employment were included. The contrasting of non-academic work and the German vocational concept of *Beruf* resulted in specific questions that were added to the analytical frameworks. Furthermore, depending on the type of artefact in question, the development of analytical patterns was oriented towards other disciplines. For example, art-scientific methods offered an adequate framework for the analysis and interpretation of murals (Held & Schneider, 2007). Table II shows an example of an analysis pattern for filmic material.

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[3] This was determined, for example, on the basis of cinema rankings, views on the Internet, etc.

[4] Intertextual passages appear relevant in this context because they too can provide insight into the social relevance, reach, etc. of other cultural artefacts.

[5] According to Erll (2017), this concept has become one of the most discussed in cultural studies memory research. Assmann's (1988) concept of collective memory is constituted by communicative and cultural memory. In this context, the approach of collective memory is not explored further. However, the temporal dimension is taken up by anticipating that collective memory is implied by knowledge shared collectively across generations. In this regard, the work of Fortino Mario Alfonso Moreno Reyes' alias 'Cantinflas' should be mentioned, for example. He and his work are still highly valued in Mexican society today. For example, other cultural artefacts have taken him up as a theme in terms of the criterion of intertextuality.

Table II

Example of an analysis pattern for filmic material (elaboration KuPraMex[6])

Title:
Author:
Year:
Genre:
Entire Duration:
Exact Location of Finding:
Is work somehow a subject of discussion/ visualised in the material?
Which sectors (e.g., tourism, gastronomy, metal technology, administration, etc.) are focused in the material?
Describe the scene or the scenes referring to the following questions/topics! *(always mention the exact minute and duration for every scene)*
Work Tasks *What does the person do?* *What kind of problems is she or he facing?* *How significant/critical are these problems for others/for society?* *What is the risk/the worst outcome if problem solution fails?* *Who has interests in solving/not solving the problem? Who is involved in the working process?*
*How are the **Work Tasks** structured?* *(Highlight the appropriate term)* Holistic Fragmented Complex Simple Problematic Task Routinized Contextualised Standardised Socially Relevant Exploitation Interest
Competencies *Which knowledge does the working person show?* *What is she or he able to do? How are skills described or visible?* *On the base of which external signs/symbols do others recognize the competencies of this person?* *Where does the know-how or skills find limits?*
Habitus *What is the working person proud of?* *How does their identity get visible?* *Which conditions/communication form does he or she accept? Which not?* *Which physical, verbal or physical expression does the identity of the working person show?* *Which traditions become visible?*
Working Conditions *Which context conditions are visible, e.g. in terms of recruitment, pay, contractual basis, employment status, hierarchical position, promotion opportunities, gender etc.?*
Institutions *Which institutions does the working person belong to? Which memberships are shown?*

With the help of the analysis patterns, it was possible to focus on specific aspects contained in the cultural artefacts and to reduce the complexity of the content, while at the same time creating a common starting point for the analysis in binational teams of two.

Particularity:

Like other qualitative methods, the analysis of cultural artefacts proves to be time-consuming, especially because the concretised interpretation method depends on the respective artefact type. The aspect of diversity made cross-artefact comparisons difficult. The use of analysis patterns and the instrument of group interpretation was intended to overcome this problem by comparing the reconstructions resulting from the artefacts with each other.

However, the use of analysis patterns also followed further research pragmatic considerations. Thus, specifically contained modes of representation and narratives and not the entire

[6] The development of the analysis patterns goes back to Professor Ute Clement.

diversity of content in the artefact were to be focussed on. In addition, the interpretative work in the binational team of two was only made possible by the patterns of analysis, because it was relatively clear before the start what was to be paid attention to in the cultural artefacts. The interactions between the researchers proved to be essential in the interpretation. It was precisely because an analytical distance or alienation in relation to the respective cultural artefact was repeatedly achieved in the discussion that it became possible to subsequently carry out the reconstruction taking culture-specific aspects into account. Accordingly, such a procedure can not only contribute to understanding and knowledge about the respective research object, but also promote so-called "cultural learning" (Bakirci & Pilz, 2019; Brüch, 2001; Weber, 1997).

4.4 Work step IV

The analysis in teams of two was followed by the fourth step. In this context, selected analytical patterns and elaborated hypotheses were discussed in the extended binational research group. In addition, further hypotheses were elaborated. Five to seven persons of different age, gender, etc. participated in the institutionalised interpretation group. At least half of the participants came from the cultural context of Mexico, while the remaining participants approached Mexican culture from the outside. Within the research group, narratives were reflected and further hypotheses, on possible social representations of non-academic work, were discussed and questioned. The underlying assumption was that recurring narratives, representations, etc. in cultural artefacts refer to socially shared knowledge and thus expose the central core of social representations.

Particularity:

The interpretation phases in the larger group proved to be useful and helpful in eliminating further blind spots in view of the situatedness. However, due to time constraints, it was not possible to look at every single analysis pattern in the larger interpretation group. Instead, those artefacts were selected for this setting that represented the topic in a condensed form or were particularly emblematic.

5 Results

Forms of representation and narratives about non-academic work emerged from the cultural artefacts. In addition, the researchers also familiarised themselves with colloquialisms and their background. With the help of the artefact analysis, hypotheses could be generated regarding the core of prevailing social representations of non-academic work in Mexico. Some of the results of the artefact analysis are summarised below[7].

In the analysed cultural artefacts, a relatively unattractive image of non-academic work emerges. It often seems to be informal, which means a lack of job security, poor pay, etc. Strong gender differences can also be observed. Furthermore, the cultural artefacts show that non-academic work is usually physically demanding but cognitively undemanding. In terms of physicality, only office work is an exception. Social capital (Bourdieu, 1983) plays a prominent role for entry into a company, and promotion opportunities also depend strongly on this form of capital. In addition to limited promotion opportunities, company hierarchies also tend to be rigid. However, a narrative with more positive attributions regarding non-academic work can also be identified. This states that young people experience a positive transformation of their habitus through non-academic work and find their place in the world through it.

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[7] In the following, a comprehensive presentation of the results is omitted and instead reference is made to the article "Social Representation of Non-Academic Work in Mexico in the Light of Cul-tural Artefacts", which will be published by IJRVET.

Overall, however, non-academic work seems to lack prestige in Mexican society, which could explain the low acceptance of TVET programmes and thus negatively influence implementation attempts.

6 Discussion and Conclusion

The analysis of cultural artefacts offers an interesting approach to a largely unknown field, especially in research projects with an international focus. Furthermore, the derived core hypotheses can be very helpful for further project steps. In KuPraMex, for example, the development of the survey instruments was based on the findings from the artefact analysis, which were compared with secondary data and scientific literature.

With regard to the diversity of cultural artefacts, the challenge arose to establish comparability between the different types of artefacts. This problem was addressed with the help of the elaborated analysis patterns and the group interpretation. However, the problem can also be circumvented by focusing on only one type of artefact.

In view of their omnipresence and reciprocity, the inclusion of cultural artefacts in scientific theory building seems to make sense. Especially in combination with other qualitative and/or quantitative approaches, there is the possibility of opening up a more holistic perspective on an object of study. However, triangulation also proves expedient because cultural artefacts in the research context are 'natural' data. Consequently, the production of such data is beyond the reach of the researchers, which is why in an explorative approach there is ex ante uncertainty about the extent to which relevant objects for answering the research question will be found. Given this uncertainty, it may also be advisable to conduct a preliminary survey instead of pursuing an exploratory approach.

In the context of reconstructing their symbolic meaning, cultural artefacts experience an influence by the researchers. Given the situatedness of each individual, it is therefore essential to institutionalise interpretation groups. In the context of international VET research, it is also necessary to conduct research together with researchers from the respective cultural context, as this is the only way to obtain adequate interpretations. Furthermore, artefact analysis in binational teams can initiate 'cultural learning' (Bakirci & Pilz, 2019; Brüch, 2001; Jammal, 2003; Weber, 1997) among researchers, even if they are unable to enter the respective country due to external circumstances, such as a pandemic.

The relevance of cultural learning has been highlighted in international studies, especially in relation to expatriates (Bakirci & Pilz, 2019; Jammal, 2003), while researchers have received less attention in this regard. For the field of international VET research, however, it may be relevant to train researchers' perception, thinking and acting in relation to the respective cultural context in order to ensure adequate action practices in the field and thus achieve desired results. Accordingly, cultural learning through artefact analysis in binational teams could favour the success and sustainability of international projects.

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Educational Aspirations of Migrant Parents and the Relationship With Educational Success

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Abstract

Adding to the strand of research which shows that when taking into account accumulated disadvantages, descendants from migrant families succeed to a higher amount in education than natives, this paper analyses if and how parental educational aspirations act as a protective factor for educational success. Based on the Swiss longitudinal TREE data (Transition from Education to Employment, n= 7,971) of the second cohort we answer this question using a multinomial logistic regression analysis. Our results show that some migrant groups have higher parental aspirations and that these aspirations serve as a pushing factor for several second-generation groups to take up higher education at upper secondary level. To have a closer look at the underlying mechanisms we assess the definition of success by taking into account qualitative data chosen by a criterial-based sample of TREE respondents. The inductive definition of success, based on a content analysis with n=119 young adults and their parents from migrant and Swiss families will add to the existing theoretical reflection on the narrow definition of success and its interplay with parental aspirations.

Keywords

parental aspiration, educational success, second generation, mixed method

1 Introduction: Success Against the Odds and Parental Educational Aspirations

Compared to their native counterparts, students with a migration background - the so-called second generation - are generally less successful in attaining tertiary education and more likely to be NEET[1] in most OECD countries (OECD, 2020). This is especially true for Switzerland with its highly selective and early segregated pathways that stream students after sixth grade into different educational tracks at lower secondary school (ibid.). Nevertheless, within the

[1] Neither employed nor in education or training

group of second generation youth large differences in terms of educational achievement exist when taking into account socio-economic status (SES), country of origin and language spoken at home (Schweizerische Koordinationsstelle für Bildungsforschung (SKBF), 2018). For the transition towards post-obligatory educational pathways children of immigrants are overrepresented in intermediate solutions (Sacchi & Meyer, 2016). Moreover, several studies reveal a discriminating effect for second generation youth, and particularly females, in the selection process towards vocational education and training (Hupka-Brunner & Kriesi, 2013; Hupka-Brunner & Stalder, 2011; Imdorf, 2010). In addition, particularly vulnerable young adults with a migration background – from Turkey and former Yugoslavia – participate less frequently in tertiary education (Murdoch et al., 2016).

Another strand of research focusses on those second-generation who 'succeed against the odds' – meaning that when taking into account accumulated disadvantages (low SES, parents with lower educational attainment) – descendants from migrant families succeed to a higher amount compared to natives from the same strand. Research on success against the odds has a long tradition in the US: studies show unexpected successful educational pathways - measured by test scores, academic achievement and participation in post-secondary education (Fuligni, 1997; Glick & White, 2004). In Switzerland, the context of this study, there is some evidence for success against the odds of students with a migration background: Schnell and Fibbi (2016) show that second generation youth (Turkish, Balkans) more often experience upwardly mobile education-employment pathways than Swiss (with similar characteristics). This phenomenon is referred to as the 'immigrant paradox' (Feliciano & Lanuza, 2017).

Parents' and young adults' educational aspirations as well as parental co-agency or involvement in the education of their children are discussed as possible explanations for this paradox (Liu & White, 2017; Schoon et al., 2021). Our analysis of the second cohort of compulsory school leavers of TREE[2] shows an interesting relationship between lower secondary tracking with students and parental educational aspirations. Tracking seems to influence aspirations toward a more realistic perspective on students' future educational pathways – meaning that parental aspirations tend to be lower if the student attends a track with basic requirements and higher if the child attends a higher one. However, we observe group differences: migrant parents tend to keep their high aspirations, even if the child is streamed in a less demanding track at lower secondary level. Furthermore, high aspirations remain when controlling for socioeconomic status and educational attainment of the parent. Referring to the concept of Bernardi and Valdés (2021) parental aspirations of migrant parents seem to be more "sticky" (high educational expectations that are irresponsive to lower academic achievement) in comparison with Swiss parents.

Based on this strand of research and our own data exploration, the present article focuses on how parental aspirations contribute to a successful pathway for second generation youngsters in Switzerland on the transition towards upper secondary education. Taking into account the comparatively good reputation of the Swiss vocational education and training system, success at upper secondary level is defined as either attaining general education or an apprenticeship with vocational baccalaureate (Berufsmatura). Based on the mixed-method-design of the PICE-project[3], we will further discuss the definition of (objective and subjective) success at upper secondary education.

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[2] Transitions from Education to employment survey, see: https://www.tree.unibe.ch

[3] Parental Investment in Children's Education: a TREE study, see: https://www.pice.unibe.ch. This project is mainly funded by the Swiss National Science Foundation (SNF) and located at the University of Bern.

2 Success Indicators and Measurement Methods

In this chapter, we will first focus on the theoretical definition of educational success and then discuss the measurement methods to answer the question on how parental aspirations of second generation students in Switzerland contribute to a successful pathway towards higher secondary education. Furthermore, the mixed-method-design of our data allows us to reflect on the definition of educational success on our qualitative data.

2.1 The Definition of Educational Success

Educational success is a multifaceted construct, which is defined differently according to various research designs and question. When defining it, one has to take into account the level of education in focus, the population of interest and the context-bounded definition of being successful. Educational success in dual systems is mostly measured as objective success that focusses on observable, measurable indicators of success (performance, high level of academic achievement at lower/upper secondary school, successfully finding and completing an academic/vocational training place at higher secondary level) (Beicht, 2011; Häfeli et al., 2015). Recent studies perceive this definition of success as too narrow and not sufficiently actor-centred. Therefore, they further take into account subjective educational/vocational success indicators, that focus on the individual perception of this achievement (satisfaction, educational/vocational fit, self-efficacy) (Kamm, 2019; Neuenschwander & Nägele, 2014; Shockley et al., 2016; Stalder & Lüthi, 2020). Characteristics that are frequently taken into account to operationalize subjective educational success at upper secondary education in a dual system are: satisfaction with education/training, educational/occupational self-efficacy, commitment with profession/school, and educational/vocational fit (Abele et al., 2016; Neuenschwander & Nägele, 2014). This definition is not conclusive and it is of great interest to have an inductive perspective to re-evaluate it. This holds even more with respect to parental aspirations underlying different definitions of success.

2.2 Measurement Methods

To shed more light on how parental aspirations influence successful pathways of the second generation with low SES in Switzerland, we use the second cohort of TREE2 (with a nationally representative initial sample of n=8,429). TREE2 is a yearly longitudinal follow-up of the AES 2016 (assessment of the attainment of educational standards) sample of compulsory school leavers. It includes comprehensive information on respondents' school situation (e.g., type of requirement track, mathematics test scores), family characteristics and resources (parents' level of education and their occupation, economic resources, etc.) and educational aspirations of parents.

To have a closer look on the mechanisms behind parental educational aspirations, qualitative data of the TREE in-depth study PICE (n=71 qualitative interviews with TREE2 respondents, average age of 20 and n=48 of their parents) provide us with an individual perspective on educational success. The qualitative sample includes 1) students who had been successful against the odds along their educational pathways (attending advanced or high requirement tracks at lower secondary level and who undertook mostly general education or VET at upper secondary level) and 2) one of their parents (Swiss or migrant) with a modest social origin (non-tertiary educated and low SES). The interviews are analysed following a structuring content analysis.

For the quantitative analyses, we measure objective educational success one year after the end of compulsory education (~16 years, n= 7,971) defining a successful educational pathway

as entering either general education or a vocational baccalaureate[4] which allows the direct access to general tertiary education. In the analysis, we control for individual and familial characteristics such as gender or social origin and for previous educational outcomes as competences and institutional tracking; previous research has shown its importance in the Swiss context (Gomensoro & Bolzman, 2015; Hupka-Brunner & Kriesi, 2013). We use regression analysis to assess parental aspirations of the most important low-SES migrant groups and their relation to objective and subjective educational/vocational success.

In this study, we compare Swiss native students with second generation students, defined as students who were born in Switzerland or who arrived at the beginning of kindergarten and who have two parents born abroad.

3 Parental Aspirations and Educational Success

In the following chapter, we will answer the hypothesis if *high parental aspirations in migrant families have a positive effect on the objective educational/vocational success of second generation young adults at upper secondary school (H1).* In the second part, we qualitatively assess the definition of success by migrant and Swiss parents and their children in more depth, to understand their individual/familial conception of success underlying parental aspirations.

3.1 The Relationship Between Parental Aspirations and Objective Educational Success

Our descriptive results confirm that, as in many other countries, migrant parents express higher educational aspiration levels for their children compared to Swiss parents (see Table 1). In our case study, the differences are especially important since several groups (particularly Portugal, Turkey, Balkans and Sri-Lanka) have a more modest socioeconomic status and parental education levels compared to Swiss families. Below, we investigate if higher parental aspirations in migrant families transform into higher educational success and into an "immigrant paradox".

Table 1
Parental educational aspiration for their children by country of origin

	Don't know/no opinion about it	Want me to complete a VET programme	Want me to go to university	n
Swiss native	29%	47%	24%	5844
2G Italy Spain (Greece)	16%	37%	48%	140
2G Portugal	22%	36%	42%	221
2GTurkey	7%	39%	55%	112
2G Balkans (Albanian countries)	14%	38%	48%	286
2G Balkans (others)	18%	43%	39%	229
2G Sri-Lanka	15%	31%	54%	129
2G Other countries	25%	22%	53%	536

(2G=Second generation; reported by the young adult at the end of lower secondary level)

To answer the research question on the role of high parental aspirations in migrant families for objective success (measured by the type of education undertaken one year after the end of compulsory school), we carry out two multinomial logistic regression models. In the first model, we show the difference in the type of education undertaken at upper secondary level between Swiss native students (reference) and students with a migration background while

[4] In Switzerland, there are two major possibilities to achieve a vocational baccalaureate: BM1, an integrated VET option with additional classes to obtain the Federal Vocational Baccalaureate at the end of training and BM2, where young adults attend baccalaureate classes after finishing VET. According to the sample, we can only integrate BM1 students, which make around half of the total vocational baccalaureate (BFS, 2018).

controlling for diverse potential moderating factors.[5] Model 2 includes all these factors, adding the parental aspiration, reported by the young adult at the end of lower secondary level. The model statistics (Table 2) show that both models are statistically significant (prob>chi2 = 0.000). The models suggest integrating parental aspiration as an explaining coefficient, as the log likelihood decreases for the second model. Furthermore, the difference of 6283.623 in BIC' strongly supports model 2.

Table 2
Multinomial logistic regression on t1 educational status

Model 1 (sex, language region, math competence and track attended at the end of compulsory school, parental education and HISEI)	Model 2 (all variables of model 1 PLUS parental aspiration)	Difference
N = 7'889	N = 7'889	
Wald Chi2 = 1930.99 (prob >chi2 = 0.000)	Wald Chi2 = 1878.46 (prob>chi2 = 0.000)	
Log likelihood full model = -67749.242	Log likelihood full model = -64567.051	3182.191
BIC′ = -64019.676	BIC′ = -70303.299	-6283.623

Given the focus of this paper, the included covariates in the model will not be discussed in depth[6]. To test our hypothesis, we take a closer look at the regression coefficients for different groups of second generation students and examine how they differ between Model 1 and Model 2 compared to the Swiss native students. For this purpose, we compare the average marginal effects (AME) and confidence intervals for each group and educational track in Figure 1 below.

If we look at the Swiss and migrant groups regarding the type of education one year after the end of compulsory school some differences reveal between the first and the second model. Part of the differences between Swiss natives and migrant groups can be attributed to parental aspirations.

For young adults who, at the age of ~16 years, are not in certifying education and training we see no significant effects for the second generation and few differences between the two models. The picture gets more interesting if we look at VET attainment: By adding parental aspirations we notice a reduction of the difference compared to natives, meaning that high parental aspirations prevent different migrant groups to attain VET. This is true for Portuguese, Turkish and Sri-Lankan young adults, while there are no significant differences for the second generation from Italy/Spain and both Balkan groups that are quite similar to the native group. There are no significant differences for attaining a vocational baccalaureate when we control for parental aspiration. On the contrary, there are significant differences regarding general education for the Portuguese and both Balkan groups when adding parental aspirations, meaning that high parental aspirations make them undertake more often this type of education.

To sum up, parental aspirations can be considered an explanatory factor if we look at attaining different types of education at upper secondary level. To test our hypotheses, we analyse the differences of regression coefficients for the migrant groups in more detail: high parental aspirations serve as a pushing factor for attaining higher educational tracks at the upper secondary level for some of the second generation. This is especially true for the second generation of Portugal, Turkey, the two Balkan groups and Sri Lanka as well as for the first generation for all countries, while the coefficient for the second generation of Italy/Spain is not significant.

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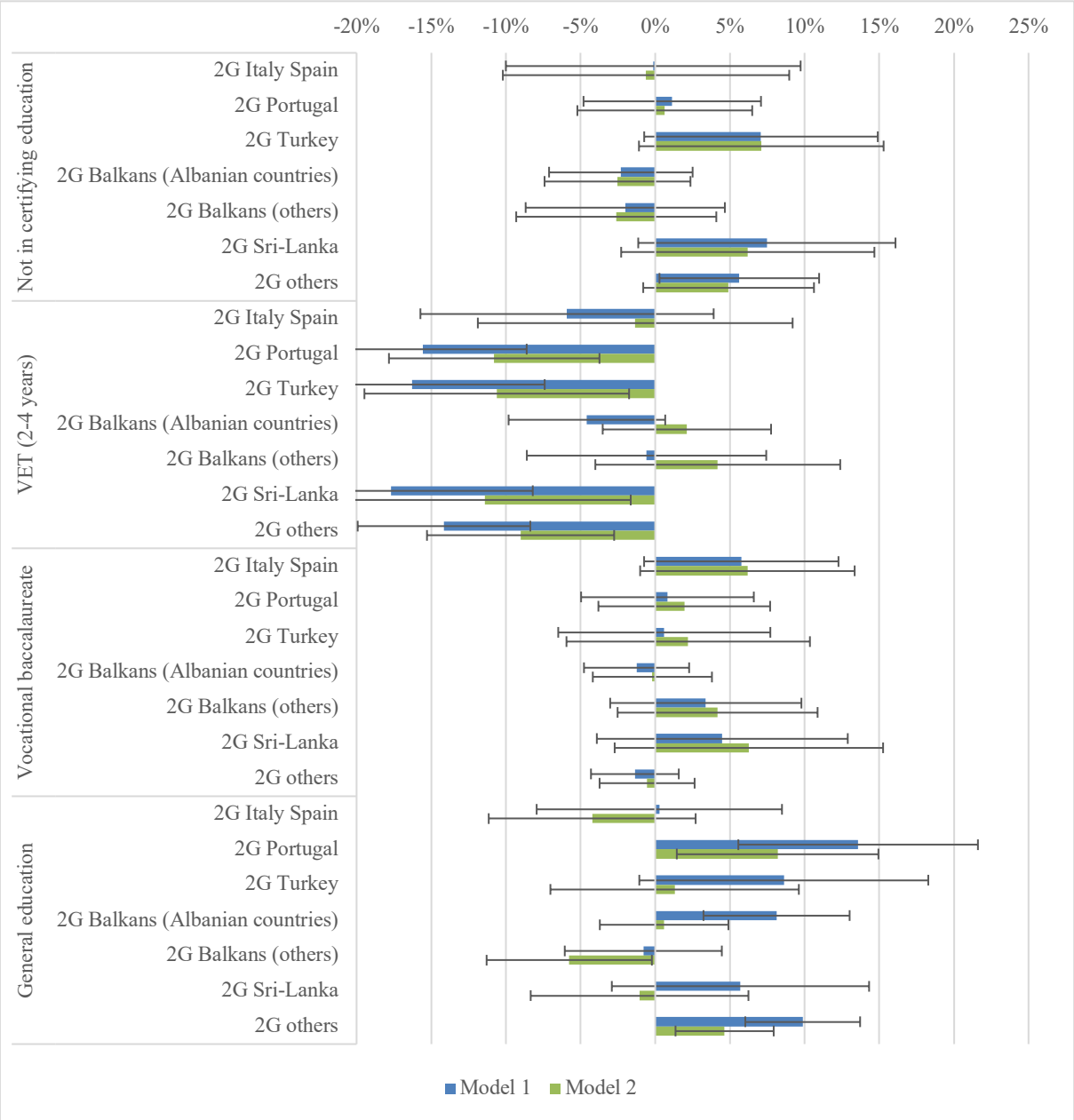
5 Sex, language region, math competence and track attended at the end of compulsory school, parental education and HISEI.

6 Nevertheless, there are significant differences for some of the covariates for each and between the two models.

Figure 1

Average marginal effects (and confidence intervals [5%]) of upper secondary education attended by students' migration background (reference: Swiss native)



Next, we have a deeper look at the definition of educational success by young adults and their parents of the second generation migrant groups and natives who mostly attain general education or VET with high requirements. This can help to understand the relation between parental aspiration and educational success observed above.

3.2 The Individual Definition of Educational Success

One possible explanation for the group differences regarding parental educational aspirations identified in the previous chapter could lie in ways in which different groups define educational success. Therefore, we now focus on the definition of educational success of young adults and their parents. Based on the qualitative data of the PICE project the following inductive aspects of the individual definitions of educational success appeared in the material:

- **Performance-oriented**: 1. Good grades in education, 2. Do your best (own capacity)
- **Output-oriented**: 1. Tertiary A degree, 2. Employability/completion of apprenticeship, 3. Education creates opportunities, 4. Best/highest education (system options)
- **Process-oriented**: 1. Matching education/training – skills/interests, 2. knowledge acquisition, 3. Linear path of education, 4. Continuing education/lifelong learning
- **Occupation-oriented**: 1. Good /sufficient income, 2. Job satisfaction, 3. Social relevance, 4. Job security
- **Individual**: 1. Good work-life balance, 2. Build a social network, 3. Overcoming challenges, 4. Achieve own goals, 5. Many roads lead to success

Not surprisingly, we find the dominant meritocratic logic of educational success in society and academia to be one of performance and output as well in the data (Dietrich et al., 2013). The first two inductive definitions **performance-oriented** and **output-oriented** are thus in line with the theoretical definition of *objective* educational/vocational success (Häfeli et al., 2015). While performance-oriented points at the process (having good marks respectively doing the best that one can by taking account one's capacity), the second is targeted to an output (diploma, degree, opportunities). Nevertheless, the inductive subcategories of **output-oriented** adds the importance of vocational education and training in the Swiss education system as "employability / completion of apprenticeship" underlies a conception of success by a vocational pathway. Except this last aspect of an output-oriented definition of educational success, this definition is more pronounced amongst Non-EU students (Balkan, Turkey, Sri-Lanka), to a somewhat lower degree in families from the EU (Italy/Spain, Portuguese) and least in Swiss families. Non-EU families mostly define educational success as attaining a university degree or attaining the best/highest education. The output-oriented definition referring to VET is more pronounced in native families. This is in line with former research showing that migrant parents and their young adults have a more pronounced tendency for academic achievement, while Swiss parents and their young adults tend to value vocational education and training as equal, especially if they have completed it themselves (Cattaneo & Wolter, 2013; Kost, 2018).

Next to this, **processual** and **occupation-oriented** understandings of educational success, especially matching education/training with skills/interest and job satisfaction are closer to the theoretical definition of *subjective* success (see Neuenschwander & Nägele, 2014). These two aspects are the ones most mentioned in the interviews and can be considered as having a high importance for the young adults and parents interviewed. If we look at group differences "continuing education / lifelong learning" seems to be a mainly Swiss understanding of educational success. As we see in the quotations, this could be explained by the frequently propagated slogan "*kein Abschluss ohne Anschluss"* (no educational qualification without the possibility for further training) (Pfister et al., 2015; Spellenberg, 2001) that Swiss parents and young adults have internalised.

> Sabine: Well, you have to do something for yourself/ I don't think there's good and bad as long as you're doing something (.) and you're always continuing your education. So, from the moment you stop on the spot (.) the successful educational path stops, so to speak? But (.) if you keep going and it doesn't matter what you do (.), I think it's neither good nor bad.

The quote of Sabine, a Swiss young woman, reveals an idea of a dynamic understanding of educational success that can change over time (due to one's career). Furthermore, there are other aspects that focus on the importance of stability and reliability in working life (good /sufficient income, job security, linear path of education). Likewise, subcategories point to an idealistic/philanthropic understanding of success, such as gaining knowledge, lifelong learning or

doing something that has social relevance. In the words of Sofia, a parent from Portugal, this would mean:

> Sofia: Academic success for me is (.) if you have a hunger for knowledge and are able to satisfy it. If you don't have a hunger for knowledge? Well, then/ you won't feel a satisfaction if you can quench it. But if you have one and are able to satisfy it through school? Then it is a success for you.

So educational success is understood as fulfilling one's hunger for knowledge focussing on the process, in opposite of arriving a certain output/outcome.

A last alternative understanding of success came together in the bundle **individual**. Most important is the notion of "achieving your own goals" independent of educational certificates or pathways. This is more pronounced for families from non-EU countries (Turkey, Balkans, Sri Lanka) as we see in the citation of Mila, a young woman of a Sri Lankan family.

> Mila: I think you can be successful in every educational path if you simply do what you like and if you are fulfilled by the education, and you also achieve your goal, so if you can strive for your goal with this education.

This sub-category shows the relevance of individual goals, challenges, networks that go beyond a hierarchical understanding of educational pathways and that are defined highly subjectively. So, the educational aim differs from a societal definition of high/low and from what research commonly does, for example by taking into account an ISCO-Classification (International Labour Organization, 2012). The path is less important than the goal, as the sub-category "many roads lead to success" pointedly states. This should not be understood as that the young adults do not know what they want to achieve. On the contrary, the aim is very clear and they integrated adaptive strategies to arrive and even overcome (systemic) barriers:

> Ella: It's a successful career, even if at one point you had to repeat or if at one point you thought of giving up or whatever. If you're here today, it's thanks to everything you've done. And so I think for me, in any case, it's a successful trajectory no matter what we do.

In the representative citation of Ella (young woman from Italian parents) we see that success includes the idea to overcome obstacles that were imposed by the educational system (had to repeat a grade). This might be a hint on the permeability of high aspirations for second generation youth even if the achievement is less favourable.

To sum up, there is a tendency that the understanding of educational success has a slightly different meaning for Swiss parents and young adults than for migrant parents and their children, whereas the first group tends to give more credit to VET and lifelong learning as the second. Especially Non-EU families define educational success more often with a connotation of achieving a general education pathway (output-oriented) and its own goals (individual). Nevertheless, professional oriented understandings of success, as "matching education/training to skills/interest" or "job satisfaction" are of high importance for all groups.

4 Conclusion: The Definition of Educational Success and Its Interplay With Parental Aspirations

Adding to the literature about the so-called "immigrant paradox" (Feliciano & Lanuza, 2017) stipulating that children of immigrants outperform native peers when taking into account social background, in this paper, we have focused on the interrelation between parental aspirations and educational success at upper secondary level in Switzerland. High parental aspirations can

be understood as a protective factor for some second generation groups to attain education with higher requirements at upper secondary level. This is especially true for young adults from Portuguese, Balkan, Sri Lankan and Turkish families, while there is no difference for young adults from Italian/Spanish families. If we consider the high requirement tracks at upper secondary education, we see no significant differences between the groups for vocational baccalaureate but for general education.

One potential explanation is migrants' preference for general education (Cattaneo & Wolter, 2013); this also reveals in the group-specific definitions of educational success in the qualitative data. Our data suggests an interplay between the definition of success and parental aspirations. For the targeted group (successful young adults with families of low socioeconomic status and non-tertiary educated parents) the identified differences between groups could add to answer how parental aspirations enable second generation youth to "succeed against the odds". We see that some migrant groups (especially non-EU) have a strong notion of success towards performance and outcome. This is less the case for the Swiss interviewees who are more VET-oriented and have a processual understanding of success (lifelong learning, "many roads lead to success").

Overall, the definition of educational success via attaining a high demanding upper secondary school is too narrow when looking at the variety of further definitions by parents and young adults. Especially subjective indicators of success represent an important gap in many existing studies (Shockley et al., 2016). Our mixed-method design speaks in favour of integrating a broader definition of success, as it helps to better understand their interrelation with parental aspirations. A plural definition of success seems especially important for research on success of immigrant parents and their descendants, as Santagati (2021) points it out as well. This helps to reveal group differences, which might explain parental aspirations and their interrelation with success.

Our paper has some important limitations. We have focused on parental aspirations as one possible explanative factor for the immigrant paradox-hypothesis. In the PICE project, we consider the interplay between aspirations with resources and strategies as further important aspects, which is highlighted as well by other research (f.e. Schoon et al. 2021). A further limitation results from the definition of the sample in the qualitative part. The definition of success corresponds to that of families with high performing young adults. It would be interesting to find out if there are differences to low performers. A final limitation concerns the context-bound nature of the concept of success. Switzerland, with its dual system and high VET participation, can be considered a special case when we talk about educational success at upper secondary level. It would be interesting to compare this case with other countries and different school to work transition types (Schoon & Silbereisen, 2009; Smyth et al., 2001).

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Sustainable Vocational Education and Further Training Practice Through Multiplier Training

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Abstract

Context: The structural anchoring of sustainability in vocational education and training practice is an essential goal of the National Action Plan (Germany) and represents a problem of vocational education and training for sustainable development that is still valid today.
Methods: A promising transfer path is offered by the targeted anchoring of offers in educational practice, flanked by pedagogical support. However, a complete structural anchoring of ESD is a necessary, but not sufficient condition for the transfer of didactic concepts of ESD into educational practice. This paper shows how a design-based research approach is used to familiarise trainers and company trainers with the contents and methods of ESD and make them capable of acting. The multiplier approach, which is presented here in more detail, serves to anchor sustainability more deeply in vocational education and training.
Findings: The article mainly refers to the hurdles that can occur during the transfer and how these are addressed in the project.

Keywords

ESD, multiplier approach, company trainers, trainers

1 Sustainable Vocational Education and Further Training in Germany

With the adoption of the Global Sustainability Agenda the global community has committed itself to ensuring quality, inclusive and equitable education for people by 2030. Therefore, vocational education and training also has a duty to develop this approach further. Transformation of learning and teaching environments plus the development of teacher and trainer skills is needed. Sustainability, to a greater or lesser extent, found its way into the legislation of the European states, which is a prerequisite for implementing for increasing its importance for in our case education. In Germany sustainability and environmental protection will, by august 1st 2021, be a fundamental educational content for every revised or new passed vocation (cf. BIBB-

Pressemitteilung 03/2021, 2021). The so-called “Standardberufsbildpositionen” (a set of minimum requirements in vocational education) mark a framework, which every vocational training must meet. This is good news, but it comes with some challenges, which will be addressed in this paper, too. An implementation on the legislative part doesn´t include the practical implementation, adaption and establishment in the process of VET in the companies. Questions to be answered are for example: How can VET trainers get acquainted with education for sustainable development (ESD) or to be more precise vocational education and training for sustainable development (VETSD)? Where can they qualify themselves? In which way are trainers in further education prepared for training the trainers of the companies? The project TraNaxis (Transfer of sustainability into vocational education and training through multiplier qualification) aims to transfer learning tasks into further education. Two universities and several further education institutions are involved in this project, which is funded by the Federal Ministry of Education and Research (2020-2022). Initially, workshops are planned for the qualification of trainers in initial and further education as well as in-company trainers. The results of these events are to be evaluated, revised and finally transferred into practice. The first phase involves the qualification of trainers in further vocational education and training. In the second phase, they in turn organise workshops for company trainers from different sectors. This paper will discuss the basic structure of the project TraNaxis. The challenges of implanting VETSD in the practical VET and the handling with those in the project, on a theoretical and practical way, will be presented in second step. An actual state of process will complement the paper.

1.1 TraNaxis -Transfer of Sustainability Into Vocational Education and Training Through Multiplier Qualification

TraNaxis is based on findings from two previous projects on sustainable vocational education and training. The project Pro-DEENLA (Qualification of vocational training staff through learning tasks in dual training) pursued the question of how work routines can take ecological and social effects of economic activity into account. Therefore, learning tasks were developed that now represent the content for the transfer project (Fischer et al., 2018a, 2018b). And the project KoProNa (Concepts for the professionalization of training staff for sustainable vocational education and training) pursued the goal of supporting companies and educational institutions in developing, implementing and realizing concepts and strategies of sustainable vocational training (KoProNa, 2019b). The procedure for analysing the training reality developed here is used for the procedure in TraNaxis. In the TraNaxis transfer project, the results and products from the pilot projects are transferred into training and further education practice by means of a dual multiplier approach. One of the aims of TraNaxis is to transfer the results of the previous projects into further education practice. The learning tasks need adaptations, which are to be done at the beginning of the project with regard to a cross-sectoral approach on the one hand. And the preparation of the workshop regarding digitalisation and the qualification of multipliers on the other hand.

Transferring products, as learning contents or workshop concepts, developed in previous projects into a more varied field of praxis presents a challenging task and manifold obstacles are to overcome. Trainers, who want to benefit from the results of the projects, and later use, modify and adapt the learning tasks, need to be helped to mentally penetrate the pedagogical structure of the learning tasks. For this reason, they need to participate in the process of adapting these to further fields of VET, which will be a big part in the qualification process during the workshops. We understand the trainers as constructors of knowledge, not receivers of what we think is best. Therefore, VET trainers need to analyse their own operational context. A tool, in which they will be trained in, helps fulfilling that task (KoProNa, 2019a).

2 Transferring Educational Products Into VET Practice

While transferring educational products into educational practice some obstacles are to be overcome. This applies to VETSD and its corresponding pedagogical interventions too. To address three of these challenges is part of the work progress in TraNaxis. As these are most likely more characteristic for the German model of apprenticeship some further remarks will be made on each topic. Orientation in the area of further training for company trainers, in our case for VETSD, is provided by offers that have been certified by a credible authority. In vocational education and training, the respective chambers are responsible for this task, among others. Certified qualifications by chambers represent cultural capital that can then be used on the labour market. So far, there is no nationwide certification for further training on BBNE, apart from a few regional initiatives from pilot projects. However, certificates following formalised education fulfil some not entirely unimportant functions. If learning, e.g. with regard to sustainability, is not already intrinsically motivated, certificates can provide an external incentive (c.f. Kell, 1995, p. 302). Furthermore, they offer orientation through the information contained in certificates and possibly grant entitlements to an extended range of work (c.f. Kell, 1995, p. 304). Therefore, in the transfer project, together with chambers from different regions, a regional certification is initially being sought, which should then be transferred to the federal level. A joint and coordinated cooperation of all transfer projects is also possible here.

Assuming that there is already a certified training course on VETSD, the next question is: Who conducts it? The answer would be trainers in various (supra-)regional educational institutions. However, the professional group of trainers represents a very heterogeneous formation (c.f. Autorengruppe wb-personalmonitor, 2016) with regard to their own pedagogical qualification as well as their affinity and prior knowledge of VETSD. Therefore, in the transfer project, previously selected and regionally networked trainers are familiarised and qualified with the products from the pilot projects. The project team takes on the task of carrying out the qualification by means of workshops. In terms of content, workshops address, for example, the pedagogical attitude of the educators, trying out and practising pedagogical-didactic methods for VETSD as well as theoretical content on sustainability and sustainable development. In the process, a training guideline is derived, which remains in the selected educational institutions and can be used to qualify further trainers.

The question of who is responsible for the practical implementation of VETSD at the company level is usually answered with the training personnel (c.f. Mohoric, 2014, p. 189), i.e. the company trainers and skilled workers providing training. However, there is also agreement that their pedagogical qualification is rather short and rudimentary (c.f. Eckert, 2017, p. 123). In contrast, the pedagogical products of the pilot projects are methodologically and didactically sophisticated and, in some cases, very demanding in their implementation. Consequently, it is important to sensitise and, above all, qualify company training personnel for VETSD. This should not be done on their own initiative, but proactively create offers. Appropriately qualified trainers offer certified further training on VETSD. The second project phase in the transfer project was also designed in this way. The trainers, accompanied by the project team in an advisory capacity, carry out the further training for the in-company training staff. After the evaluation of this project phase, regional and national certification will be announced.

3 Methodical Design

In order to generate practice-related and scientific findings regarding a successful transfer of the model projects for the qualification of training personnel, TraNaxis pursues a participatory, design-oriented research approach (Cobb et al., 2003; van den Akker et al., 2006a). Design-based research intends to relate research and practice within a collaborative, iterative as well as systematic process. The research's methodological approach refers to cycles of design,

implementation, analysis and re-design (Reinmann, 2017). Squire 2004 (as cited in van den Akker et al., 2006b, p. 5) summarizes the variations of design-based research as follows: “a series of approaches, with the intent of producing new theories, artefacts, and practices that account for and potentially impact learning and teaching in naturalistic settings”. Even though design-based research can focus on different perspectives, this project focuses on the development of didactical concepts within a realistic setting (c.f. Prediger et al., 2012). Hence, it is highly relevant to include partners within the transfer project to link theoretical as well as practical goals. Concerning our project, the collaborative work with trainers in further education and companies is fundamental. Therefore, research in TraNaxis will be guided by Euler's phase model (Euler, 2014). Euler's 6-phase model depicts the cyclical development process in a circular form. Starting with the definition and specification of the problem and the subsequent review of literature as well as the evaluation of experiences, the development of a design, an intervention or a procedure follows. This is tested under continuous evaluation. In the process, design principles are generated for the design, the intervention or the procedure, which can be incorporated in a re-design. In this way, the own design undergoes various stages of concretisation and adaptation. When a satisfactory degree of maturity is reached, the summative evaluation takes place, which may again lead to the definition of a new problem. The problem to be solved, or rather the task for TraNaxis, is the transfer of already developed and tested learning materials for ESD into professional practice.

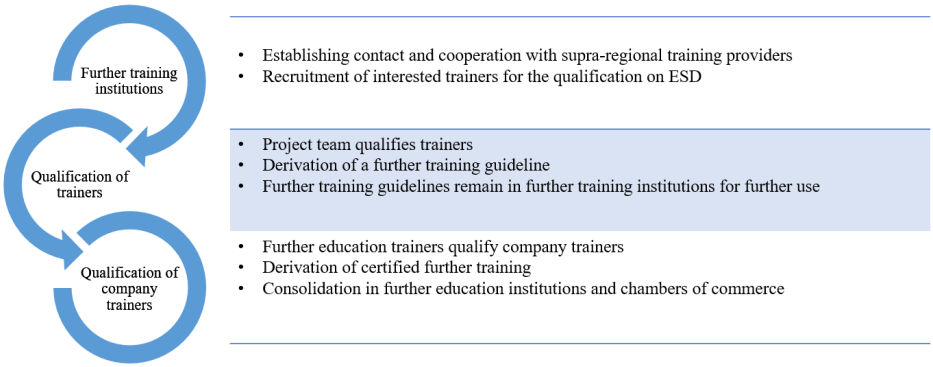
4 The Dual Multiplier Approach of TraNaxis

During the first research phase, the identification of the needs of the new context of further education and the target group of trainers as well as the adaptation of the programme planning are central. In the second phase, the focus is on analysis and processing of the results of the model tests as well as desk research. Even before the project began, a nationwide network consisting of four further education institutions was set up to ensure a broader regional transfer. Through the institutions involved in the project from Thuringia, Berlin, East Westphalia-Lippe and the Rhine-Main region, 20 trainers were acquired. The diagram shows that TraNaxis (Figure 1) not only focuses on the target group of in-company trainers, but also on continuing education trainers in an upstream qualification. The high heterogeneity of this sector is also reflected in the structure of the TraNaxis network. In our case teachers from continuing education providers, lecturers from chambers of industry and commerce or freelance trainers from business associations and societies take part in the first phase of the multiplier qualification. Consequently, their professional contexts and acquired qualifications are extremely complex. These contexts form the starting point of the adaptation processes and require reflection and explication in order to provide the basis for the learning process of the trainers.

After the successful acquisition of the trainers, a first interview took place. The basic aim was to get to know the university and practical actors, but questions were also asked about their professional background, professional qualifications, pedagogical experience and their own level of knowledge about VETSD. These were recorded and evaluated. The educational organisations participating in the project from the 4 project regions were analysed by means of document analysis. The online presences of the organisations served as a data source, which were analysed using a protocol. Relevant categories were the organisation's mission statement, projects carried out, locations, integration into networks and one category covering other aspects.

The evaluations showed that both the group of continuing education trainers and the focus of the work of the continuing education organisations are extremely heterogeneous. Generally speaking, the group of trainers has a high proportion of academics and is divided into teaching and non-teaching staff. In the study "wb-personalmonitor", 63.7% of the continuing education trainers stated that they had a degree from a university of applied sciences or a university (c.f. Autorengruppe wb-personalmonitor, 2016, p. 110). It is striking that only 26.3% of all respond-

Figure 1
The dual muliplier approach



ents have a degree in education or educational science. Only 7% stated that they had studied a minor subject in education. This shows that 33.3% of those with an academic background but no pedagogical background are involved in teaching in continuing education. However, 59.3% of the continuing education instructors stated that they had an additional qualification. A quarter of them hold the AEVO (training instructors aptitude) trainer qualification. Further additional qualifications were acquired through training in coaching, train-the-trainer, systemic counselling, etc. In addition, 81.8% of the trainers who are "active in the field of teaching, training or coaching" (Autorengruppe wb-personalmonitor, 2016, p. 114-127) participate in continuing education themselves. In terms of professional qualifications, the situation is similar for the trainers involved in the project.Some have sound pedagogical experience in different subject areas with diverse target groups. There are also participants who are at the beginning of their pedagogical work and use the cooperation in the project for their own further qualification. As expected, however, only a few are qualified in the field of VETSD. We find self-employed and permanently employed trainers. A second aspect, in which the trainers in the project differ, sometimes considerably, is their experience in relation to in-company training and in-company trainers. Here, the statements vary from the case that no experience is available to date to trainers who have worked as trainers themselves and can therefore contribute sound knowledge of the dual system in Germany and look back on their own experience. Finally, the trainers differ in terms of their knowledge of sustainability, sustainable development and VETSD. For the conception of continuing education for the group of trainers, this means that depending on the region and the profile of the trainers working there, an adaptation must be made from a thematic point of view. Professional pedagogical action is characterised by the fact that it is based on reflected theoretical knowledge. Therefore, the trainers in the TraNaxis project are always encouraged to reflect on their own theoretical practice. Likewise, the methods presented in the workshops are reflected upon together, discussed in terms of their usefulness for VETSD and theoretically substantiated. Reflection on one's own practice is a decisive condition for the successful adaptation of educational content not only for trainers but also for company trainers and constitutes a fundamental component of pedagogical professionalism (c.f. Reißland & Müller, 2020, p. 6). The results of the two pilot projects united in TraNaxis were able to show that reflection spaces (c.f. Fischer et al., 2021, p. 102f) with concrete reflection occasions must be opened up for in-company training personnel. Further education trainers are thus enabled to facilitate individual reflection processes for the target group of in-company trainers in order to be able to initiate in-company learning and change processes. The TraNaxis approach of a double qualification of multipliers represents a significant didactic basis for the development of a reflexive professional capacity to act in the context of sustainable development (c.f. Pranger & Hantke, 2020, p. 84).

The qualification approach of the trainers, who are enabled by the project team by means of training guidelines to further develop the existing results in a pedagogically and methodologically sound, individual, needs oriented and cross-domain manner, is new. In the second phase of the qualification, the knowledge gained can then be used to train the company trainers independently. The university project team then takes on an evaluating and advisory role. An elementary breaking point is the retention and independent adaptation of the continuing education guidelines into the own product portfolio. This also opens up a third problem area, which is only briefly mentioned here. Further education concepts for BBNE have not yet achieved nationwide recognition in the form of certificates. A recognised certificate is therefore envisaged in the transfer project, even if it does not currently cover the whole country.

5 Status of TraNaxis

A total of 24 trainers were acquired for the TraNaxis project. All of them have already been qualified by the project staff in the first and second module. The group of trainers includes teachers from continuing education providers, lecturers from chambers of industry and commerce or freelance trainers. The heterogeneity of the trainers already mentioned becomes apparent here. Their professional contexts and acquired qualifications are very different. This diversity is also reflected in their level of knowledge on the topic of sustainability in general. During the first modules, however, it was also found that the trainers had a rather low level of knowledge on the specific topics of ESD and VETSD. The high heterogeneity of the group as well as the different knowledge levels with a specific focus on VETSD requires constantly adaption of the contents and methods according to needs. Thus, in the six trainings that have already been carried out, there are clear differences in the implementation, as these always have to be adapted to the trainers accordingly. Considering this knowledge clarifies that it is not enough to offer proven concepts, handouts and materials freely available in order to be able to implement and apply sustainability in education and training practice. Rather, comprehensive explanations, as well as specific guidance and adaptations are needed in order to be able to pass on and implement the pedagogically demanding VETSD materials. These initial findings also show that the approach of multiplier qualification in the TraNaxis project is sensible and purposeful in order to be prepared for the topic of sustainability in general on the one hand and with a special focus on the ESD and especially the VETSD on the other. The aim of the project is that the trainers enable the trainers in the companies to take acting when it comes to the topic of VETSD. In order to achieve this, the support of expert trainers is indispensable for the qualification of training and further education staff.

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Work-Based Learning: Towards Embedded Processes and Inclusive Approach

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Abstract

Context: The context for this paper is strongly underpinned by the significance of the integration of education and the world of work, which has been recognised as a key issue for policy, practice and research across Europe and beyond.
Approach: The four interrelated symposium papers focus on the complexities of work-based learning and explore its different configurations. The potential of a social ecological approach for exploring the relationships between work and learning will be considered. The papers will further draw on perspectives from three European countries: Germany, Latvia and the UK.
Findings: Through these three cross-national case studies, the context of the workplace has been considered as a crucial indicator of different dimensions of work-related learning. The papers identify some influential interdependent and embedded processes involved, such as the consolidation of theory and practice, digitalisation, personalised workplace learning patterns and crossing boundaries between different sectors, approaches and learning routes such as work-based and Higher Education. In these processes, the central place of agency of the learning individual, needs to be taken into account, and the social ecological approach provides a useful framework to capture the interdependent, relational and contextually embedded developments involved.
Conclusion: Through these three case studies, this paper aims to facilitate cross-national discussion of the complex nature and changing demands of contemporary work-based learning, particularly highlighting the significance of its inclusive perspective and embedded approaches.

Keywords

work-based higher education, digital change, employer engagement, learning ecologies at work

1 Introduction

Natasha Kersh and Andrea Laczik

The symposium papers explore the complexities of work-based learning and consider its different configurations particularly drawing on perspectives from three European countries: Germany, Latvia and the UK. The consideration of the complex interrelationships between work and learning brings attention to the interdependent and embedded processes involved, such as the consolidation of theory and practice, digitalisation, personalised workplace learning patterns and crossing boundaries between different sectors, approaches and learning routes such as work-based and Higher education. The significance of the integration of education and the world of work has been recognised as a key issue for policy, practice and research across Europe and beyond. A number of studies bring attention to the existing mismatch between graduates' career aspirations or job readiness and employer expectations, as due to the lack of practical experience, young adults are finding it challenging to break into the sectors they were aiming at (Helyer & Lee, 2014). Bringing together subject-based and work-based knowledge in ways that meet the requirements and expectations of the learner, the employer and the provider, is considered to be one of the most significant challenges in the area of VET and work-based learning. The issue of how students/learners combine and integrate the various types of knowledge developed in college or the workplace is increasingly attracting more attention from researchers, employers and policy makers. (Guile, 2010; Bakker et al., 2011; Edwards, 2011). Research indicates (Evans et al., 2006; Guile, 2010) that reinforcing the connection between theory and practice and developing closer links between the college and the industry, supports learners in moving between college/university and work in a range of ways, specifically through participating in workplaces cultures that can facilitate learning and appreciating the way in which theory is embedded in practice. This paper considers the issues of the theory–practice consolidation as a key dimension of learning at work, specifically in relation to opportunities to contextualise and associate the experience of work to theoretical content and vice versa.

The four interrelated papers provide perspectives on the complexities of these processes as well as associated factors and challenges, and offer country-specific illustrations. Firstly we set out the context of the current challenges and new trends in the area of work based learning, particularly demonstrating the potential of a social ecological approach for exploring the relationships between work and learning through the dynamics of different scales of activity: societal, organisational and personal. Two cases from the UK illustrate a work-based learning approach to undergraduate study, which provide opportunities for the embedded practical experience, enabling higher education (HE) students to integrate their theoretical learning in the context 'real-life workplace settings'. Another example of work-based higher education is explored in the longitudinal case study from Latvia, particularly through employing the evidence-practice of work-based smart human learning facilitation design. The impact of digital change on work-based training has been explored through the German case, which brings attention to the ways digital technologies expand and change the boundaries of work-based learning. Through these three case studies, this paper aims to facilitate cross-national discussion of the complex nature and changing demands of contemporary work-based learning, particularly highlighting the significance of its inclusive perspective and embedded approaches.

2 Learning Ecologies at Work

Karen Evans

Work-based learning (WBL) is, at root, about relationships between the fundamental human, social processes of working and learning. The process of defining and scoping the field of work-based learning brings oppositions, tensions and exclusions to the fore. In offering expanded definitions of WBL, bridging embedded workplace learning perspectives and those that frame WBL as a class of programmes, this paper renews the argument for an inclusive approach that expands and rethinks the field. Theories and perspectives cluster in ways that are of significance to an inclusive understanding of interconnectedness of work-based learning, modes of practice and organisational dynamics. Dominant clusters have focused respectively on cognition/expertise (e.g., Eraut, 2011); on the textures of practice (e.g., Gherardi, 2015) and on organisational learning and change processes in collaborative networks (e.g., Elkjaer & Wahlgren, 2005; Toiviainen & Vetoshkina, 2018) with critical theories bringing insights that problematise and challenge some of the dominant assumptions in both (Sawchuk, 2011).

This introductory paper argues for a more dialogic approach in which robust lines of inquiry in different domains are opened more fully to an exploration of overlaps, gaps and points of connection. The international contributions in the symposium exemplify points of connection, as work-based learning is re-imagined in smart pedagogies for social capability (Maslo, Latvia); is reflexively reconfigured by digitalisation (Ertl, Germany) and deepened through higher vocational learning (Laczik, Emms, Kersh & Huegler). Furthermore, it is suggested here (more fully in Evans, 2020) that there is as yet unrealised potential in a dynamic social ecological approach that allows the relationships between work and learning to be explored through the dynamics of different scales of activity: societal, organisational and personal. While the agency of the learning individual is significant for work-based learning, a social ecological approach avoids the pitfalls of individualistic interpretations by capturing the interdependent, relational and contextually embedded processes involved.

3 Alternative Approaches to Higher Education in the UK: From Simulated to Real-world Workplace Learning

Andrea Laczik, Katharine Emms, Natasha Kersh

The UK HE landscape is strongly characterised by a theoretical approach to learning which can often be disconnected from the workplace. Two case studies that investigate alternative HE provisions have been considered which, to different extents, offer a work-based learning approach to undergraduate study. The first considers the Edge Hotel School (EHS) as a case example of practically-based higher education. Students on the programme gain foundation or honours degrees from the University of Essex whilst working alongside industry professionals to operate a 4-star country house commercial hotel. This model of HE combines theoretical and practical knowledge and skills in contextually-relevant curricula and identify aspects of innovation relevant to the wider landscapes of hospitality education and practically-based higher education more generally.

The EHS model highlights issues such as the significance of the preparation of young people for the world of work (Tuomi-Grohn & Engestrom, 2003; Guile, 2010), facilitating the links between academic studies and practical experience and situating practice-based education in the higher education landscape. Cardiff University's National Software Academy (NSA) offers an example of both simulated and real-world workplace learning within a traditional university through its undergraduate degree in applied software engineering. The NSA was established in partnership between Cardiff University, local government and employers in order to address

local skills shortages and regenerate the south Wales economy, in which it is situated. Key aspects are the use of client-facing projects students work on in small teams to find solutions to tasks set by employers; the replication of a work-place environment in the NSA resembling an office space without lecture rooms; and the high level of employer engagement from co-designing of the curriculum content to guest lectures and relevant work placements. Similarly, in the context of the EHS case study, our interviews with both the school staff and employers have demonstrated that the practically-based model has been perceived as a quality 'brand' filling a gap in hospitality education, fostering the practically-based elements of the programme. An important example of embedded industry-engagement is the consultancy project undertaken in the final year, where a real-life problem provided by industry partners is tackled by students in small groups. Employers collaborating with the EHS on this project noted that it provided invaluable opportunities for the students to apply academic knowledge to real-life issues of key relevance to the industry. These two UK HE case studies collected data from semi-structured interviews with a range of stakeholders, including teaching and senior-leader staff, focus groups with students, and interviews with employers and other key informants, in order to understand the design and delivery of the courses in particular relation to employer engagement and real-world learning. It is argued that as an inclusive perspective, work-based learning approaches can be regarded across a scale with varying degrees of theory and practice (Evans et al., 2006). The two models described here offer distinct approaches, the EHS could be considered as offering a high level of real workplace engagement, whilst the NSA delivers its courses in a simulated workplace setting and with a distinct employer engagement.

4 Strengthening the Smartness in Work-based Higher Education Practice: A Case Study on Patterns of Complex Transformations

Irina Maslo

Going through four complicated transformations: knowledge hierarchy, social activities, community organization and modern system science, the work-based vocational education develops based on pedagogy as an inter- and trans-disciplinary system science (Uskov et al., 2016), and by changing educational spaces and nature of learning (Brooks at al., 2012) 'in' and 'for' smartness (Gil-Garcia et al., 2016) of inclusive multidimensional ecological systems of societies (Zuzevičiūtė et al., 2014; Jeladze et al., 2017). Therefore, the consolidation of theory and practice, the relationship between the university and the workplace in practically-based education are challenging aspects to accomplish the complex transformations highlighted above. The objective of this example from Latvia is to discuss the evidence on the embedding of multidimensional smart merging learning transformations in work-based higher education practice. The research was conducted in 2015-2019 as the part of the longitudinal case study 2007 - 2019 of Master degree programme "Educational Treatment of Diversity " at the University of Latvia, selected as one of the 15 best European practice cases for preparing the teachers for diversity in initial education (European Commission, 2017).

The patterns of complex transformations in work-based HE were explored using learning analytics and student feed-back/self-evaluation. A research framework of smart education (Zhu et al., 2016) was chosen. By using temporal learning analytics (Chen et al., 2018, p.7) and their potential for future computer-assisted qualitative analyses, class-based differentiated instructed smart merging learning collaborative activities have been observed over time and students' statements in forums and self-evaluation rubrics tested on evidence of students' individual-based personalized work-based learning and mass-based generative learning pattern (Zhu et al., 2016). The evident patterns of transformation show that, the work-based HE practice merges science (subject contents), pedagogy (class-based personalised instructed work-based smart collaborative activities) and digital technologies (organization of higher education studies in

smart work-based e-learning communities) in holistic smart pedagogical design. Secondly, strengthening the collective capacity of HE organization at students' self-determined physical, virtual and spatial life as well as workspaces ensure the success in achievement of smart merging learning outcomes - transformational smartness of themselves as collaborative person specifying them in diverse social, cultural and economic contexts of multidimensional inclusive ecological environments. Thirdly, it integrates existing and emerging digital educational technologies to meet the demand on flexibility for personalisation of smart merging generative learning and demonstrates the breadth and depth of transformational changes.

5 Reform or Revolution? The Impact of Digital Change on Vocational Education and Training in Germany

Hubert Ertl

In Germany, vocational education and training (VET) plays an important role in preparing the ground for young people's entry to the labour market. In particular, the dual system of apprenticeship training, combining on-the-job learning at training companies and school-based learning at vocational colleges, has been a remarkably big and stable educational sector in Germany. This contribution raises the question whether this system is still fulfilling its traditional role of facilitating school to work transitions in times of fast and far-reaching changes in the world of work caused by the effects of digitalisation. Research shows that digitalisation results in the need for a more highly skilled workforce (Zika at al., 2017, 2018). While digital instruments and digitalised work processes change occupational tasks in most sectors, the magnitude and impact of change is highly variable across sectors. It is, therefore, necessary to differentiate according to specific areas. What is much less clear, is how relevant skills can be developed and what contributions different educational sectors (school education, VET, higher education) can make to the skills mix in digitalised economies. This contribution draws on research conducted by the Federal Institute for Vocational Education and Training (BIBB) into the three connected aspects.

The first is the macro-economic change that is happening as a result of digitalisation and how this change is affecting the types, numbers, and levels of jobs that will be needed in the future labour market. The basis of this part of the work are big data sets, compiled across all economic sectors, used to model the impact of political and other kinds of interventions on the future labour market. The second aspect comprises the effects digital work environments have on different types of occupations, and the training programmes and processes associated with these occupations in the German system. In this context, detailed quantitative and qualitative analysis was conducted in eleven occupations, creating a reach and differentiated picture of the impact of digitalisations on vocational training in these occupations. The third aspect focuses on the pedagogic implications digital change has on training processes and the competencies required by training staff. This work is based on surveys of in-company-training staff and a number of workshops in which need for supporting training staff was drawn out in a systematic way. By drawing these perspectives together, indications for necessary changes to the training system emerge. These include a more important role of further training (based on initial training in the dual system) and a need for developing and supporting specific media-didactic competences of in-company trainers.

6 Conclusion

The complex interdependencies between work and learning have been underpinned through the consideration of the three national contexts. In the context of Germany, the rapid changes resulting from the increasing use of digital work processes have far-reaching implications for work-based learning arrangements. This entails the introduction of digital learning tools and

requires the application of a variety of pedagogical approaches. It is also important to consider that the role of in-company training staff in supporting work-based learning processes will increase and that they, in turn, will need to be supported in order to be able to fulfil their roles. In Latvia the case study has indicated the ways in which smart-merging-learning as active, deep, constructive and meaningful learning goes beyond simple traditional teaching in the e-environment in the digital age. The case has suggested that these developments cause fundamental changes in our world-views, transiting from the uncontested acceptance and critical reflection of available information to causing profound changes in our souls, feelings, life and work perspectives, beliefs and behaviour. It enhances transformational changes of selves, workplaces and societies as communities of smart-human learning culture and socio-ecological practice. Simulated workplace environments, practices and projects that offer an alternative approach to HE have been considered through two UK cases studies – the EHS and NSA. With input from employers to help co-create and support these provisions, students' learning can be supported through the linking of theory and practice, which in turn supports students' employability.

Through these cross-national case studies, the context of the workplace has been identified as a significant indicator of different configurations of work-related learning, including aspects such as digitization, combination of theory and practice and employer engagement. In these processes, the central place of agency of the learning individual needs to be taken into account, and the social ecological approach provides a useful framework to capture the interdependent, relational and contextually embedded developments involved.

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Abstract

In Sweden, upper secondary vocational education is organised as school-based as well as workplace-based learning, just like in other European countries. However, few studies focus on the programme-specific teaching and learning in the school-based part of the education. In a three-year project, we address this lack of research in different sub-projects. In this paper we present empirical examples from four of those sub-projects concerning teaching and learning in vocational education workshop sessions carried out in four vocational programmes. Video-recorded teaching and learning in workshop sessions have been analysed based on CAVTA (Conversation Analysis and Variation Theory Approach), with a specific focus on the learning processes that take shape when vocational teachers and upper secondary students interact with tools and materials in relation to technical objects of learning. Altogether, these examples show complex and dynamic interactive processes, which become visible in the analysis of the interaction between teacher(s) and student(s) while teaching and learning in vocational workshops.

Keywords

vocational learning, workshop sessions, interaction, vocational learning content, CAVTA

1 Vocational learning in workshop sessions

The importance of studying learning in school practices is highlighted in different studies, but there is an evident lack of such studies in vocational education. Like in many European vocational systems, the vocational programmes in Swedish upper secondary school are school-based as well as workplace-based (Andersson & Köpsén, 2018; Kuczera & Jeon, 2019). However, few studies focus on the programme-specific teaching and learning in the school-based part of the education. Vocational teaching and learning are often referred to as concrete and specific, focusing on professional tasks (cf. Baartman & De Bruijn, 2011). Furthermore, teaching and learning in vocational workshops are often done in interaction between teacher and student(s)

and concern practical objects of learning (including an act of doing) (cf. Kilbrink et al., 2021; Orozco et al., 2019; Ryökkynen et al., 2020).

In a three-year project, financed by the Swedish Research Council (ref no 2017-03552), we address this lack of research in different sub-projects. In this paper, we will present four sub-projects including empirical examples from this project concerning vocational learning, aiming to redress this lack and respond to the call for research by focusing on learning practices that take shape in technical vocational educational settings. In the project, we only focus on the programme-specific teaching and learning in the school-based part of the Swedish vocational education. Furthermore, the specific focus is on the learning processes that take shape when vocational teachers and upper secondary students interact with tools and materials in relation to technical objects of learning. The study concerns four Swedish technical vocational programs: the Sanitary, Heating and Property Maintenance Programme, the Construction and Installation Programme, the Electrical and Energy Programme, and the Handicraft Programme.

2 Aim and research questions

The aim of this paper is to increase knowledge on vocational learning processes with a specific focus on what is possible to learn in relation to the enacted learning content and how learning is done in relation to the different emerging objects of learning in vocational workshop sessions. In this paper, we will present four empirical examples as sub-projects from a larger project concerning vocational learning in technical vocational educational settings. The first sub-project responds to a research question concerning *how an object of learning can be introduced in a vocational workshop*; the second, *how longitudinal orientations can be made in teaching vocational content*, the third, *how tools are focused and made relevant as objects of learning in interaction*; and finally the research question in the fourth sub-project concerns *how the learning content is handled in a make-up session in the Handicraft Programme*.

3 Theory and Method/CAVTA

In this project, we video-recorded the interaction between teachers and students in order to study what was possible to learn in relation to the enacted learning content and how learning was done in relation to the different emerging objects of learning (cf. Asplund & Kilbrink, 2018; Kilbrink et al., 2021). We followed four different teachers, from different technical vocational programmes, while they were interacting with their students during two vocational workshops each. The video-recorded examples have been analysed in depth, with a focus on both the *what* and the *how aspects* of learning, using CAVTA (Conversation Analysis and Variation Theory Approach) (cf.Asplund & Kilbrink, 2018, 2020; Kilbrink & Asplund, 2020a, 2020b).

The data for this study consist of eight video-recorded workshop sessions (two from each programme), with a focus on the teachers' interaction with different students concerning the learning content during the sessions (about twenty hours in total). In the programmes, the vocational students worked with predefined tasks, sometimes individually and sometimes in pairs. In the Sanitary, Heating and Property Maintenance Programme, the students worked individually, with different kinds of tasks. In the Construction and Installation Programme, the students worked in pairs – mainly with the same task, but in different phases of completing the task. In the Electrical and Energy Programme, the students again worked in pairs, but with different tasks on different stations in the workshop area – and in this programme there were also two teachers present, due to security reasons of handling electricity. Finally, in the Handicraft Programme, the students worked in pairs with the same tasks, alternating working on each other as models.

When analysing the empirical data, examples in relation to the research questions in the four sub-projects were chosen to be analysed more in depth. Those chosen sections were

transcribed according to CA conventions and analysed on a micro level using CAVTA (Conversation Analysis and Variation Theory Approach) (cf. Asplund & Kilbrink, 2018, 2020; Kilbrink & Asplund, 2020a, 2020b). In this manner, we performed a detailed analysis of the interaction, mainly based on CA concepts such as *semiotic resources* and the *establishment of mutual understanding* (cf. Sidnell & Stivers, 2014), and of the learning content made visible in the interaction, mainly based on concepts from Variation Theory such as *object of learning*, *critical aspects* and *features* and *patterns of variation* (cf. Marton, 2015). Through this approach, we can reach an understanding of what content is made relevant in the interaction and how it is oriented to here and now, in the actual teaching situation.

We focus solely on the interaction that takes place in relation to the enacted object of learning, and therefore do not discuss what the teacher aimed for or what the students actually learned. We follow the ethical principles of the Swedish Research Council (2017).

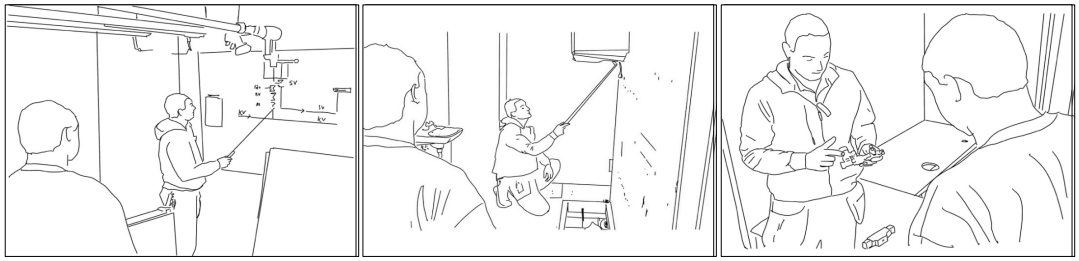
4 Results

In this section, we will give an overview of the main results from the four sub-projects, based on the empirical examples.

4.1 Sub-Project 1: How an Object of Learning Can Be Introduced in a Vocational Workshop

In our first example, we can see how the teacher is using different semiotic resources for teaching the same learning content when introducing an object of learning in a vocational workshop. He is also alternating between parts and the whole and moving between different physical places in the workshop – showing the same learning content on a drawing, on a mounted artefact as well as on physical parts to be mounted by the student (see Figure 1).

Figure 2
Teacher moves between different physical places in the workshop



(The Results from this sub-project have also been reported in Kilbrink, Asplund and Asghari, 2021)

4.2 Sub-Project 2: How Longitudinal Orientations Are Made in Teaching Vocational Content

Another sub-project explores the future-oriented movements (longitudinal orientations) that take shape when a vocational teacher and vocational students negotiate how a practical task could, and should, be executed in vocational teaching situations in plumbing school workshop settings. Findings show that the teaching can involve a longitudinal orientation – including two parallel processes concerning both the solving of the task here and now as well as a future orientation where contextualising the specific vocational learning content and making vocational learning relevant for future working life are highlighted. (Results from this sub-project have also been accepted for publication in (Asplund et al., in press)

4.3 Sub-Project 3: How Tools Are Focused and Made Relevant as Objects of Learning in Interaction

The third sub-project concerns empirical examples of how tools as artefacts are focused and made relevant as objects of learning in the interaction between teacher and students in the vocational workshops (Figure 2). In the empirical material from all four vocational programmes – the Construction and Installation Programme; the Electrical and Energy Programme; the Handicraft Programme; and the Sanitary, Heating and Property Maintenance Programme – we have first analysed different ways in which tools emerge in the interaction between teacher(s) and student(s) in the vocational workshop sessions, and thereafter we have performed a micro-analysis where some of the examples were analysed in more depth. This sub-project is ongoing, and the results presented here are preliminary.

In the first part, examples where tools appear in different contexts, in different teaching situations and in the interaction between vocational teacher and vocational student(s) in the workshop sessions are analysed thematically, with a focus on how the tool is made relevant as a learning content. In the examples, the use of the tool appears in nine different ways in the interaction between vocational teacher and student(s). The preliminary results from these nine different ways of using tools show three prominent themes: 1) When use of the tool appears as a situated resource (hence something needed for solving another task, (cf. Nevile et al., 2014), 2) When use of the tool appears as practical accomplishments (that is, the tool as such is foregrounded in the interaction, and focused as the object of learning, (cf. Marton, 2015; Nevile et al., 2014), and 3) When the tool is designed or created to be used in the teaching situation.

When going more in depth in the analysis of what happens in the interaction when tools are foregrounded in the workshop teaching, we explore how tools and machines are constituted through the interaction between vocational teachers and students in Swedish upper secondary vocational education. Preliminary results indicate that tools and machines emerge as practical accomplishments (cf. Nevile et al., 2014), hence objects of learning (cf. Marton, 2015), when students experience problems in the handling of tools or machines, or when teachers identify such problems.

Figure 3

The use of a tool is foregrounded in the interaction between teacher and student

4.4 Sub-Project 4: How the Learning Content Is Handled in a Makeup Session in the Handicraft Programme

Finally, our fourth sub-project is work in progress, focusing on how soft values in relation to the object of learning are negotiated between teacher and student(s) in different phases of the actual learning situation in a makeup session in the Handicraft programme.

The vocational students in these examples are in the beginning of their education. In the workshop sessions, they apply eye makeup on each other's faces in pairs – where one student acts as the professional (student A), while the other acts as a putative customer (student B). A first analysis of the data shows that the teacher gives support at an early stage to student A while she is applying makeup on student B. The teacher's support changes at a later stage when student B is doing makeup on student A. The findings indicate that the teacher's support during the first part of the session is more detailed, and that the second student doing makeup gets support directed to more general aspects of the object of learning. This will be further studied in the sub-project.

4.5 Summary of the Results

Altogether, these examples show complex and dynamic interactive processes, which become visible in the analysis of interaction between teacher(s) and student(s) when teaching and learning in vocational workshops. Although the learning content as well as the tasks and ways of working differ between the examples, we can see that there are parallel learning processes present in all the examples. One learning process focuses on the solving of the task here and now, while other simultaneous processes concern more general aspects such as reading manuals, understanding instructions, learning concepts, contextualising aspects of the learning content, and relating it to a future working life.

5 Conclusions and Implications

All the above examples help us understand vocational teaching and learning and how the learning content is enacted between teachers and students in vocational workshops in different vocational programmes. Furthermore, these analysed examples show a dynamic interactive process concerning how learning is done and what is made possible to learn through interaction in vocational school workshops. One conclusion is that learning in such workshops often involve parallel processes where one concerns the solving of the present task and others concern other aspects of the learning content. Another conclusion is that the complexity of vocational learning needs to be studied further with a focus on different learning content in different vocational programmes, since we cannot see vocational teaching and learning as one homogenous phenomenon, but rather as complex processes including both general and specific aspects.

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Klein, I., Saniter, A., Tütlys, V., Piro, J., Spata. S., & Spinelli, P. (2021). Good practices and methodological approaches in supporting competence development of WBL trainers and tutors in European countries. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. IV. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 150–159). https://doi.org/10.5281/zenodo.5416421

Good Practices and Methodological Approaches in Supporting Competence Development of WBL Trainers and Tutors in European Countries

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Abstract

Context: There are different practices and experiences of work-based learning (WBL) and training of trainers (ToT) in the member states of the EU. Moreover, work is changing; new skills are demanded and have to be acquired related to the application of Industry4.0 technologies (AI, cyber-physical-systems, VR, Big Data etc.). The main aim of the Erasmus+ Project "STEP -UP Supporting Tutors Educational Profile" is improving continuing professional development of in-company trainers and tutors engaged in WBL practices in this changing work environment.
Approach: In first part of the study (IO1) comparison of the relevant aspects of the VET systems of the countries Spain, Germany, Italy and Lithuania. Analysis of the strength, weaknesses, opportunities and threats (SWOT) of the existing institutional mechanisms and apparent good practices in WBL and methodological approaches for supporting on support of WBL tutors and trainers working in digitalized work processes competence development in the involved countries. The roles of trainers and their competence requirements were researched by applying content analysis of the different competence profiles and occupational standards.
Findings: The study revealed: In all four countries work-based learning (WBL) is seen as a promising approach of closing the gap between school-based VET-programmes and labour market needs. However, 3 in 4 countries are still developing their approaches on WBL in form of an established dual system. There are differences regarding the involvement of stakeholders, funding schemes and quality standards.

Conclusion: The main structure of WBL was identified. Establishing a sustainable dual system, anchored quality standards, legislation and funding are still goals to achieve. Regarding the role of teachers and trainers the study points out that there is still the need of enhancing technical and pedagogical competences as well as innovative approaches for the training of trainers and tutors. This will be subject of part two of the study: developing ToT modules enhancing teachers and trainers' competences in the field of pedagogy and digitalization.

Keywords

training of trainers, skill development, digital skills, youth at risk, work-based learning

1 Context

With the expansion of apprenticeship, work-based learning (WBL) and other dual education schemes supported by EU initiatives like the European Alliance for Apprenticeships (EAfA) and by reforms of national Technical Vocational Education and Training (TVET) systems promoted in many EU Member States, more companies need support to ensure the development and improvement of the new digital skills of potential trainers (paid for training) and tutors (mainly paid for work). Improving continuing professional development of in-company trainers and tutors has been on the EU policy agenda for some years but it becomes now even more important in the context of the increased policy attention (EC 2010-2012, Teachers and Training Matter EC 2018). This is why the current study, undertaken in the framework of the Erasmus+ Project "STEP -UP Supporting Tutors Educational Profile" executed a comparative analysis of apparent good practices and methodological approaches of supporting WBL tutors working in digitalized work processes implemented in Italy, Germany, Spain and Lithuania. It involves a selection of good practices of technical and pedagogical competences and innovative approaches for the training of trainers and tutors engaged in WBL practices.

Based on the assumption that there is a direct link between the effectiveness of WBL schemes and the pedagogical skills detained by all the different professionals involved in the planning, performance, follow up and evaluation of these paths, issues surround the development of pedagogical skills for in-company trainers in order to be adequately equipped for new digitalized or expanded roles seem to be particularly important. Not only creates the digitalization of work processes specific demand of the professional and general skills and competences for trainers (Lee & Pfeiffer, 2019; Pfeifer, 2017; Spöttl et al., 2016; Spöttl & Windelband, 2019), but these new skill demands concern a) professional skills and competences related to the application of the Industry4.0 technologies (AI, cyber-physical-systems, VR, Big Data etc.), and b) a demand of new pedagogical skills and competences related to the innovative and digitalized pedagogical techniques (Brown et al., 2018; Hirsch-Kreinsen, Itterman 2019; Zinke et al., 2017). The roles of trainers change, because now they have to cooperate closely with the engineering and production staff of the companies as well as with vocational education and training providers and teachers to guide apprentices in the digitalized work environment.

Unfortunately, the development of pedagogical skills for in-company trainers is still rather marginalized and fragmented in most of the involved countries, despite of the increasing attention of VET policy makers for the implementation and development of WBL and apprenticeships. Continuing professional development often seems to be a neglected area for both teachers and in-company trainers. This aspect is a great challenge for quality in apprenticeships in terms of the cost for both public sector and enterprises of ensuring the supply of sufficiently competent teachers and trainers. Therefore, the training and competence development of the WBL trainers in the conditions of digitalization of the work processes requires a systemic and holistic approach to their competences focused on all fields of WBL (from curriculum design and planning to competence assessment) and supported by mutual and regular feedback mechanisms.

This is why our comparative study (Saniter et al., 2020) focuses on the following aspects to support WBL trainers:

- **main structures of WBL in partner countries**: aims, learning venues, alternation, and cooperation, stakeholders involved and their main tasks, funding and juridical issues, structures of curricula, examinations, approaches, involvement of research in development of the system,
- **trainer/tutor training:** how are trainers/tutors chosen, level of trainer/tutor training, quality standards/assessment,
- **digitalized work and learning stations:** learning potentials and tutoring activities, examples of apparent good practices of reacting within training of trainers/tutors on challenges induced by digitalization.

This paper highlights only the most interesting issues of the first two aspects.

2 Methods

The research methodology is based on a comparative analysis and an analysis of the strength, weaknesses, opportunities and threats (SWOT) of the existing institutional mechanisms and apparent good practices in WBL and on support of WBL trainer competence development in Spain, Germany, Italy and Lithuania. This support was analysed in the context of implemented VET reforms in the involved countries which target on the development of competence-based VET curricula and promotion of apprenticeship and WBL in school-based VET systems.

There were applied different research methods:

Comparison of the relevant aspects of the VET systems of the countries was based on desk research of the literature and content analysis of the policy documents, as well as analysis of available statistical data.

Case study method was used for the analysis of apparent good practices of training in the enterprises of the involved countries. The roles of trainers and their competence requirements were researched by applying content analysis of the different competence profiles and occupational standards.

3 Findings

3.1 Remarkable Differences

In all four countries work-based learning (WBL) is seen as a promising approach of closing the gap between school-based VET-programmes and labour market needs; to "bring the student closer to the workplace" (Saniter et al., 2020, p. 9).

But Germany is the only country where WBL in form of the dual system is established, the other three countries are still developing their approaches or are experimenting. In Germany the dual system is established in all regions, sectors (except: health care, education and science-assistants due to historic reasons) and with standard stakeholders. Lithuania has chosen a comparable approach for reforming IVET. On the other hand, Italy and Spain are experimenting with various types of WBL, e.g. the division between VET-system and VET for employment (and each with many sub-types) in Spain. Additionally, in both countries VET is (due to the federal structure) part of the duties of the regions; engagement for WBL depends strongly on the federal governments.

All countries combine three learning venues: work-processes in a company, workshops and classes. Partly (but not systematically) two of these venues are at one place: often VET-school and workshop are combined to a VET-centre or huge German companies run own workshops on their premises as part of their training department.

Regarding the involved stakeholders, it is remarkable that only Spain and Germany refer to learners (apprentices/VET-students). They, as actors, must apply for a WBL VET-

programme; whilst in Lithuania and Italy these programmes are seen as part of the (state-driven) educational system and thus learners more as objects than as subjects. Another remarkable difference is the role of the state (whether on regional or national level): in Germany public bodies are only in charge of the framework of work-based learning; in the other three countries the state or regional institutions play a much bigger role; e.g. in curricula design, examinations or funding (see also below). Or, to put it different, the role of the social partners: in Germany they are responsible for curricula design and examinations – trade unions are not even mentioned as relevant actors in the national reports of the other three countries.

Funding schemes depict very clear the differences between countries with established and developing WBL-schemes: whilst for Lithuania, Spain and Italy a clear prevalence of public funding has to be stated, only in Germany companies invest substantially in WBL-VET (the dual system). They do not do so because they are "different to" or "better than" companies from other countries – but as this is the only way to recruit skilled future work-forces – as there are no other (public) IVET-providers that are offering these skills to the next generation.

Differing from the situation ~10 years ago, all countries established regulations on issues like contracting, insurance, assessment, etc. for WBL. But, again, only in Lithuania and Germany on national level; whilst in Italy and Spain this task is (mainly) delegated to regional authorities. And again, juridical issues depict the main approaches/beliefs of the partner countries; as an example, might the age restrictions in Italy serve: apprenticeship, as part of the state duty "IVET" is restricted to people at the age of 15-25 or 18-29 – whilst a German employer is free to hire an apprentice aged 50 years – with the same conditions as another apprentice aged 20.

In Germany quality standards are set by the community of practice; delegates from employer's organisations and trade unions are in charge of defining curricula, assessment methods and performing the examinations. On the one hand, this approach assures a high level of standards; on the other hand, it is (partly) excluding colleagues with unusual career pathways or new training approaches. In the other three countries minimum standards are set by public bodies (or not even that) – and rather pragmatic indicators are chosen, like in Spain: quality refers to impact "in terms of insertion of unemployed workers into a job related to the training received" (Saniter et al., 2020, p. 21).

All four countries are working on increasing the flexibility of their VET-systems, but approaches differs largely: Lithuania modularised it's VET system, Germany still sticks to "vocational principle" (Saniter et al., 2020, p. 25) but allows companies to vary time spent on the different spheres of activity according to their core-business, Spain sets nation-wide minimum standards to be adapted by each region according to local needs and Italy even works with "individual training plans (PFI)" (Saniter et al. 2020, p. 25), taking prior learning into account. Increased flexibility of VET-programmes is for sure a need due to technological changes, work-share between companies, etc. – but it should be always kept in mind that tailor-made skilled workers are only up-to-date for a certain moment in time; broad basic knowledge and skills of skilled workers are a mandatory precondition for being prepared for upcoming technological changes.

An encouraging finding is that in all four countries research is involved in the development of VET-systems. Not encouraging is that research is often or even mainly undertaken by national agencies / ministerial departments, being often not free in choosing the research topics and sometimes not even the results; if the clear expectation is to deliver evidence that a certain educational reform was a success. Even in Germany, where many universities are researching in VET, the competent body (BIBB) often sells itself as the only legitimate research body. A positive exemption is Spain, where in last decades a couple of independent research centres emerged (e. g. at the universities of Barcelona, Tarragona and Valencia) as there is no ministerial department for VET research.

Numbers of learners in dual VET (sub-system) are for Lithuania, Italy and Germany quite in-line with the findings from the previous analyses: Very low (~300) in Lithuania as dual VET is still in very early piloting phase. A substantial amount in Italy of 428,933 (2017) in dual programmes; even with respect to the size of the country a remarkable amount as dual programmes are not the standard IVET-approach. In Germany ~500.000 apprentices start each year; as most programmes last 3 year approx. 1.5 million people are in dual programmes – the standard and most popular IVET programmes. Remarkable are the figures for Spain: between 3.7 and 4.7 million beneficiaries in the VET for employment system; but here it must be considered that many programmes are rather short (re-)trainings.

Remarkable is that the questions formulated for the training of trainers could be answered only in Spain and Germany; in the other two countries either no institutionalized provision of initial training of VET trainers exists (Lithuania) – or too many approaches, where each region or VET-provider sets its own standards (Italy). Regarding the question, by whom trainers and mentors are chosen, in Spain as well as in Germany the company is the main actor; human resource departments ask/encourage colleagues to take this role. Only for German trainers a mandatory curriculum exists (but a rather short programme of ~2 weeks full-time, focussing on rights and responsibilities, not on didactics); preparing and supporting German mentors and Spanish trainers and mentors is up to regional or company-driven initiatives.

3.2 SWOT

The relevance and institutionalisation of work-based learning in the form of a dual system, ***Germany*** can be considered as apparent good practice. Companies and other stakeholders are highly committed to the system, roles and share of responsibilities between involved institutions are clearly negotiated and stable over a long period of time.

On the other hand, this established corporatist approach led to a certain inertness; in case of new developments, stakeholders tend to defend their claims instead of being open for new needs. A negative example was the 3rd industrial revolution: social partners, federal states, BIBB and others needed years to develop vocations for IT-sector (until 1997); private providers like big IT companies were much faster.

STRENGTHS	WEAKNESSES
Vocational principle: Nation-wide recognised qualifications.	Market-driven: In times of economic crises companies reduce the amount of apprentices.
The dual system as such; it assures accountability and commitment of companies as well as a balance between general and specific knowledge, skills and competences (KSC).	High number of youngsters in the substitute system.
Good image of VET.	Mentors (skilled workers) not prepared for training.
Involvement of all stakeholders.	Low permeability to higher education (HE).
Strong CVET system.	
Internal flexibility of VET-profiles.	
Holistic approach: apprentices learn about all relevant aspects of a profession and therefore can development necessary competences.	

OPPORTUNITIES	THREATS
Transfer of KSC from companies to schools and vice versa. Trend of bridging the gap between VET and HE. Integration of new technologies into existing VET-profiles. Digital media for new learning environments.	Still: Some voices that support modularisation. Academic drift. International companies that do not accept the role of companies in DE VET system. Opening scissors: digitalisation might have the effect of more need of CVET (EQF level 5 or 6) and semi-skilled workers (EQF level 3) – and less skilled work on EQF level 4.

Training and continuing professional development of work-based learning trainers in ***Lithuania*** is defined by the following main factors:

STRENGTHS	WEAKNESSES
Created infrastructure for work-based learning in the different sectors of economy-sectoral practical training centres. Strong network of the VET schools and centres with high capacities of VET teachers. VET curricula are based on the occupational standards developed by analysing work processes.	Domination of the school-based VET provision and undeveloped work-based learning and apprenticeship practice define comparatively peripheral role of trainers in the VET provision. Traditionally trainers are treated as supervisors of short-term practical training in the enterprises delegated by the management and with the domination of administrative and organizational responsibilities. Slow and cumbersome implementation of the dual apprenticeship started in 2007 can change this situation with the increasing share of the work-based learning. Low activity of social partnership and social dialogue in the field of VET, what limits the potential for development of pedagogical and professional skills and competencies for VET trainers. Absent institutionalized provision of the initial training for trainers remains a weakness and significant obstacle for systemic and sustainable preparation of trainers.
OPPORTUNITIES	**THREATS**
The engagement of employers in the field of VET (design of occupational standards and qualifications, VET curriculum design, organisation of practical training and apprenticeship, assessment of competencies) is gradually but steadily increasing (opportunity for development of training of trainers), while trade unions remain rather isolated from these processes. Institutional change of the VET provision with stronger orientation to development of apprenticeship and work-based learning leads to the establishment of the	Lack of skilled and experienced trainers in the enterprises. Lack of the culture and practices of cooperation between the companies and enterprises in the provision of apprenticeship and work-based learning. Increasing domination of employers without involvement of trade unions in the WBL and apprenticeship can lead to the low-quality standards of training.

new places for practical learning and training (sectoral practical training centres), opening the governance of the public VET providers for external stakeholders (change of the legal status of the VET providers) and introduction of the dual apprenticeship as alternative pathway of VET provision in the legal regulations. All these trends create new opportunities for the training of VET trainers in the future. These factors tend to increase the demand of skilled trainers, especially for work in the sectoral practical training centres. Development of qualifications of the VET teaching staff, including trainers, especially with the approval of the occupational standard of education and library sectors in the 2019, which includes qualifications of VET teachers (EQF level 5 and 6) and trainer (EQF level 5). It opens the opportunities for implementation of the initial training programmes for training of trainers.	

SWOT analysis ***Italy:***

STRENGTHS	WEAKNESSES
IVET system as a winning choice against early school leaving. The Dual system contributing to the further development of this training offer. New resources capable of expanding the offer on the territory constitutes. Development of innovative strategies to increase flexibility of the didactic organization and personalize the training courses. New impulses for the development of career guidance and job placement systems.	The quality of in-company training is the focus of attention. It is often difficult to adapt the training management of apprentices to the work processes and company organisation, especially in case of unforeseen events during the contract. In-company training is generally aligned to the needs of the individual company, rather than to the local labour market or sector. The most common mode of delivery is "on-the-job training under supervision"; as a result, apprentices in micro and small enterprises generally find it difficult to distinguish between training and ordinary work. The SMEs may not be able to develop the full spectrum of technical skills foreseen in the individual training plan, and even the training institution may not be able to cover them all, with the consequent risk of gaps in expected learning outcomes. Education and training institutions face an excessive burden in designing and implementing apprenticeship pathways of this kind, particularly when the employer is a micro or small enterprise, or when cooperation between companies and training institutions is not sufficiently stable and robust.
OPPORTUNITIES	THREATS

Transfer of knowledge from the company to the school and vice versa. Creation of Academies together with Companies and Technical Schools Recognition of the training of workers within the company by educational centres in certain VET studies. Promote the ToT system. Create opportunities in new sectors.	School and VET Teachers Skills obsolescence. Decreased role of Professional Workshops within VET centres. Schizophrenic learning (this focused on specific needs highlighted by companies and less on transferable skills).

SWOT analysis ***Spain:***

STRENGTHS	WEAKNESSES
Increase of students in Higher VET and online VET studies. Promotion of the VET studies from public institutions. Companies see an opportunity to create a career for future workers through VET and Dual VET studies. The companies have begun to value the qualifications of the students of VET and above all Dual VET to do jobs that require direct and practical contact with certain technologies (robotics, 3D printers, artificial vision cameras ...).	There are no tax incentives for companies to train their own workers. Most of the Spanish companies are SMEs. Different regulations in each region of the country. Need for a specific employment contract for Dual VET, the current "Training and Learning" contract is difficult to adapt to the company. For years the curricula have not been adapted to the new needs (there are no modules on Artificial Intelligence, on Virtual Reality, etc.). The curriculum should be less incomprehensive and should be updated more frequently. VET centres must have more pedagogical autonomy to incorporate curricula adapted to the needs and reality of the place where they are located. Lack of teaching means to work with students with special needs. Need for training in new technologies for teachers. No nationwide curricula or training for mentors and trainers.
OPPORTUNITIES	**THREATS**
Transfer of knowledge from the company to the school and vice versa. Possibility of transferring new technology (robots, artificial vision cameras, etc.…) to schools, that are due to the high costs not able to compete.	Changes of educational laws too often. The constant and rapid technological changes in industry 4.0 can cause that teaching of knowledge is outdated if the company does not adapt to them.

Enhance that experts from the business sector participate in teaching activities in the classrooms.	We are realizing that it would be interesting to have 3 years Dual VET courses to carry out the curriculum in the educational centre and the 1,000 hours of Dual training because the 2 years courses are very stressful for the students.
Creation of research and innovation centres in the VET system with involvement of centres, companies and administrations.	Little interest of the students and little training offer in very manual works that cannot be replaced with technology. Example: in the case of TEMSA, the final polishing phase of the dies and the punches is manual and there is no way to automate this last phase of the process. In the department the average age is 55 years, what will happen when the polishers retire?
Create opportunities for teachers of schools to expend time in companies so that they know the technological innovations and the place where the students are trained. To do this, the Education Administration would have to replace these teachers during the time that they are in the company.	
Promote at the local level technological centres financed by public funds and SMEs where the companies can train their workers as well as use their technology to develop prototypes or manufacture products.	
Recognition of the training of workers within the company by educational centres in certain VET studies. Example: Celsa - SVH: Celsa workers validate part of the internal training in the company with the curriculum of mechanical VET studies (intermediate VET) in SVH school.	
Promote the ToT system.	
Give support to schools.	
Create opportunities in new sectors.	

4 Conclusions

The findings mirror very well the elements of the national reports/conclusions drawn from the comparison: in our four countries, dual approaches in VET are more or less established/appreciated. But independent of the status of dual VET in the countries, in-company mentors, and partially also trainers, are a weak link in providing dual VET.

Analysis of the cases of good practices of training of WBL trainers and tutors in the project partner countries disclosed that there is a significant gap of systemic and comprehensive assistance and support in the development of trainers' and tutors' skills and competences needed for working and training in digitalized workplaces. Most of the existing practices are based on short-term projects funded by different national and EU programmes and involving VET providers, enterprises and social partners. Target of most projects is the development of professional and didactic competences of VET trainers and tutors in specific industrial sectors and occupations, especially those, which show particular progress in the implementation and development of the Industry 4.0 technologies and digitalization of the workplaces.

One of the particular challenges in supporting WBL trainers in developing their professional and pedagogical competences for work and training, especially with respect to digitalization, is the lack of systemic institutional infrastructure and study/training programmes in this field. Weak institutionalisation and fragmented provision of training of WBL trainers present particular difficulties and challenges for the successful preparation of WBL trainers for high-quality training. The most relevant issue seems to be the developing of sustainable train the trainer modules in the fields of enhancing pedagogical skills, transversal competences,

competences needed for teaching in digitalised workplaces and training with remote learning activities.

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Business Model Development and Transfer in the Context of Internationalisation: Lessons Learned of German VET Providers

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Abstract

Context: The internationalisation of vocational education and training (VET) is today almost a necessity in a world with global labour markets, where employees, employers and other actors have to deal with constant and rapid changes. Flexibilisation, digitalisation and the emergence of new occupations and markets require ongoing adaptations of training provision to changing demand. This research focuses on the aspect of business model and VET service development of small and medium sized VET training providers from Germany being active in different target countries. The aim of this study is to analyse the processes of business model development and adaptation by VET service providers and to crystallise the lessons learned by the actors.
Approach: The research design contains two steps. Firstly, a *document analysis* was conducted based on 50 documents from selected projects of two German funding lines and following the approach of organisational research. Analysed document types were project descriptions, interim reports, final reports and business model canvases. Result of the document analysis was the formulation of work theses to develop guiding questions. Secondly, the project actors were interviewed based on those questions using *semi-structured expert interviews*.
Findings: Regarding the development and design of business models in international contexts, the following lessons learned can be summarised: Development processes are not linear. Close involvement of local partners and customers facilitates the demand-oriented development of VET services and at the same time serves to reduce risks. Across the marked diversity of the projects and their lessons learned, a common development emerged, namely the attempt to reduce complexity, such as through planned modularisation at product or service level, adaptation of organisational framework conditions or flexible interface design.
Conclusion: The development of business models still seems to be largely intuitive and less strategic or systematic. However, this result may also be due to the contextual conditions of the survey. Furthermore, there is a need for research regarding the design and transfer processes with concrete reference to VET services, for example in relation to programme development on a meso- and micro-didactic level.

Keywords

vocational education and training; internationalisation, service-engineering; transfer of VET

1 Problem statement and research questions

The internationalisation of vocational education and training (VET) is today almost a necessity in a world with global labour markets, where employees, employers and other actors have to deal with constant and rapid changes. Flexibilisation, digitalisation and the emergence of new occupations and markets require ongoing adaptations of training provision to changing demand. VET is increasingly playing a role, e.g. by combining academic education and vocational training to develop labour market relevant skills and competences (OECD, 2015). Both followed by further training in that field, vocational training can contribute to a country's competitiveness (ibid.).

In this context, the German dual approach of vocational education and training enjoys great recognition worldwide, as it contributes to economic development and social inclusion to a particular degree (OECD, 2010). For this reason, the Federal Ministry of Education and Research in Germany (BMBF) supports projects that pursue the goal of internationalising VET with three different target directions:

- Bilateral exploratory projects on the preconditions and issues of vocational education and training cooperation" (a),
- "Measures for the support and model implementation of bilateral vocational training cooperation" (b) and
- "Demand-driven development and model implementation of education and training services for international markets" (c) (BMBF, 2017).

Pilz and Wiemann (2020) show different internationalisation strategies of VET providers depending on their organisational orientation and, though that, their objectives related to the target market. The study describes the strategies based on the closeness or distance towards both the dual model and the target market (ibid.). Within the context of internationalisation of VET, there are two understandings of transfer. While the first is located at system level stating, that system transfer of the German VET system to other countries is difficult, if not even impossible (Wiemann et al., 2019; Wolf, 2017), the second relates to the different ways of how VET service providers transfer elements of VET to foreign markets. However, in both cases the transfer of VET is a major challenge that is not easy to overcome, neither at the system level nor at the level of individual VET-related services (Wiemann et al., 2019; Posselt et al., 2019). This research relates to the projects of funding line (c) picking up the aspect of business model and VET service development of small and medium sized VET training providers from Germany being active in different target countries. This means that the second understanding of transfer is set as basis for this research relating to Gessler (2019), who defines VET transfer as "a transfer of VET ideas, structures and practices from one place to another. The unit of study can be countries, regions, cities or even institutions" (Gessler, 2019, p. 232). The transfer of VET services is particularly feasible, where few government structures make this transfer particularly challenging. In many countries, this means the market of VET is rather unregulated, which, however, also requires the positioning of education service providers from an economic perspective. Vocational training as a product is difficult to address, and if it is, then with strong local business partners who primarily aim to meet their own needs (Kühn et al., 2020).

The possibilities for VET providers to approach a new market are manifold. A common feature here is the development of a business model that is oriented to their own resources on the one hand and to the requirements of the market on the other hand (for example, see Bullinger

& Scheer, 2003; Leimeister, 2020; Osterwalder & Pigneur, 2013). Systematic development increases the probability of success of business models and of their VET service providers. At the same time, it represents a major challenge, especially in an international context. The development of a sustainable business model represents an important criterion for success in the aforementioned BMBF funding. This funding consists mainly of two funding lines, namely "Berufsbildungsexport [Export of VET] (BEX, 2009-2017)" and "Internationalisierung der Berufsbildung [Internationalisation of VET] (IBB, 2017-2022)". The target direction differs only slightly between the two funding lines. BEX called for the "[development] of innovative solutions for the sustainable implementation of new education and training offers in the VET landscape of the target regions". These activities were to be accompanied scientifically in order to gain insights into the obstacles and drivers of export projects (cf. iMOVE, 2011). The funding activity IBB (c), as described above, aims the “Demand-driven development and model implementation of education and training services for international markets” (BMBF, 2017). Though the development of business models is not required explicitly, it appears as a necessary condition to get a funding. To a certain extent, the same actors were and are active in both funding lines. This offers the opportunity to examine the learning processes and effects in the course of VET transfer more closely and in this way to contribute to VET-related service research as a relatively new research field. This work aims to analyse the processes of business model development and adaptation by VET service providers and wants to crystallise the lessons learned by the actors. The basic questions of this paper are thus: *What are lessons learned by actors who were active in both funding lines? Are there adaptation processes and how can these be described?*

2 Theoretical Frame

This paragraph provides brief information about the current debate on business model and educational service development. As summary of the theoretical part and starting point for the methodological part as well as analysis, the category system is presented.

2.1 Business Model Development

A business model comprises all elements that are necessary to design the entry into a new market and the establishment of a new offer there. A visualisation of these elements can take place, for example, in the form of a Business Model Canvas (BMC) (cf. Osterwalder & Pigneur, 2013). In the literature, this process is also referred to as service engineering (Bullinger & Scheer, 2006). Bullinger and Scheer (2006) name process steps that are elementary in the course of developing business models. These include, for example, the design of potentials, goals, results and processes. The latter have as a result the quality of a service. Furthermore, the involvement of customers in the development process is considered significant (Reckenfelderbäumer & Busse, 2006). Another decisive factor is the assessment of market suitability. Classic phases of a business model development are the start, analysis, conception, preparation, test and implementation phases (Bullinger & Schreiner, 2006). The consolidation of business models is preceded by a successful market entry. Various competitive strategies come into play here. These are usually differentiated into cost leadership, differentiation and focus strategy (niche strategy), based on the work of Porter (2013). Research on (VET) service engineering has developed as relatively new field of research in recent years. Firstly, the number of scientific publications has increased and secondly, there has been a further development of business modelling approaches for organisational or strategic areas (Wirtz, 2020). Current studies in the field of business model development in VET relate to drivers and obstacles of VET export (MOEZ, 2012), export of VET and central elements of business models that are important in international contexts (Posselt et al., 2019) or business model innovations under consideration of dynamic capabilities (Hilbig, 2019).

2.2 Educational Service Development

(Educational) services can be described as a specific form of product development within business models. In contrast to material products, a central challenge for the development and provision of services is their immaterial character (Leimeister, 2020). In the context of business model development, service provision is located between suppliers and customers and includes all activities necessary for service provision at this interface. The research field relating to service development is of great variety, ranging from single aspects of serviec engineering to sustainability with research dimensions like service industry, service marketing or service research. Most of the scientific literature was found for the empirical rather than the conception area (Zimmermann & Fließ, 2017). According to Leimeister (2020), services represent a "meaningful business model extension" that increasingly accompany material products, for example (Leimeister, 2020, p. 7). This is increasingly necessary because, especially in the course of digitalisation, services are becoming more complex due to "stronger networking and the increased exchange of data" (ibid.). This growing complexity caused by digitalisation requires changes both in the portfolio, but also with regard to the processes within an organisation, which includes the inclusion of customers (ibid.). Referred to VET services as to other educational services, the immateriality and simultaneity of the provision and consumption of a service challenge the development of services. Particularly for German VET providers, the dual approach of VET, meaning the combination of pracitcal and theoretical learning environments, has to be respected in the different dimensions of service development.

2.3 Development of a category system

Former studies highlighted drivers and obstacles of VET export from Germany to foreign target markets. Since the scope of the current funding line exceeds this context, this study builds on those findings and aims to develop the scientific basis for VET transfer. To enter new markets, the projects in the IBB funding action (c) are free to define pathways apart from export. To answer the research questions, it is necessary to understand what actions the VET providers take in terms of business model and service development and what context factors are relevant. Therefore, a rather broad category system was developed to deduce information from the extensive research material, which will be further described within the presentation of the applied methodology. Here, the analysis categories are presented briefly:

Business model and service-related information

1. *Business model development*: Based on Bullinger and Schreiner (2006), the undertaken and planned actions are identified and categorised based on the procedure model-based development of the service dimensions (Bullinger & Schreiner, 2006). Examples for this category are potential, process and result design, customer involvement and performance evaluation. This dimension focuses on processes.
2. *Business model design*: Within this category, the nine elements of the business models canvas (BMC) (Osterwalder & Pigneur, 2013) are analysed concerning their expression and consideration within the database. Examples are key partners, key activities, channels, customer segments and cost structure.
3. *Innovation content of business model and service*: This category serves to classify a project's degree of innovation. Therefore, the dimensions path-generating and path-optimising (Hauschildt et al., 2016) were used. Next to the classification, additonal quotations were gathered to better describe the innovation state.
4. *Market entry*: Based on the information on market regulation and innovation state given by the projects, the projects were categorised by timing strategies (Bullinger & Scheer, 2006; Fischer et al., 2007).

Context-related information (external)

5. *Market regulation:* This category covers all information given concerning the perceived or sounded regulations or restrictions in a target country at i.e., political oder socio-economic level.
6. *Design of network*: Includes information found on promoters and opponents (Gmünden et al., 2007), cooperation partners and political support.

Context-related information (internal)

7. *Organisation of work*: Includes information on project organisation, project communication as well as external and internal knowledge management, since the projects are driven by project partners which have to create their own work environment in cohesion with the requirements of the planned project.

2.4 Learning in project contexts

The opening up of new activity spaces as well as the adaptation of the existing to new environments also require the adaptation and expansion of subjective and organisational possibilities for action. This means that learning potentially takes place. However, these learning processes are not systematically accompanied. Instead, they result from the context and the resulting demands on the actions themselves with the result of solving problems. This is what Dehnbostel calls implicit learning (Dehnbostel, 2015). Following Dehnbostel, Krichewsky-Wegener (2020) states that implicit learning, which takes place unconsciously and without reflection, can be regarded as a form of experiential learning (Krichewsky-Wegener, 2020). As a second form, Krichewsky-Wegener (2020) names reflective learning, which takes place "through reflective processing of experiences" (Dehnbostel, 2004, p. 55). The terminus of *lessons learned* is well known in the culture of project management. Here, it is widely understood as knowledge stocks that emerge from the reflection of activities. In this context, lessons learnt are defined as "findings, knowledge or experiences that have emerged and are documented during project implementation" (Dechange, 2020). At the level of learning theory, the agreement with the concept of reflexive experiential learning according to Dehnbostel (2004) becomes clear.

3 Methodology

This research aims to gain insights in experiential knowledge that could actually be relevant to the practice of internationalisation processes through a comparison of actions in two funding lines. For this reason, the first step required the selection of relevant projects. First selection criteria was that at least one project partner was actively present in BEX and as well is in IBB. Second criteria was the readiness of at least one project actor to take part in the study. Through that, 18 projects could be won over for participation. Overall, the sample of 18 projects (nine each in BEX and IBB) included 34 partners in BEX and 32 in IBB. In all cases, at least one person agreed to take part in the study. These participants came from the areas of research, commercial as well as non-commercial VET providers. The research design contained two steps. Firstly, a *document analysis* was conducted based on 50 documents from the BEX and IBB context of the selected projects and following the approach of organisational research (Schmidt, 2017). The named approach respected the organisations in two perspectives: Firstly, the projects occupy a special position in the participating companies, which requires an organisation that differs from the core processes in other work areas of the company. Secondly, the projects themselves represent a unique organisational form that claim specific demands on the actors. Analysed documents types were project descriptions (BEX, IBB), interim reports (BEX), final reports (BEX) and business model canvases (IBB). Relevant information was filled in a matrix based on the presented category system. Result of the document analysis was the formulation of work theses to develop guiding questions for the next step.

Secondly, the project actors were interviewed based on those questions. Therefore, the approach of *semi-structured expert interviews* was applied (Meuser & Nagel, 2013). The second

step aimed to validate the findings from the document analysis, since project documents have a limited informative value due to their function as reporting documents to clients and thus only reflect changes authentically to a limited extent. The interviews consisted of seven main questions targeting the same categories as the document analysis, with specific scope on reflection of transfer processes. The interviews lasted about 90-120 minutes, depending on the extent of an interviewee's speaking parts.[1] Due to the COVID-19 pandemic, the interviews were conducted via telephone or Zoom from August to October 2020, and they were recorded and protocoled. Time marks within the protocols helped to seeking specific information, since a transcription was not possible for the reason of a lack of resources.

4 Findings

The study aimed to answer the following research questions: *What are lessons learned by actors who were active in both funding lines? Are there adaptation processes and how can these be described?* Within the following part, five main findings are presented, which were identified through an integrative analysis of the two methodological approaches. While four of them address the broader scope of general learning effects in the context of internationalisation, one gives directly answer to the question of transfer processes.

1. *Business model development: Setting the course early on and intensive customer integration in non-linear processes*
   Starting with the transfer-related lessons learned, it is noted that these refer to decisions and activities that are relevant in the start-up, analysis and conception phases. Here, the project activity focuses on the success of the localisation of the offered services.
   The development and localisation processes are not described as linear, but rather as non-linear or changeable. The reaction to contextual developments, which is sometimes necessary at short notice, requires the project actors to be able to react quickly, which is reflected in the design of the project consortia, the project organisation as well as the process design.
2. *Context: Actively shaping the network as an enabling structure*
   With regard to the design of business models, network-related activities are primarily to be found in the areas of key partners, key activities and key resources. Networks are among the non-material resources of projects, especially in the form of strategic partnerships and/or customer databases. They can be difficult to establish and, if the establishment is successful, are the basis for the sustainable implementation of a business model. In this respect, networks not only serve the development of business models and the transfer of services, they are even a prerequisite.
3. *Project organisation: Complementarity and agility as a prerequisite for flexible adaptation processes*
   Firstly, the most promising possible composition of the project consortium is determined on the basis of an analysis of the potentials and the allocation of roles, and can be described as complementarity of composition. The most important element here is the facilitation of rapid knowledge exchange. This is done by creating a common working culture and environment with access to all central project actors, and by setting up regular project meetings. The agile transfer and control processes created in this way serve the necessary continuous adaptation and process optimisation and enable a relatively quick reaction to changes in contextual conditions.

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[1] The interviews were conducted by the scientific monitoring of the IBB funding line. Therefore, the project actors know the authors of the study from other contexts. Due to the COVID-19 pandemic and the lack of exchange whilst rapid changes in the projects' environments, there was a lot of need for speech in some cases.

4. *Design of market entry: Filling niches by VET service providers*
   With regard to the strategic orientation of internationalisation projects in the VET context, the choice of niche strategies means, among other things, that the addressed market or customer segment is kept very small. Examples are the targeted addressing of German companies abroad with their own infrastructure, the establishment of a training institution that attracts German providers, or the consistent orientation towards the needs of specifically defined interest groups. Moreover, the way to market entry is through exclusivity. This means that competition tends to become a subordinate issue in the area of complexity reduction. For the unique selling proposition "*Training - Made in Germany*", this also means that it only appears to be of high quality as long as it sustainably fulfils the expectations associated with it.
5. *Business model design: The lesson learned refers to the reduction of complexity on different dimensions to create capacity to act*
   Across the marked diversity of the projects and their lessons learned, a common development emerged, namely the attempt to reduce complexity, such as through planned modularisation at product or service level, adaptation of organisational framework conditions or flexible interface design.

To sum up, lessons learned of German VET service providers in the context of internationalisation are: Development and localisation processes are rather non-linear or changeable, complexity must be reduced, local partners and customers need to be closely involved, conditions and channels of the target country need to be considered.

5 Discussion

The theoretical framing of lessons learned as a research object was done through the concepts of implicit learning (Dehnbostel, 2015) and the practice-based approach from project management (Dechange, 2020). Both concepts served to identify lessons learned as the results of reflecting on learning processes, here in the funding context of the "Internationalisierung der Berufsbildung [Internationalisation of VET]". In addition, the activity theory approach of Engeström (2008) was used to capture developments between organisations in a common context. However, the core of the analyses was not the tracing of internal organisational development processes, but rather the lessons learned as a common boundary object.

The analysis was carried out in a theory-based inductive manner, based on the available project documents from the BEX and IBB projects (document analysis) as well as a direct survey of the actors (expert interviews and qualitative content analysis) who were active in both funding lines. The analysis was mainly based on the process model-based development of service dimensions (Bullinger & Scheer, 2006) and the Business Model Canvas for describing business models (Osterwalder & Pigneur, 2013).

The decision of German VET service providers for early timing strategies and focus rather indicates that a corresponding reduction of complexity has already taken place in the run-up to the start of implementation. In addition, a close involvement of the clients seems to make sense not only for the best possible adaptation of the business model and service, but above all for the creation of value for the clients. This is particularly important if vocational education and training does not have a good reputation in the target country. Niche strategies or focusing require unique selling propositions. In the case of the internationalisation of VET, this is provided by the dual approach and, as a representative example, by the label "Training - Made in Germany".

Reduced complexity, especially through flexible interface design serves to generate order in Germany as well as in the target country and is involved in the existing potential, i.e. in the consortium as an organisational context, as far as possible. Examples are marketing partners, binding contact persons in the middle management of partner companies or political actors.

Overall, especially the increased focus on the process of transferring a business model as well as a VET service confirms the majority of lessons learned in the area of market development through targeted adaptation and positioning of the necessary activities. The great importance of strong labels and local presence in many respects point to the fact that occupying a niche must go hand in hand with intensive public relations work in order to successfully position oneself on the market. Furthermore, the *use of proven establishment strategies*, the *increased clarity* or even *focus of the VET service product* as well as the *strengthening of local presence* speak for the necessity of strong customer integration. For example, the funded projects are used for basic market exploration.

In addition, central information providers from the context of the target country are regularly integrated into extended project meetings in order to continuously record the development of the target market and its context (e.g., through constant adjustments of environment, stakeholder and market analyses), to evaluate it and to take measures if necessary. In this way, crises that are due to environmental factors can also be prevented.

To sum up, this is a good base for international VET cooperation with relation to the dual approach. However, further international VET research is required to mind international competition with other approaches of VET.

6 Conclusion

The strong focus of the results on process-related aspects may be due to the timing of the survey. The actors were interviewed in the context of IBB in the middle of the process. At that time, the projects were more involved in adaptation processes and less in completion processes. In addition, due to the pandemic, many adjustments and reactions were necessary in a short period of time, which may have focused more attention on the process level. Overall, however, it became clear in the course of identifying the lessons learned that process design is of particular importance. This is not surprising in view of the theoretical context.

What was surprising, however, was the comparatively large proportion of implicit lessons learned, which emerged from the document analysis but were not reflected in the interviews. The development of business models still seems to be largely intuitive and less strategic or systematic. However, this impression may also be due to the contextual conditions of the survey already described. Another surprising result was the clarity with which the reduction of various complexity challenges could be observed. This was clearly more targeted in IBB than in BEX. Whether this is a cause-and-effect relationship cannot be assessed here due to the lack of comparison possibilities. As a thesis, however, this would be an interesting starting point for further research.

The present research has limitations. Actors' experiences could be subjectively attributed to BEX, but have their origins in other (project) contexts. Furthermore, it was not always project teams that were interviewed, but also individuals. This means that some of the results only reflect the perspective of one actor in a network and that the lessons learned do not relate to a common learning context. In the available documents, data was sometimes missing (for example, unscanned pages of the project documents, missing statements on individual analysis categories), so that the document analysis is incomplete in places. In addition, not all project documents were available at the time of the survey.

A decisive limitation is the sample on which the research project is based. A study with a larger data base would be desirable. Follow-up surveys would also have to focus more on individual aspects of the analysis. For example, a comparative analysis of cases or a quantitative validation of the identified lessons learned by the community would be conceivable.

Finally, the influence of the wording of the funding announcement as well as the funding context itself, within which this research was conducted, cannot be controlled or specifically excluded as influencing variables. Furthermore, there is a need for research regarding the design

and transfer processes with concrete reference to VET services, for example in relation to programme development on a meso- and micro-didactic level. Another aspect concerns the organisation-related internationalisation processes of VET service providers. To what extent and with what goals and strategies do VET providers develop their organisations? What share do business models with an international reference have in this? To what extent can planned activities be achieved and what consequences does this have for future organisational development? In this context, processes of change could be identified at different levels (Gessler, 2017), and forms of complexity as well as cost-benefit effects could be considered (Blockus, 2010).

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The Relevance of Training for Work Among Youth at Risk: Research in Accredited Second Chance Schools in Spain

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Abstract

Context: The Spanish Ministry of Education has commissioned our research group to conduct research on all accredited second chance schools where we are inquiring young people on their past and present educational experience; trying to differentiate the relevance of the personal, the social, and the occupational dimensions. We are also finding out about the educational practice of second chance schools: their projects, methodologies and organizational arrangements, as well as their choices of occupations for the vocational training.
Approach: Our theoretical framework assumes that early school leaving is a multidimensional process where individual and social features are combined with a sense of fail in the experience of schooling (Bonal, 2003; García et al., 2013; Escudero, 2005; Bernad et al., 2015; Horcas et al., 2015; García-Rubio, 2015). Furthermore, we assume that second chance schools offer these youngsters chances to reengage, reconnect and develop a sense of belonging through a space of personal and vocational identity that restores their educational experience and invites them to search and follow their vocation (Martínez-Morales, 2021).
The research question we want to address in this contribution is what the relevance of work-based learning, practical teaching, and occupational training in the reengagement of young people is. In order to find this out, we will use our data to establish differences among types of students according to the value they attribute to the vocational dimension of second chance schools.
Findings: Regarding the opportunities offered by second chance schools, we found that 20,6% of survey responses state that second chance schools help them to get a job, 16,3% of the answers show that the school encourages them to look for a job. Furthermore, 17,6% declare the school will help them to achieve their GESO.
Conclusions: Even if our data show that the role of work and vocational training in second chance schools is not of major relevance, considering the high youth unemployment rates in Spain and the fact that our sample is within second chance schools, vocational training seems a better chance than reengaging in the school system or even taking control over their own lives.

Keywords

work-based learning, second chance schools, early school leaving, labour market, careers

1 Introduction

The Spanish labour market is different to most European countries in that it is polarized between high and low qualified jobs, while those holding a vocational qualification and being employed as such are the smallest proportion of the workforce (Homs, 2008). The risk for early school leavers to end up covering low qualified positions and precarious employment is high.

VET, particularly basic VET, provided in secondary schools but also by organizations of the Third Sector of Social Action (Marhuenda-Fluixá & Molpeceres, 2020), and a cornerstone in the educational offerings of most Second Chance Schools, has been seen by politicians as an appropriate measure to attend the educational needs of these youth. Indeed, it is almost the only option to attend formal VET for those who do not succeed in getting the General Certificate in Secondary Education (GESO, in its Spanish acronym).

Other than basic VET, the only chances for these youth are non-formal VET programs (Marhuenda-Fluixá & Martínez-Morales, 2019) but no specific measures in vocational education. Nevertheless, there is a wide offer of vocational training, non-formal though conducing to an accredited qualification, and this is a choice for both those who did not finish compulsory schooling successfully as well as for all those who do not have the chance to access formal vocational education (MEC, 2002; Marhuenda-Fluixá-Morales & Martínez, 2019). Certainly, the choice for young people of migrant origin who arrive in their teens to the country and have trouble to have their compulsory studies recognized, or for those who have difficulties with the language, is no other than accessing basic VET or non-formal VET.

Basic VET has a long tradition in Spain (Aparisi et al., 1998; Martínez & Marhuenda, 1998) and has been provided along the years by VET schools, companies, unions, municipalities and NGOs. It is an offer that equips with a low vocational qualification which is however accredited by the Ministry of Education and Vocational Education, that gives access to employment and, through access exams, to intermediate and upper-level VET.

Some institutions, particularly non-for-profit organizations, have a tradition of providing basic vocational training, sometimes subsidized, as a means to facilitate social inclusion through fostering employability (Villardón-Gallego et al., 2017; García-Montero, 2016; Marhuenda-Fluixá, 2021). Second Chance Schools have worked particularly in this domain, providing training (and usually short internships too) with specific support measures to cover specific education needs.

2 Context

One of Spain's main educational challenges is early leaving of education and training (Fernández et al., 2010; García et al., 2013), where the rate is of 17.9%, the highest in the European Union, and the average is 10.6% (Ministerio de Educación y Formación Profesional, 2019), even if it has significantly decreased since the financial crisis, where it amounted 31.7%. This is a problem both for young people as well as for the labour market (García-Montero, 2016), and one that has been tackled at policy, institutional and practice level.

Second chance schools was the name given at the turn of the century to initiatives of different kind attempting to train and retain young people who had dropped of the formal education system (Commission of the European Communities, 1995). This umbrella notion allowed the implementation of different kinds of training, mostly practical training, preparing for trades, which would motivate young people to enrol and learn in order to facilitate a smooth transition into working life, and such initiatives were also evaluated and reported (European Commission, 2001). Most of these initiatives were promoted by the municipalities.

In 2016, the Spanish Association of Second Chance Schools was established, promoted by five Third Sector of Social Action organizations, and it has expanded since then to achieve 43 partners nowadays, employing more than 700 trainers and enrolling more than 8000 students all over the country. This association gathers institutions of different kinds (associations, foundations, cooperatives and others) that are part of the Social Economy and that provide training for employment for young people ages 16 to 29 in order to help them to enter the labour market with a qualification or having access to formal vocational education. The Association has established an accreditation procedure that is guaranteed through an external body and an internal committee, a process which relies upon five principles. Three of these principles are behind our research question, these are a) favouring social and labour integration; b) developing social and occupational competencies; and c) cooperation with companies and how second chance schools contribute to this and to improve the young people reengagement.

3 Method and Questions

In this contribution, we present first data on the value that youth enrolled in Second Chance Schools attribute to their preparation for work, be it in formal basic VET or non-formal VET and other forms of social and pedagogical support.

In late 2019, the Spanish Ministry of Education and Vocational Education commissioned a study to find out the profile of the young people attending accredited second chance schools, and we took charge of it. In this contribution, we will focus on the profile of youngsters in second chance schools with a particular focus upon their views on work-based learning, practical training and preparation for the demands of the world of work.

We want to address the following questions:

- What are the views of youngsters in Second Chance Schools about their opportunities in them?
- What are the main features through which they describe second chance schools?
- Which of those features are related to training for work and access to the labour market?

In our research, conducted in Autumn 2020, we got data from 40 Second Chance Schools, amounting 2024 youngsters, ranging from 15 to 30 years, more than ¾ of them between 16 and 20, and almost half of them (990) people of migrant origin. Therefore, half of our sample was of Spanish origin, 35% were born in a non-Spanish speaking country and almost 15% were born in a Spanish-speaking country other than Spain.

We prepared a questionnaire for students in second chance schools in February 2020, but its application had to wait until October 2020 because of the health situation. The questionnaire has gone through a process of content-validation by experts as well as it was piloted in two groups of pupils in second chance schools. Data were gathered between October and December 2020. Between February and April 2021 we also collected qualitative data from teachers and trainers in schools, and we have conducted interviews with students during the spring.

The online questionnaire includes, beyond sociodemographic data, information about previous educational trajectories, young people expectations, their assessment of their previous school experience and their assessment of their current educational experience in the second chance schools. The questionnaire has closed and open questions, and the latter have been codified and analysed in order to facilitate further bivariate and multivariate statistical inference.

The results we present here evolve from an open question where students had three chances to respond or three alternative replies.

4 Findings

76’593 students were attending Basic VET in school year 2019/2020, and more than 11000 were of migrant origin (Ministerio de Educación y Formación Profesional, 2020, 4, 8).

In our sample, it is worth noting that before joining the second chance school, 21.9% youngsters used to work; while 34,6% had already attended some form of training course, and over 43% used to help at home, therefore showing some knowledge or awareness of what is behind a job, be it formal or in the informal economy.

These youngsters joined the second chance school thanks to the careers guide (38.92%), to peers and friends (27.23%) and to teachers in their former school (20.66%). 2,65% attend the second chance school as part of a judiciary measure, and 10.54% attend as they could not pursue their own choices.

44.72% of the youngsters think the second chance school will be useful for them, and 33.08% are happy with the way they are being taught. Good relations with teachers (23.11%) and peers (18.99%) do not appear to be relevant determinants in their attendance; while 9.30% admit that they have no other choice than attending.

20.6% expect the school to help them find a job, 16.3% feel motivated to search for a job and 15.8% expect to improve their personal and social competencies; while 17.6% expect the school will help them achieve their GESO. 22.6% expect to get a vocational qualification level 1 or 2 while in the school, and 7.1% expect to prepare their access to formal VET.

As for their expectations once they finish their trajectory in the second chance school; 29.73% expect to work in the same occupational field they have been trained for, 20.11% expect to work in whatever occupation, and a relevant 25.11% expect to get an Intermediate VET qualification afterwards. 56.97% expect to work in three years, while 11.02% see themselves still studying in three years.

We will now analyse the replies to the open question[1] on which are the features that best describe the Second Chance Schools, among which we find the following: 1481 youngsters assess their experience as positive, 341 as ambivalent and hardly 27 identify it as a negative experience, while 174 did not reply (Table 1).

In yellow in the table, we have highlighted the answers provided by students that focus upon the practical side of the training provided[2], the preparation for work, the application and usefulness of the knowledge and skills acquired, and the setting up of vocational expectations for young people. We have left others out, such as quality teaching and training: even if it might apply to preparation for work, it lays more emphasis on the pedagogical dimension that on the instrumentality of the preparation for work.

283 of 1850 youngsters who have answered this question (the remaining either have answered do not know or have not answered at all) have specified these labour-related dimensions (a 15,3% of the whole sample), 77,39% being men and 21,91 women; 81,23% ages 16 to 20, while 15,17% were over 20; 47,87% Spanish born while the rest have migrant origin, and more than 38% did not live with their families. 7,7% had already attended basic VET before joining the second chance school, and 16,79% have thought of leaving the second chance school along this schoolyear.

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1 Following our research questions, we present the results of those students according to their first choice or as a combination of their second and third choice.

2 A gain, data highlighted in yellow portray the replies provided by students who either chose one of those options in first place or as a joint combination in their second and third choices.

Table 1
Features describing second chance schools (three replies possible)[3]

Feature	n	%
Good experience: Freedom, motivation, supportive	1015	16.7
Good environment, good treatment: welcoming institution, good environment, kind, happy, family-like	852	14
Quality teaching and training I learn, I learn Spanish, good teachers, they train well	970	16
Enjoyable	451	7.4
They are interested in you and adapt to your needs	420	7
Useful – practical – future - opportunity	393	6.5
Human relations: Good classmates, you can make friends, comradeship	242	4
Infrastructure and equipment	206	3.4
Demanding – hard working	198	3.2
Professional	153	2.5
Bad experience: Boring, depressing, bad timetables	135	2.2
Learning a trade – training for work	112	1.8
Innovation	79	1.3

35,94% consider that attending VET in Second Chance Schools allow them to return to study in the ordinary school system, while 33,92% intend to work after it, and 39,5% value them for the support they receive to take decisions in their personal life.
The opportunities they find in the Second Chance Schools are mainly focused upon finding a job (20.37%), finding the support to search for a job (15.46%), achieving their GESO (17.18%), achieving the basic VET accreditation (14.11%) and achieving (8.71%) or preparing access (7.12%) to Intermediate VET. 16.07% consider the main contribution of the Second Chance Schools will be to improve their personal and social skills. When asked about their expectations after finishing in the Second Chance School, they expressed they want to work in the trade they have learned here (31.92%), to work in anything at all (15.49%), to study Intermediate VET (28.64%) and to study basic VET (4.46%). We can illustrate these with the following expressions in their own words:

> "It is useful" / "They open many opportunities" / "They help you search for a job" / "They train you and help you find a job"/ "Practical training, not just theory"/ "I learn a trade" / "A chance to work" / "I handle machinery" / "I learn to earn my living" / "It is real work" / "It is rather doing than studying"

We have extended our research until November 2021 in cooperation with the Spanish Association of Second Chance Schools and we are attempting to identify what are the features of the schools and the pupils having an impact upon their trajectories, reengagement, and access into the labour market.

[3] Percentages in the table add to 86% and not 100% as we have not included empty replies nor replies that indicated 'other choices' without specifying them.

5 Discussion

We have not found significant differences among second chance schools: young people experience their learning, growth, and success similarly in those with a larger orientation towards reengagement in formal vocational education and in lifelong learning, and in those that conceive themselves as platforms where young people take off towards their working life. We have neither been able to apply to our results existing classifications that the literature had shown, according to the focus upon social and personal development or occupational qualification (Marhuenda and García, 2017); the role of social and occupational competencies in their curriculum and the accreditation of them (Villardón-Gallego et al., 2020). What we have found instead is that the occupational profiles they offer and the kind of cooperation with companies they provide are among the weakest dimensions of second chance schools; hence more work is required upon the three principles related to work to which every school commits when joining the Spanish Association.

However, they allow transforming the traditional academic structure of ordinary schools, partly due to the ratio trainer/pupil; partly due to the practical experience they enjoy in the workshops that bring the world of work to the institution. Practical learning is highly valued, for it implies less studying and it feels closer to real life.

Some of these youngsters have experienced harsh lives (even exploitation) and they have achieved certain maturity that allows them to appreciate the education they receive. Therefore, they see an opportunity in the Second Chance School, one without segregation, where they can be valued for their abilities even if these are not academic. They also appreciate the support they get and the autonomy they can achieve. Being and feeling competent, doing useful things, addressing practical challenges; most of the activities prove meaningful and they feel closer to real life, to the outside-world. That may also be the reason behind the relevance of further training and their will to achieve a vocational accreditation, preferably an Intermediate VET one.
Careers guidance is something these youth need to stop thinking of 'working in whatever' and start defining their will, their chances and their career, in order to avoid having among them cheap and precarious low-skilled labour force. Therefore, Second Chance Schools might allow them to explore and practice with different occupations, in order to let them discover their call. In order to do so, relations with companies should be strengthened, as the work of these Schools only makes sense if they prepare young people for the ordinary adult world. Being responsive to the needs of the companies and the sector should go hand in hand with addressing labour stereotyping and facilitating access to new and not just traditional low-skilled occupations.

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A Quantitative Analysis of the Underrepresentation of Women in Science, Technology, Engineering, and Mathematics (STEM) Programs within Vocational Education and Training in Spain

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Abstract

The “leaky pipeline” metaphor describes the greater likelihood of women and girls to leave STEM fields at every point, relative to men and boys. Gender disparities occur both in recruitment—that is, who chooses to enter a STEM pathway—as well as retention—that is, who chooses to persist in a STEM major or occupation. In addition, women who persist in STEM careers are less likely than men to reach top levels of leadership in those careers.
Purpose: This paper describes and compares, in quantitative terms, female enrolment on STEM programs within Spain's vocational education and training (VET) system, analyzing the proportion both overall and by occupational group, while also examining the trend in these figures and the extent of progress.
Approach: Female enrolment on STEM programs in VET is analyzed at two distinct points: entry and completion. On the one hand, this paper analyzes the proportion of women entering STEM programs based on the number and distribution of women enrolling on STEM vocational education and training courses. On the other, it examines female representation among all holders of STEM qualifications, considering those graduates to represent the potential workforce leaving the education system. Moreover, its studies system efficiency in terms of course completion within the designated time, doing so via the completion rate.
Findings: This detailed quantitative breakdown by occupational group reveals a clear gender gap as regards female participation in STEM VET programs. Particularly noteworthy aspects of this difference between the genders are the low number of women attracted to these VET courses, the level of female representation across the STEM occupational groups and their completion rate at the end of the training and learning process.

Conclusions: It is important to note that the scarcity of studies of this issue in Spain, especially quantitative ones, shows the limited scientific attention paid to analyzing the gender gap in STEM subjects in the country's VET system. We therefore believe that this paper's innovative and socially relevant nature makes a valuable contribution to the field, since it represents one of the first steps towards employing scientific research into Spanish VET to help understand and characterize this field that is so important to achieving equality of opportunities for men and women and to advancing sustainable and resilient development in Spain. Finally, it is important to underline that this is an initial analysis of an area that will require further theoretical and empirical development in future years.

Keywords
vocational education and training, STEM, women

1 Introduction

The low proportion of women studying science, technology, engineering or mathematics (STEM) is a constant in secondary and tertiary education worldwide, even though various studies have demonstrated women's aptitude for those subjects (Buck et al., 2008; Christie et al., 2017). Women start to move away from STEM during compulsory secondary education, especially between the ages of 13 and 15 (National Centre for Education Statistics, 2013; OECD, 2017). This directly results in low numbers of women working in the traditionally male professions that generate greatest economic value (Struthers & Strachan, 2019). The scientific literature shows that this situation worsens at subsequent stages of education (post-compulsory secondary and university education), with the consequent underrepresentation of women in the labor market (Korbel, 2016; Makarem & Wan, 2020). Research conducted mainly at university level indicates that both female performance and retention (understood as women's choice to persist with the courses selected) in STEM subjects is similar to that of men. Thus, the underrepresentation of women is a consequence of low levels of enrolment in these disciplines and not of women's performance or aptitude (Diekman et al., 2015; Sadler et al., 2012).

This paper describes and compares, in quantitative terms, female enrolment on STEM programs within Spain's vocational education and training (VET) system, analyzing the proportion both overall and by occupational group, while also examining the trend in these figures and the extent of progress. Female enrolment on STEM courses in VET is analyzed at two distinct points: entry and completion. On the one hand, this paper analyzes the proportion of women entering STEM programs based on the number and distribution of women enrolling on STEM vocational education and training courses. On the other, it examines female representation among all holders of STEM qualifications, considering those graduates to represent the potential workforce leaving the education system. Moreover, its studies system efficiency in terms of course completion within the designated time, doing so via the completion rate.

2 Methodology

The methodology consists of conducting quantitative analysis of data gathered from secondary sources (Educabase, Spanish Ministry of Education and Vocational Education and Training [MEFP], etc.), analysing two academic years (2016/2017 and 2017/2018) taken from the latest figures available (Gamboa-Navarro et al., 2020; MEFP, 2020).

Firstly, we analyse female representation in STEM occupational groups in general and then examine those groups individually.

Secondly, we study female participation in Dual VET in STEM occupational groups.

Thirdly, we compare the completion rates of women in STEM occupational groups with those of men.

Fourthly, we analyse the employability of female STEM graduates in comparison with that of their male counterparts. This paper reports preliminary findings in these four areas.

Finally, we would like to point out, on the one hand, that this study is novel in the Spanish context and, on the other, that it is relevant given the underrepresentation of women on STEM programs in VET, a situation that creates barriers both to women's professional development and Spain's economic and social advancement. This is both because employability in these occupational groups is usually higher than in the rest and because of the amount of value these occupational groups generate for enterprises. Studying the proportion of women on STEM programs in VET is key to examining their underrepresentation in detail and so advancing our understanding of a significant problem for Spanish society, thereby allowing for reflection on possible ways of encouraging female participation in these occupational groups.

3 Results and Discussion

In our initial analysis of the data on the proportion of women enrolled in VET programs providing access to the STEM occupational groups, it is first important to determine the number of VET students taking STEM qualifications.

3.1 Female Access to VET in STEM Occupational Groups

The figures in Spain, which have remained stable in the last two academic years for which data are available, show that around 36% of the 815,354 students are enrolled in STEM programs and that roughly only one in ten (11.5%) of those students is female.

Moreover, based on the figures in Table 1 below, the breakdown by level of education of the women on VET courses in the STEM occupational groups shows several major imbalances. Overall, 61.9% are on Higher VET programs, with 29.2% studying Intermediate VET courses and just 8.9% enrolled in Basic VET.

Table 1
Female enrolment in VET and STEM-based VET by level of education (2016/2017 and 2017/2018 academic years)

		2016/2017	2017/2018
Total VET enrolment	n	791,385	815,354
Total STEM VET enrolment	n	290,224	296,144
	%	36.7%	36.3%
Total female STEM VET enrolment	n	33,263	34,063
	%	11.5%	11.5%
Total female enrolment in Higher STEM VET (% of total women enrolled in STEM VET)	n	20,619	21,074
	%	62.0%	61.9%
Total female enrolment in Intermediate STEM VET (% of total women enrolled in STEM VET)	n	9,744	9,942
	%	29.3%	29.2%
Total female enrolment in Basic STEM VET (% of total women enrolled in STEM VET)	n	2,900	3,047
	%	8.7%	8.9%

Source: Compiled in-house from Educabase data provided by the MEFP (2021)

Analysis of the breakdown of female enrolment by STEM occupational group reveals a heterogeneous distribution across the different groups (Table 2). Of the total number of women (34,063) who took these courses in the 2017/2018 academic year, most were found in just one third of the STEM occupational groups available. Consequently, three out of every four women were enrolled in one of four occupational groups. The most popular occupational group among

the total number of women enrolled in STEM programs was IT and Communications (29.3%). It was followed by Image and Sound (17.9%), Chemistry (15.6%) and Food Industries (10.8%). Of these four occupational groups, only IT and Communications is among the five programs with greatest overall demand (91,59%), reducing the absolute number of female VET students in STEM occupational groups.

Another aspect worth highlighting is the proportion of female students in each of the STEM occupational groups, which is also shown in Table 2. The distribution is not uniform in this case either. At one extreme, we see predominantly female STEM occupational groups in which 50% or more of enrolees are women, as in the case of Chemistry (51.8%) and Food Industries (50.8%). At the other, we find occupational groups with minimal female presence and evident male predominance: Transport and Vehicle Maintenance (2.8%), Electricity and Electronics (3.8%) and Machine Manufacture (5.4%).

Table 2

Enrolment in STEM occupational groups (2017/2018 academic year)

	Total STEM VET students	% of total women enrolled in STEM VET		Women as % of total students in each occupational group
	n	n	%	%
IT and Communications	91,595	9,984	29.3%	10.9%
Electricity and Electronics	59,085	2,254	6.6%	3.8%
Transport and Vehicle Maintenance	45,528	1,273	3.7%	2.8%
Machine Manufacture	26,235	1,415	4.2%	5.4%
Installation and Maintenance	24,221	1,930	5.7%	8.0%
Image and Sound	19,841	6,084	17.9%	30.7%
Chemistry	10,231	5,303	15.6%	51.8%
Food Industries	7,234	3,676	10.8%	50.8%
Building and Civil Works	5,282	1,403	4.1%	26.6%
Wood, Furniture and Cork	4,842	567	1.7%	11.7%
Energy and Water	2,050	174	0.5%	8.5%
Total STEM VET	296,144	34,063	100%	11.5%

Source: Compiled in-house from Educabase data provided by the MEFP (2021)

Analyzing the data in greater detail, we now focus on Dual VET, which is an alternance training model that combines classroom teaching at VET schools with on-the-job learning, usually in firms. Table 3 shows that in this VET option the STEM occupational groups accounted for a greater proportion of enrolment (45%) than they did in non-Dual VET programs (36.3% – Table 1) in the 2017/2018 academic year. Nevertheless, female representation in the STEM occupational groups remained very low, around 11%, similar to the situation with non-Dual VET STEM courses.

Therefore, although Dual VET does not penalize women, neither in general terms does it encourage greater female participation. Breaking down the overall figure by level of education reveals that the highest proportion of women are enrolled in the highest level (i.e. Higher VET, ISCED 5). The pattern of distribution according to level of education seen in VET is repeated in Dual VET in the STEM occupational groups, where female participation is greatest in Higher Dual VET (69.7%), followed by Intermediate Dual VET (23.9%) and Basic Dual VET (6.4%).

Table 3
Enrolment in Dual VET and Dual STEM-based VET by level of education (2016/2017 and 2017/2018 academic years)

		2016/2017	2017/2018
Total Dual VET enrolment	n	19,943	22,616
Total Dual STEM VET enrolment	n	8,538	10,167
	%	42.8%	45.0%
Total female enrolment in Dual STEM VET	n	962	1,164
	%	11.3%	11.4%
Female enrolment in Higher Dual STEM VET (% of total women enrolled in Dual STEM VET)	n	733	811
	%	76.2%	69.7%
Female enrolment in Intermediate Dual STEM VET (% of total women enrolled in Dual STEM VET)	n	229	278
	%	23.8%	23.9%
Female enrolment in Basic Dual STEM VET	n	-	75
(% of total women enrolled in Dual STEM VET)		-	6.4%

Source: Compiled in-house from Educabase data provided by the MEFP (2021)

3.2 Efficiency of the Education and Training Process

Another key indicator when analyzing the situation regarding female VET students in the STEM occupational groups is provided by the completion rate. While the enrolment rate indicates the attraction to these studies have for women and their level of participation in them, the completion rate shows how efficient the education and training process is for female students. This indicator refers to the percentage of students who complete their studies in a given academic year out of the total number of students enrolled in the first year of each course in the previous academic year. The number of first-year students is obtained by dividing the number of students in the academic year of interest by two so as to calculate the completion rates for the greatest possible number of academic years, given that the figures for VET students by year (first and second year) are only available in the source data for the 2016/2017 and 2017/2018 academic years.

The first finding that stands out is that students in the STEM occupational groups had lower completion rates (53.8%) than the overall VET average (61.6%) in the 2017/2018 academic year. The second finding is that the level of education and the completion rate are directly linked; in other words, the higher the level of education, the higher the success rate. Thus, the figure for Higher VET rises to 56.7% compared to approximately 52% for Basic and Intermediate VET also in the 2017/2018 academic year.

Finally, we found that in the last academic year for which data are available the female completion rate was 6 points lower than the male one in the STEM occupational groups. This situation requires further analysis because the reasons for this lower performance could be the consequence of circumstances prior to entering VET, or of issues associated with the VET process itself over the course of each 2-year program.

Table 4
Comparison of completion rates: Completion rate over two academic years (2016/2017 and 2017/2018)

	2016/2017	2017/2018
Total VET completion rate	60.2%	61.6%
Total STEM completion rate	53.1%	53.8%
Higher STEM VET completion rate	56.7%	56.7%
Intermediate STEM VET completion rate	49.3%	51.2%
Basic STEM VET completion rate	54.7%	52.2%
STEM VET completion rate (female total)	48.0%	51.6%
STEM VET completion rate (male total)	53.7%	57.9%

Source: Compiled in-house from Educabase data provided by the MEFP (2021)

3.3 Employability of Female Graduates in STEM Occupational Groups

The next steps in the analysis aim to shed light on the employability of female STEM VET graduates. To this end, we use three employment-related indicators: the labor force participation rate, the employment rate and the unemployment rate.

As can be seen in Table 5, the labor force participation rate and the employment rate show more favorable outcomes for female graduates with STEM qualifications in comparison to those with non-STEM ones. In this regard, labor force participation among women with a STEM qualification is above both the total female rate and the average for women with qualifications in non-STEM occupational groups in Higher VET. Employment rates are also better among those women who studied Higher VET in comparison to both the total female rate and the average for women with qualifications in non-STEM occupational groups.

Regarding the unemployment indicator, the figures also show a benefit for Intermediate and Higher VET graduates with STEM qualifications, as in both cases the unemployment rate is below both the average and the figure for women who did not study in STEM occupational groups.

The above make evident that STEM courses make VET graduates more employable, and the fact that women are a minority in both access to the programs and graduation from them (11%) places women at a disadvantage when it comes to seizing employment opportunities. The fact that most of Spain's female VET students and graduates do not choose STEM subjects constitutes a major disadvantage as regards their future employability in a labor market that rewards candidates with a scientific-technical VET background. It is therefore imperative that public policy decisions and measures be implemented to address this.

Table 5
Employment status in 2019 of female Intermediate and Higher VET graduates

(2013/2014 academic year)	Labor force participation rate			Employment rate			Unemployment rate		
	STEM	non-STEM	Total women	STEM	non-STEM	Total women	STEM	non-STEM	Total women
Intermediate VET	87.1	87.1	88.0	71.2	67.6	71.6	18.0	22.4	18.7
Higher VET	90.5	89.7	89.9	78.7	74.5	77.1	13.0	17.1	14.3

Source: Compiled in-house from the 2019 INE survey on the transition from education–training to employment (Instituto Nacional de Estadística [INE], 2021).
Note: The STEM and non-STEM rates have been calculated as average rates in the relevant occupational groups.

Finally, we supplement our analysis by applying the same labor market indicators to male VET graduates with STEM qualifications (Table 6).

In this regard, labor force participation and employment rates among men with a STEM qualification is above the STEM female average Meanwhile, unemployment rates are also better among those men who studied Higher STEM VET than among women.

When we apply the same indicators linked to male employment to the analysis, the trend shows the same pattern seen above with women. Thus, the labor force participation rate and employment rate are higher among VET graduates in STEM occupational groups and the unemployment rate is lower. However, when we compare the scale of the advantage — in terms of the labor force participation and employment rates — among men studying STEM subjects in VET as compared to the overall male, or as compared to men average without VET qualifications in STEM subjects, we see that the difference is greater than that observed among women. In contrast, the difference in unemployment rates favors female VET graduates with STEM qualifications in a greater extent as compared to those who took non-STEM VET.

Table 6

Employment status in 2019 of male Intermediate and Higher VET graduates (2013/2014 academic year)

	Labor force participation rate			Employment rate			Unemployment rate		
	STEM	non-STEM	Total men	STEM	non-STEM	Total men	STEM	non-STEM	Total men
Intermediate VET	90.2	89.5	89.6	77.7	74.6	77.5	14.0	16.7	13.5
Higher VET	93.6	91.5	91.9	84.2	79.1	82.0	10.0	13.5	10.9

Source: Compiled in-house from the 2019 INE survey on the transition from education–training to employment (Instituto Nacional de Estadística [INE], 2021)

Note: The STEM and non-STEM rates have been calculated as average rates in the relevant occupational groups.

4 Conclusions

As a starting point for the conclusions, it is important to note that this research remains ongoing and that the conclusions are subject to change once the project is completed.

Firstly, the authors substantiate the underrepresentation of women on STEM programs in VET in Spain. Of the total number of VET students enrolled in the 2017/2018 academic year, 36% were studying STEM subjects, of which 11.4% were women. Furthermore, while the number of these enrollees has fallen by almost two percentage points since 2012/2013, underrepresentation has increased in relative terms in the last five years.

Secondly, female underrepresentation in entry to STEM programs (11.4%), in terms of number of enrolments, is matched by the proportion (11%) of total STEM graduates in the 2016/2017 and 2017/2018 academic years. However, in the last academic year for which data are available the female completion rate was 6 points lower than the male one in the STEM occupational groups. This situation requires further analysis because the reasons for this lower performance could be the consequence of circumstances prior to entering VET, or of issues associated with the VET process itself over the course of each 2-year program.

Thirdly, female representation is unequal between STEM occupational groups, ranging from over 50% in the case of Chemistry and Food Industries to less than 5% in Electricity and Electronics, Installation and Maintenance, and Vehicle Maintenance and Transport. However, most job offers target these latter occupational groups (Infoempleo-Adecco, 2020). Therefore, analysis of female representation by occupational group needs to be conducted at the level of each group, or in even greater detail at program level.

Fourthly, female underrepresentation in STEM in Dual VET is increasing, meaning that the effort to raise their participation in Dual VET associated with the STEM occupational groups needs to be greater.

Fifthly, female STEM graduates show better employment outcomes than those who do not follow STEM courses. However, labor market rewards are greater for male STEM graduates than for females. These differences in labor market outcomes may be due to employers' gender stereotypes, which should be explored in greater depth in future research.

Finally, this area of knowledge requires greater analysis given the limited and fragmented research conducted to date.

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European Framework for Digital Competence of Educators: Self-Assessed Digital Competence of Adult Educators in Public Vocational Training Institutes in Greece

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Abstract

The present study examines educators' self-assessment of their digital competence in Public Vocational Training Institutes (PVTI) of Attica region in Greece, according to the European Digital Competence Framework for Educators (DigCompEdu). Two hundred twenty adult educators from PVTI of Attica completed the DigCompEdu CheckIn self-assessment questionnaire, which was translated into Greek and adapted to the field of adult education. Findings indicated that the majority of the survey participants, based on their statements, had a medium to low level of digital competence. Gender, age, teaching experience and educational level were not found to be related to educators' level of digital competence. However, there was a statistically significant correlation between educators' level of digital competence and their field of expertise and attitudes regarding the use of digital technology in adult education. This research is the first attempt to study the digital competence of adult educators according to the DigCompEdu framework in Greece, thus enriching the relevant available research data at a European level.

Keywords

digital competence framework for educators, public vocational training institutes

1 Introduction

The urgent need of 21st century citizens to acquire digital skills (OECD, 2019) places high demands on teachers of all educational levels for digital educational competence (Benali et al., 2018; Redecker, 2017). Self-assessed level of digital competence of educators using a variety of different frameworks and models has been found to range from low (Napal Fraile et al., 2018; Strutynska & Umryk, 2018; Tsankov & Damyanov, 2019) to medium (Balyk & Shmyger, 2018; Benali et al., 2018; Casillas et al., 2017; Fernandez-Cruz & Fernandez-Diaz, 2016; Gallego-Arrufat et al., 2019; Ghomi & Redecker , 2019; Gowreea & DePryck, 2019; Guillén-Gámez et al., 2020; Guillén-Gámez et al., 2018; Lasić-Lazić et al., 2017).

Educators who taught science, engineering and informatics have been found in various studies with a higher self-assessed level of digital competence compared to their colleagues

from other disciplines (Fernandez-Cruz & Fernandez-Diaz, 2016; Ghomi & Redecker, 2019). Also, educators' positive attitudes towards the use of technology in education have been linked to higher level of self-assessed digital competence and vice versa (Fernandez-Cruz & Fernandez-Diaz, 2016; Ghomi & Redecker, 2019). In addition, there are limited and conflicting findings regarding the relation between adult educators' level of digital competence and their gender, age, level of education and teaching experience (Benali et al., 2018; Casillas et al., 2017; Fernandez-Cruz & Fernandez-Diaz, 2016; Gallego-Arrufat et al., 2019; Ghomi & Redecker, 2019; Guillén-Gámez et al., 2020; Guo et al., 2008; Napal Fraile et al., 2018).

Overall, it is noted that there is limited research on assessment of adult educators' digital competence (Maderick et al., 2015). Specifically, in Greece, a European country with low ranking in international surveys regarding digital competence (European Commission, 2020), a very limited number of empirical studies, without any widely accepted theoretical framework, has been conducted on educators' digital competence.

Therefore, considering that a European Framework for Digital Competence of Educators (DigCompEdu) has been developed by the Joint Research Centre (Redecker, 2017) and a research instrument based on this framework has been used in various countries in order to measure self-assessed educators' digital competence (Caena & Redecker, 2019; Ghomi & Redecker, 2019), it was deemed important to conduct a similar study in Greece using the DigCompEdu framework.

DigCompEdu framework consists of 22 digital competencies combined into three dimensions: (a) professional digital competence, (b) pedagogical digital competence and (c) ability to facilitate the development of learners' digital competence (Ferrari, 2013; Ferrari et al., 2014; Redecker, 2017). Digital competence of educators based on DigCompEdu framework is considered to include all the necessary skills for use of digital technologies in order to enhance teaching and learning and to properly prepare learners on how to live and work in todays' digital society (Redecker, 2017).

2 Aim of study, Research Questions and Hypotheses

The aim of the present study was to examine educators' self-assessment of their competence in using digital technologies in adult education in Greece, and specifically in Public Vocational Training Institutes, based on DigCompEdu, as no empirical research in the field of education based on DigCompEdu framework has been conducted in Greece until now.

Digital transformation addresses all areas of professional activity in a digital society and requires the enhancement of employees' digital competence. Thus, vocational education is nowadays an essential field in the process of digital competence development (Makrygiannis et al., 2019). Public Vocational Training Institutes (PVTI) are the most representative structure of adult vocational education in Greece. PVTI are providers of lifelong learning services (Law 3879/2010) and aim to provide initial or supplementary vocational training services (Law 4093/2012). They employ a significant number of educators and cover a wide range of fields and subjects. Out of a total of 123 PVTI, 30 institutes are in Attica region, which includes Athens, the country's capital and largest city. Therefore, the research questions of the present study are:

I. Based on the Digital Competence Framework for Educators (DigCompEdu), what is the level of self-assessed digital competence of adult educators in Public Vocational Training Institutes in Greece overall and regarding (a) their professional digital skills, (b) their pedagogical digital skills and (c) their skills in facilitating the development of learners' digital skills?

II. Is there a difference in the self-assessed level of total digital competence of adult educators in Public Vocational Training Institutes in Greece based on gender, age, level of education and teaching experience?

The research hypotheses of the present study are:

III. There is a positive correlation between adult educators' attitudes regarding the use of digital technology in education and their self-assessed level of digital competence in Public Vocational Training Institutes in Greece.

IV. The self-assessed level of digital competence of adult educators in Public Vocational Training Institutes in Greece teaching informatics, science or engineering is higher compared to their colleagues from other fields.

3 Methodology

3.1 Participants

The target population of the present study was adult educators in Public Vocational Training Institutes of Attica, the largest metropolitan region of Greece in terms of population. Data collection took place in March 2020. The sample of the present study consists of 220 adult educators (60% female, 40% male) from various fields of education, selected using cluster sampling, from 12 out of 30 Public Vocational Training Institutes of Attica in Greece. The clusters were the 30 PVTI of Attica, from which 12 were selected by random sampling. The average age of the sample was 45.21 years (SD = 7.81). 14.5% of the sample had a PhD, 53.2% had a master's degree, 25.9% had only a degree from higher education and 6.4% had a PVTI diploma, a secondary education degree or a degree from the Higher State School. The average teaching experience was 10.17 years (SD = 7.73).

3.2 Research Instrument

The research instrument used in the current study to measure self-assessed adult educators' digital competence was the DigCompEdu CheckIn self-assessment questionnaire, adapted for the field of adult education. The questionnaire is based on the DigCompEdu framework, (Ghomi & Redecker, 2019) and has been translated into Greek.

A pilot study was conducted, which led to the revision of the Greek version, improving the clarity of some questionnaire statements. The internal reliability of the questionnaire is supported by the calculation of Cronbach's alpha coefficient ($\alpha = 0.92$), which is consistent with previous studies (Benali et al., 2018; Ghomi & Redecker, 2019).

The DigCompEdu CheckIn self-assessment questionnaire includes 22 action statements grouped in 3 dimensions of digital competence (professional digital competence, pedagogical digital competence and ability to facilitate the development of learners' digital competence). These three dimensions of digital competence includes six separate areas of digital competence (1st dimension: a) professional engagement of educators, 2nd dimension: b) digital resources, c) teaching and learning, d) assessment, e) empowering learners and 3rd dimension: f) development of learners' digital competence).

For each of these 22 statements, participants were asked to indicate to which extent this statement reflects their own educational practice by selecting one of five options. The five options are organized progressively, based on DigCompEdu framework (Caena & Redecker, 2019). DigCompEdu framework distinguishes 6 different competence levels, aligned with the Common European Framework of Reference for Languages (CEFR) competence levels: Newcomers (A1), Explorers (A2), Integrators (B1), Experts (B2), Leaders (C1) and Pioneers (C2). Within the framework these levels are designed to describe typical stages and roles educators pass through when integrating digital technologies into their professional practices.

The scoring rule for the instrument allocates 0 points to the lowest answer option, 1 to the second lowest, and so on, so that the maximum number of points per question is 4. The maximum score for total digital competence is 88. For the calculation of the total DigCompEdu competence level the rule is to attribute the Newcomer (A1) category to scores below 20, the Explorer category (A1) to scores between 20 and 33, scores between 34 and 49 are mapped on the Integrator (B1) category and scores between 50 and 65 on the Expert (B2) category. Scores between 66 and 80 are attributed to the Leader (C1) level and only those selecting the highest option for at least two thirds of the 22 competences would be qualified as Pioneers (C2).
As for the scoring of the dimensions of digital competence, the maximum score of digital competence by area of digital competence is depicted in Table 1.

Table 1
CheckIn Tool – Scoring Rule by Area of Digital Competence

Competence level	Areas a and c (points)	Areas b, d, e (points)	Area f (points)
Newcomer (A1)	0-4	0-3	0-6
Explorer (A2)	5-7	4-5	7-8
Integrator (B1)	8-10	6-7	9-12
Expert (B2)	11-13	8-9	13-16
Leader (C1)	14-15	10-11	17-19
Pioneer (C2)	16	12	20

The questionnaire of the present study included demographic questions (gender, age, years of teaching experience, educational level, educational field of expertise) as well as a question about educators' attitudes towards the use of digital technology in adult education (scale 1-5, "Very Negative" to "Very Positive"). Regarding ethics, the research instrument was accompanied by an introductory note, which explained the research objective and informed participants about voluntary contribution to the research and anonymity of the data.

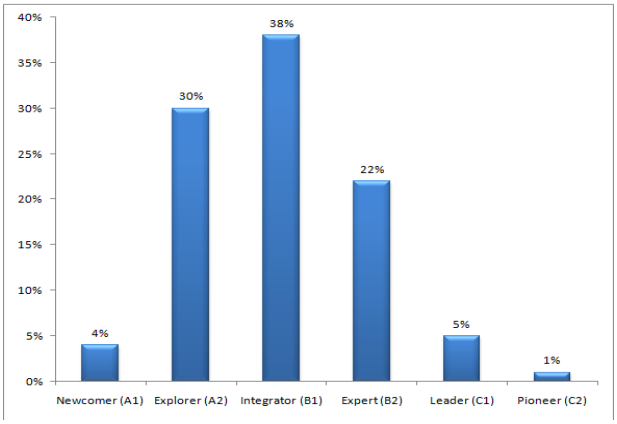
3.3 Data Analysis

Descriptive and inferential statistics (ANOVA, independent samples t-test, Pearson *r* correlation) were used for the analysis of data with SPSS v.26.0. Pearson *r* correlation coefficient was used to examine correlations between the dependent variable "total digital competence" and the independent variables "age, teaching experience and attitudes towards using technology in education". Independent samples t-test was used to compare male and female educators' total digital competence. In order to examine whether there are statistically significant differences in educators' self-assessed digital competence based on their educational level and educational field of expertise, single factor analyses of variance for independent samples (ANOVA) and post-hoc test Tukey HSD were applied to compare the means.

4 Findings

Educators in Public Vocational Training Institutes that took part in the current study had a medium to low level of self-assessed digital competence, being most competent in areas that included digital skills that they had acquired during their undergraduate studies. Overall, 68% of educators participating in the survey were at the Explorer level (A2) and the Integrator level (B1) of total digital competence (Figure 1).

Figure 1
Level of Self-assessed Total Digital Competence of Educators in Public Vocational Training Institutes in Greece



4.1 Level of Self-Assessed Digital Competence of Adult Educators Regarding Their Pro-Fessional Digital Skills

Research question I (a) of the present study relates to the first dimension of digital competence and examined the area of professional engagement of educators. In particular, this dimension of digital competence includes organizational communication skills, professional collaboration, reflective practice and digital continuous professional development. Based on the self-assessment of the educators who participated in the present study, 37% were found at level B1 (Integrators) and 31% at level A2 (Explorers) of digital competence (Figure 2).

4.2 Level of Self-Assessed Digital Competence of Adult Educators Regarding Their PE-Dagogical Digital Skills

Research question I (b) of the present study focuses on educators' pedagogical digital skills, which is the second dimension of digital competence and includes four areas of digital competence (digital resources, teaching and learning, assessment and empowering learners).

Specifically, the area regarding digital resources includes selecting digital resources, creating and modifying digital resources and also managing, protecting and sharing digital resources. 28% of educators of the current study were found regarding this area of digital competence at level A2 (Explorers) and B1 (Integrators), while 21% were at level B2 (Experts) of digital competence (Figure 3).

The area of digital competence regarding teaching and learning, includes teaching, guidance, collaborative learning and self-regulated learning. 24% of the educators were found at level A1 (Newcomers) of digital competence, 33% at level A2 (Explorers), 23% at level B1 (Integrators), 16% at level B2 (Experts), 4% at level C1 (Leader) and 1% at level C2 (Pioneer).

The area of digital competence regarding assessment includes assessment strategies, analysing evidence and also feedback and planning. More specifically, 30% of the educators in the study reached level A1 (Newcomers), 38% level A2 (Explorers), 18% level B1 (Integrators), 10% at level B2 (Experts), 3% at level C1 (Leader) and 1% at level C2 (Pioneer) of digital competence in this area.

The area of digital competence regarding empowerment of learners, includes accessibility and inclusion, differentiation and personalization, as well as actively engaging learners. Regarding empowerment of learners, it was reported by 30% of the adult educators that they adapt digital activities to the abilities of the trainees in order to minimize difficulty level, while 21% of the participants reported that they do not engage in creating digital activities. Specifically,

23% of the educators in the study reached levels A1 (Newcomers) and A2 (Explorers), 21% at levels B1 (Integrators) and B2 (Experts), 8% at level C1 (Leader) and 3% at level C2 (Pioneer) of digital competence in this area.

Figure 2

Level of Self-assessed Digital Competence regarding Professional Digital Skills

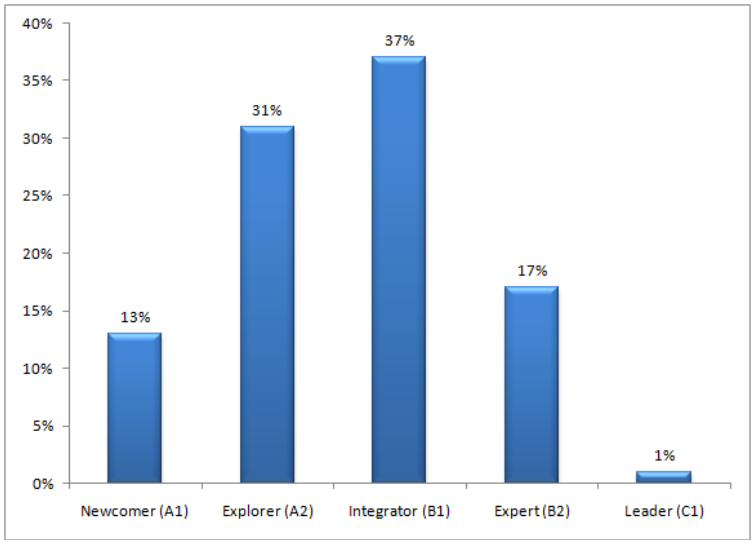
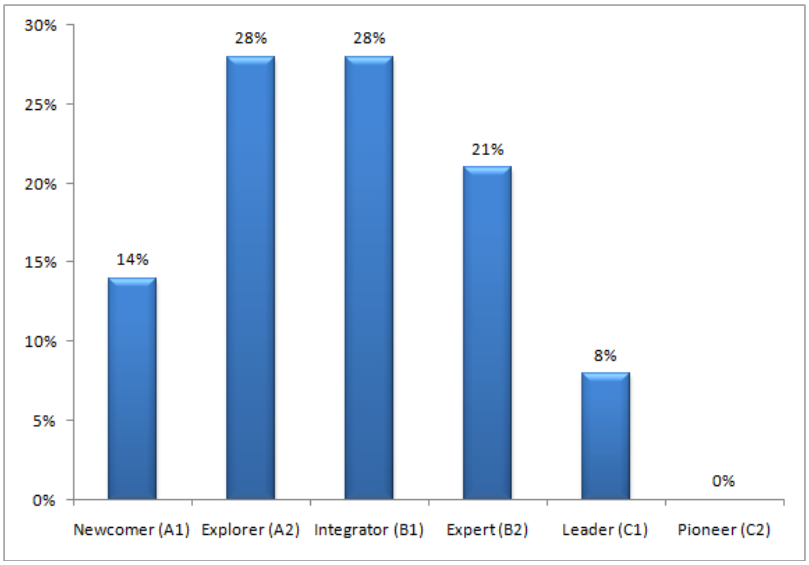


Figure 3

Level of Self-assessed Digital Competence regarding Professional Digital Resources



4.3 Level of Self-Assessed Digital Competence of Adult Educators Regarding Their Skills in Facilitating the Development of Learners' Digital Skills?

Research question I (c) of the present study refers to the third dimension of digital competence, which examines the area regarding facilitating learners' digital competence. This dimension includes information and media literacy, digital communication and collaboration, digital content creation, responsible use of digital technologies and digital problem solving. Based on the statements of the participants, 26% of the educators were at level A1 (Newcomers), 20% at level A2 (Explorers), 25% at level B1 (Integrators), 23% at level B2 (Experts), 4% Leader and 2% Pioneer.

4.4 Individual factors and level of self-assessed digital competence of adult educators

Finally, it was examined whether demographic factors and attitudes were linked to educators' digital competence. A statistically significant difference in the self-assessed level of digital competence was found between educators in the field of informatics and educators in other fields of education (F (2, 217) = 3.64, $p < 0.05$, $\eta^2 = 0.03$), with the former stating a higher level of digital competence.

No statistically significant correlation was found between the self-assessed level of digital competence and age (r = -0.09, $p > 0.05$) or the teaching experience of adult educators in PVTI (r = 0.007, $p > 0.05$). Similarly, in relation to gender, no statistically significant difference was found in the self-estimated level of digital competence of female and male adult educators (t (218) = 1.45, $p > 0.05$). In addition, the self-estimated level of digital competence of adult educators in the sample was not found to be statistically significant different among those with a PhD, postgraduate degree, Higher Education degree and PVTI diploma or Secondary education degrees (F (3, 214) = 2.06, $p > 0.05$).

Despite the rather low level of self-assessed educational digital competence, the vast majority of adult educators in the current study (85%) indicated very positive or positive attitudes towards the use of digital technology in education. Thus, only weak, positive statistically significant correlation was found between educators' self-assessed level of digital competence and educators' attitudes towards the use of digital technology in adult education (r = 0.3, $p < 0.05$).

5 Conclusions

In the present study, the self-assessment of adult educators in PVTI of the region of Attica in Greece was examined regarding their digital competence in the use of digital technologies in adult education, according to the European Digital Competence Framework for Educators (DigCompEdu).

The majority of adult educators in the study was found to have a level of total digital competence between the Integrators (B1) and the Explorers (A2) level, with the area of digital competence regarding assessment being the area with lowest scores. The research findings regarding digital competence are in line with the results of previous studies, that have adopted various theoretical frameworks, in which the level of digital competence of educators seems to be from low to medium (Balyk & Shmyger, 2018; Benali et al., 2018; Gallego-Arrufat et al., 2019; Ghomi & Redecker, 2019; Gowreea & DePryck, 2019; Guillén-Gámez et al., 2020; Napal Fraile et al., 2018), indicating an urgent need for improvement and professional development.
In addition, findings in the present study showed a statistically significant difference among the educators belonging to the field of informatics and those of other fields, confirming the results of Fernandez-Cruz and Fernandez- Diaz (2016), as well as Ghomi and Redecker (2019). In addition, no statistically significant relationship was found between the level of digital competence reported by participants during their self-assessment and gender, in line with the findings of empirical research by Benali et al. (2018), Fernandez-Cruz and Fernandez-Diaz (2016), Gallego-Arrufat et al. (2019) and Napal Fraile et al. (2018). Also, no statistically significant correlation was found between the self-assessed digital competence of educators and their age, consistent with the findings of Guillén-Gámez et al. (2018) and Guo et al. (2008).

Moreover, this empirical research did not find any statistically significant relationship between the self-assessed digital competence of adult educators and their level of education. However, it is worth noting that the educational level of the participants was very high, as the majority of the educators in the sample held postgraduate degrees, which is consistent with the high educational level of adult educators in PVTI in Greece. In addition, no statistically significant correlation was found between the self-assessed digital competence of adult educators and their teaching experience, in contrast to previous research. Benali et al. (2018) and Ghomi and

Redecker (2019) indicated that years of teaching experience were positively related to the level of self-assessed digital competence and Fernandez-Cruz and Fernandez-Diaz (2016) found that years of teaching experience were negatively related to participants' self-assessed digital competence.

A statistically significant correlation, although weak, was found between the self-assessed level of digital competence and educators' attitudes towards the use of digital technology in adult education, in line with the findings of previous international research (Fernandez-Cruz & Fernandez-Diaz, 2016; Ghomi & Redecker, 2019).

Adult educators of the PVTI of Attica, according to the findings of the present research, seem to be in need of further training in order to upgrade and strengthen their digital education competence. A new institutional educational framework, providing significant incentives for the development of their digital skills while promoting the use of digital technology in the educational process, could contribute to this direction.

This research study is the first attempt to investigate the digital competence of adult educators according to the DigCompEdu framework in Greece, thus enriching the relevant available research data at a European level. However, taking into account that the target population of the present study was the PVTI educators in the region of Attica in Greece, it is not possible to formulate conclusions that can be generalized at the country level. In addition, it is worth noting data collection took place in March 2020, during a period without lessons in the classroom in order to protect the population from the effects of COVID-19. In the following period, synchronous and asynchronous e-learning solutions were implemented at all levels of education, possibly allowing educators to become more familiar with the use of ICT, advanced web applications and digital teaching techniques.

Therefore, the present study could be used as a basis for planning a future empirical survey to be conducted nationwide to explore, according to DigCompEdu, the self-assessment of digital competency level of educators teaching in various adult education institutions. Such a study would allow the drawing of more robust conclusions regarding all adult educators in Greece as it would be addressed to educators of different adult education institutions.

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An Exploration of FET Teacher Engagement, Continuous Professional Development, and Career Progression in the South-West of Ireland

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Abstract

Context: The Irish FET (Further Education & Training) landscape has undergone major structural changes. Demands to professionalise the sector have resulted in raised professional and academic requirements, while maintaining professional learning that supports adaptable responses to constantly changing industry practices and standards. Little is known about how FET professionals' engagement in their role at work influences their commitment to CPD, and their expectations of career progression. With this overall lack of empirical attention, the purpose of this study was to contribute to current knowledge of the experiences of FET educators with respect to role engagement, CPD and career progression.
Approach: This qualitative interpretivist study used a purposive sample of twenty-three educators representing a range of roles, contexts, disciplinary backgrounds, and experience in the FET sector of southwest Ireland. Participants delivered programmes at Levels 1-6 on the Irish National Framework of Qualifications (Quality and Qualifications Ireland, 2018). Methods: Methods included two focus groups and twelve semi-structured interviews. The data sets were analysed using a mix of inductive coding and the constant comparative Comparisons between contexts and organisations were developed and built a multi-perspective view that informed the findings and discussion that follow in the paper.
Findings: Results from the study identify that engagement, professional learning, and career progression are mutually influential concepts. Thus, a high value and investment in engagement increases participation in CPD and develops expertise that contributes to career development and progression. Each of these concepts are multifaceted and multi-layered and are individually defined, constructed, and evaluated according to personal, professional and organisational standards and expectations. Unexpectedly, the common influence on all three concepts was local or line management.
Conclusions: In this study, we further the research on FET teacher engagement in their role at work and how new professional learning and development frameworks and approaches might enhance and support the evolving professional identity and agency of those working in the sector. FET teachers at all levels, have the shared responsibility to be the ones to formulate how their professional role as teachers and educators will move forward in the 21st century. Developing pathways to career progression through innovative and effective CPD and other

experiences will give teachers the skills to connect their teaching to practitioner focused research that establishes a strong and professional 'voice' to emerge for the field of further education and training.

Keywords

further education and training (FET) teachers; psychological conditions of personal engagement; professional learning and development; career progression

1 Introduction/Context

The teacher is fundamental to the learning experience. FET is no exception (Cedefop, 2016, p. 1). Committed, enthusiastic and engaged teachers share their expertise, and model professional practice resulting in student interest and engagement. This is vital to ensure that the FET sector meets the Irish Government demands to be a world-class integrated system (SOLAS, 2014, p. 3) of 'building skills; fostering inclusion; and facilitating pathways [for progression]' (SOLAS, 2020, p. 5). This echoes the aims of the European Community outlined in the Maastricht, Bologna and Riga processes (European Commission, 2020).

The Irish FET landscape has undergone major structural changes from a previous set of diverse, ad hoc, locally determined responses to a consolidated national structure under the control of a single body, SOLAS. Previous structures, cultures and practices with ideological and philosophical differences are not yet aligned into a single vision and mission acceptable to everyone. Differing personal ethos and values exist within the various categories of staff who continue to link their professional identify to their original organisational contexts, leading to 'us and them' behaviours and sub-cultures. Initiatives aimed at the professionalisation of the sector have focused on the requirement to hold an FET Teacher Education Qualification (TEQ) in addition to vocational/academic qualifications and Continuous Professional Development (CPD) requirements to keep pace with constantly changing industry practices and standards.

An examination of how FET teacher's engagement at work influences their perspective of CPD and career progression will be of interest to those working in the sector, but also to the organisations promoting post-compulsory education and training. Three questions guided this study:

1. What are the contributing psychological conditions of engagement for FET teachers?
2. What are their experiences and orientations towards professional learning and development?
3. What are their perspectives on career progression and their aspirations for their own careers?

The answers to these questions help provide an understanding of FET teachers engagement in their role at work, their CPD needs and their perspectives on career progression in the sector.

2 Literature

This study draws firstly on Kahn's (1990) psychological conditions of personal engagement and disengagement in a work role comprised of three elements: psychological meaningfulness, psychological safety, and psychological availability. Second, Evans' three components of Continuing Professional Development; behavioural, attitudinal, and intellectual development (2014), further defined as "learning in, for and through the workplace" (Evans & Kersh, 2014). And finally, Fessler and Christensen's model of teacher career progression as a cyclical process (Fessler & Christensen, 1992). While literature on engagement is extensive, there are relatively

fewer reports that specifically relate to FET teachers and the sector. Enthusiasm is identified as one of the core characteristics of work engagement for teachers in general (Hakanen et al., 2006). Finnish research on vocational education teachers found that their enthusiasm led to the development of skills and expertise, dedication, good job performance and a positive attitude towards their work. However, a lack of or reduced resources including for example, budget cuts, a negative work atmosphere and changes, weakened enthusiasm (Wenström et al., 2018). FE sector research in the UK found that teacher engagement was important, especially during periods of organisational change, but it was vulnerable to management processes and increasing demands to 'do more for less' (IPA, 2014, p. 7). CPD for FET teachers is complex as they are often 'dual' professionals (SOLAS & ETBI, 2017, p. 16). The term is used to describe those who hold a vocational profession in addition to a formal teaching role. FET teachers have to maintain and develop both pedagogical and vocational expertise in alignment with the requirements of policy and their local contexts (Institute for Learning, 2009, p. 7). Therefore, CPD is critical for the ongoing development of FET teachers' specialist/disciplinary and pedagogical knowledge and skills. Most achieve this through "learning in, for and through the workplace" (Evans & Kersh, 2014). They evidence high levels of self-directed and relevant learning in a variety of ways including formal, informal, nonformal, incidental and innovative ways (Andersson & Köpsén, 2018; Broad, 2016; Broad & Lahiff, 2019; Hoekstra et al., 2009). The Fessler and Christensen model (1992) of teacher career progression reflects a complex set of influence that occur in a cyclical process. Extant research indicates that FET teachers, in contrast to mainstream teachers, are more likely to enter their teaching career 'accidentally' (Gleeson et al., 2005; Orr, 2019, p. 337) from a variety of routes, but the decision is less likely to be made for economic gain (Orr, 2019, p. 337). CEDEFOP states that the 'poor level of data' available 'makes it impossible to provide a comprehensive statistical picture of the VET workforce and of the various challenges it faces' (Orr, 2019, p. 335). This is echoed by OECD (2010, p. 96) and the data available for the FET Professional Development Strategy (SOLAS & ETBI, 2017).

In summary, little is known about how FET professionals' engagement in their role at work influences their commitment to CPD, and their expectations of career progression. With this overall lack of empirical attention, the purpose of this study was to contribute to current knowledge of the experiences of FET educators with respect to role engagement, CPD and career progression.

3 Method

This qualitative interpretivist study used a purposive sample of twenty-three educators representing a range of roles, contexts, disciplinary backgrounds and experience in the FET sector of southwest Ireland. Participants were employed on fulltime and part-time programmes, delivered at Levels 1-6 on the Irish National Framework of Qualifications (Quality and Qualifications Ireland, 2018). Participants delivered courses on general education, vocational training, and instructor training in a diverse range of subjects from agriculture, outdoor recreation, hair and beauty, psychology, IT, health care and childcare. Methods included two focus groups and twelve semi-structured interviews conducted prior to the COVID-19 pandemic and national lockdowns. A pilot was used to test the focus group design, after which the first focus group was conducted with basic education teachers in the Cork region; and the second with occupational education teachers in the Kerry region. The researcher used the focus groups to gain a broad understanding of the variety of contexts and experiences of those working in the sector. Results from the focus groups were used to inform the design of the semi-structured interviews. Participants were invited to meet with the researcher for their interview at a time and location chosen by them. The semi-structured interviews provided a deeper understanding of FET educator individual experiences, without the influences of the group dynamic aspect of

the focus groups. Participants took part in either a focus group or an interview, with the exception of one individual who elected to take part in both. Digital recordings of each data collection method were summarised (focus groups) or transcribed (interviews) and member checked. The data sets were analysed using a mix of inductive coding and the constant comparative method (Cohen et al., 2007; Glaser & Strauss, 1967). This allowed the researcher to "remain attuned to [the participants'] views of their realities, rather than assume that we share the same views and worlds" (Charmaz, 2010, p. 187). Comparisons between contexts and organisations were developed and built a multi-perspective view.

4 Findings

4.1 Psychological Conditions of Engagement

Specific to understanding the psychological conditions of engagement, broad themes from the analysis of the data are set out in the following sequence: meaningfulness, psychological safety, and psychological availability.

Of the three core components identified for meaningfulness: task and work interactions were the most mentioned by participants. Elements of 'task' including autonomy, challenge, creativity and variety were all equally important. 'I don't have anyone kind of looking over my shoulder at what I'm delivering. Once I'm in class, that's the most important, seems to be the most important thing. Like what I'm actually doing there is very much up to my own devices,' [Elaine]. The 'teacher' title appeared to be of secondary importance to the enacted role of 'teaching, meeting the needs of their learners, and teacher-student relationships'. Lillie shared, '. . . when you see people feeling that they're getting somewhere or going somewhere, and they get something, or they understand something. And that's really rewarding'. Work interactions within the classroom were reported as positive, whereas the work interactions with colleagues and the wider organisation were a mix of positive and negative experiences. Anita said, 'I have a lot of good friends here [in the centre] . . . And so that would be a personal support. Some of my best friends are actually you know, the people that I teach with.' However, Bonnie's experience was different, 'the better your work is, the more you're resented. And the more efficient you are, the more you're shunned'. In one focus group, there were references to the 'cliques' within the centre staff and the difference in how you were treated within the centre depending on your social status within the community. The group said 'we're the others'.

There are four factors listed for psychological safety: interpersonal relationships, intergroup dynamics, management style and process, and organisational norms. The factor most reported on by participants was 'management style and process' and participants took a local rather than an organisational/national perspective. The leadership factor revealed a mix of positive and negative experiences. 'The way it is here - everyone has a buy-in in the running of the place. We all have responsibilities for different things at different levels. So I suppose it creates a buy-in into making sure the place is productive [Gerald]. One focus group described it as 'ruling through fear' and an identification of a need for help or training was described as a reason to lose hours or a module. The other focus group described managers who were hostile, disinterested or incompetent. Their experiences and perceptions of the wider management was that they were dogmatic and had an aggressive management style. A second theme of trust was identified, Imara stated, 'I felt was a level of respect there as well. And trust'. In contrast. Elaine stated: 'certain people are very - checked on. . . we've had a few incidences in the last week where like, the principal, or the principal has sent someone to make sure that we're, that certain people are in their classes, at certain times doing what they should be'. Again, support also emerged as a theme and was experienced very differently by several participants, for example; 'I would find both [resource workers] very supportive and very encouraging, and very professional, and I have no hesitation to go them with questions and find them very open and very

friendly, very warm and personable' [Lillie]. While Claire's view was an opposite one**,** 'Very simply, like, there's no support for tutors that I can see. Participants in one focus group agreed that leadership and support was ineffective, non-existent or just 'all on paper, said Rose, '… a fear that if something goes wrong you're going to get it in the neck and that fear is always there'. There were some negative views of managerial competence. For example, one focus group stated 'she couldn't change the cover on her biro'**.** 'Resilience' and 'consistency' did not emerge from the data for the 'management style and process' factor. Analysis of the data with respect to the 'inter-group dynamics' factor identified that one focus group and another separate interviewee all reported very negative experiences. In the focus group where 'management style and processes' had a negative impact it developed into a 'them and us' situation. Participants mentioned 'friends' (of the manager), and 'spies' and perceived inequalities. 'But other teachers with a higher profile, tend to come and go, whenever they feel like it, that it's okay for them'. [Elaine] Organisational norms did not feature significantly in participant responses across both sets of data but one. Four types of distractions influence psychological availability: physical energy, emotional energy, insecurity and outside life. Analysis of the data revealed a recurring theme related to both physical and emotional energy, where participants were willing and able to give high levels of personal investment in their teaching and working with their students 'I want to be 100%. If I'm not, I'm out the door' [Helena]. And 'I don't think I'd be here as long as I am if I wasn't emotionally and personally involved in this place' [Gerald]. Others reported that they were giving so much they were experiencing burnout: 'I would say I'm maxed out [Rose]. 'I'm drowning and no one gives a sh**' [FG]. Several participants maintained strict boundaries with respect to physical and emotional energy investment. For example, 'When I'm here from nine to five, I want to be totally involved in my role. And am totally involved' [Mary Jo]. Insecurity as a theme emerged from the data in the form of several individuals' perceiving a lack of 'fit' between themselves and the organisation and its purposes: 'my concerns are that I don't want to be really part of an institution does that, that that turns people into units you know. [Paco] 'I can't work like that if I think a group might be cut because of numbers. That really isn't me at all, you know. And I don't think it should be an Adult Ed organization' [Claire].

4.2 Continuous Professional Development

Participant perspectives of CPD were divided into: (1) employee training courses and vocational training and certification, and (2) self-initiated/self-directed learning and development.

The majority of participants had a negative view of the training provided by the organisation. Many described it as irrelevant, inadequate or described it as 'tick box' exercises. Types of employee training courses included 'in-house' QQI assessment procedures, general IT/software training in Microsoft 365, PLSS (database system), and policy and regulation changes e.g. GDPR. Many mentioned their lack of 'voice and choice' in what they attended, and the lack of value to them as teachers in the training provided. Management 'put things in place to teach you, so that you can be a better employee'[Paco]. Others shared experience of spurious training sessions in jive classes and drumming workshops provided by management to keep them 'busy' while their students sat examinations on designated subject areas (City and Guilds, QQI, etc). For some individuals, this prompted them to take the '*easiest option, like they tell you the minimum amount of hours … you need to get the minimum and that's it' [Elaine].*

Eight of the twelve interviewees reported that compulsory CPD was part of their employment conditions. Vocational training and certification was provided generally either to comply with employment legislation or to meet professional body 'fitness to practice' certification/'revalidation' requirements. Gerald said: '*every time manual handling comes along, he says so what do you do here? This is . . . how you pick up an empty cardboard box. But how do I empty a canoe, while I'm sitting and twisting and lifting and all of the things they tell you not to do. But they're all part of your daily work*. Additionally, members of a focus group gave examples

of an employment requirement that they personally, source, fund and complete professional training in health and beauty. They reported a variation in their experiences of funding/re-imbursement of vocational fees and training costs and attributed this to local management. Analysis of the data related to self-initiated/self-directed learning and development was categorised into formal, informal, non-formal and incidental and illustrates the pattern of activity reported by participants (Table 1).

Table 4
Categories

Type	*Formal (Academic)*	*Non-Formal (Vocational/ Professional)*	*Informal (Structured)*	*Informal (Collaborative)*	*Informal (Individual)*
Examples	Accredited		Non-Accredited		
	Accredited QQI/ HE programmes of study: Higher Cert, BA, MA, PhD	National Governing Bodies/ Professional Qualifications	Organised activities (by organisation, network or professional body).	Learning through peer collaboration/ unofficial mentoring/ communities of practice	Self-directed activities. Driven and sourced by the needs/interests of the individual. Readings, social media
	Structured			Collaborative	Unstructured

In exploring the reasons for this self-initiated learning and development activity, interview data revealed a complex set of reasons and motivations that are set out in Table 2.

Table 5
Reasons and Motivations

	Increase Efficiency & effectiveness	**Remain current**	**Maintain qualifications (revalidation)**	**Improve self (personal development)**	**Improve practice**	**Upskill (expand expertise)**
# of interviewees	1	4	2	3	6	7

Participants had differing views on the subject. For one, '*you have to know what's the latest thinking . . . you have to keep fresh otherwise . . . you'll get stale or bored'* [Helena]. Another said, '*I'm interested in my own personal development and professional development because it makes me better at what I am doing for people'* [Claire]. For some their self-directed learning, e.g. attendance at conferences and training courses on regulatory changes or required new modules (Care of the older person), was supported and valued by the organisation. However, it was also reported that activities valued by the participants (reading, working through websites like NALA, new software, and collaboration) were not necessarily valued by the organisation.

4.3 Career Progression

FET teachers understanding and expectations of career progression fell into two broad themes: (1) a personal view of career progression as a teacher; and (2) FET teacher career advancement/ progression within the organisation

Personal views of career progression were positive and enthusiastic: and, identified for most as a personal commitment to increasing subject knowledge breadth and depth and pedagogical competencies. Opportunities for career progression from this perspective, were understood to mean extending an individual's current teaching range of subjects and QQI levels. For

example, ‘another skill to learn. You know, there's always something new in the market that I have to go out and try to master’ [Paco]. Another shared, ‘you can specialize in a particular sector … in just adults … just in your mainstream … in ASD or autism, or …go down different avenues if you to wish’ [Bonnie]. Participants viewed FET teacher career advancement/progression as limited to administrative/management posts that were mostly unavailable or undesirable. Analysis of the responses indicated that there appeared to be no formal recognition for developing teacher knowledge, skills and expertise. As a result, for some teaching in FET was not a career: it was just a job. ‘And of course, if you don't have a contract, it's very hard for you to get any kind of life outside it’ [Paco]. He continued, ‘We seem to be in this dichotomous thing at the moment where or this kind of negative cycle where we're not giving people contracts because we don't want to take the gamble on this course being a longitudinal programme [laugh] and yet like we don't provide anything for the program to be good you know’ [Paco].

5 Discussion

With regard to FET teacher engagement in their role and work, we found evidence for some of the conditions described by Kahn (1990). Namely, our participants identified autonomy, challenge, creativity and variety as fundamental to their experienced ‘task’ meaningfulness. Whereas, holding a formal teacher ‘role’ title was less important to them than the enacted role of teaching, meeting their learners’ needs, and their teacher-student relationships. Within the classroom, ‘work interactions’ were reported as positive; while the opposite was stated by Mary Jo and others who referred to office cliques and “we’re the others”. Of the factors related to psychological safety, management style and process was the most mentioned with a dichotomy between the two geographic locations: one positive and the other negative in relation to experiences of leadership, trust, support and competence. Finally, psychological safety featured in the shape of home/work boundary management and expected vs invested levels of physical and emotional energy in teaching roles. Insecurity as a theme emerged in the form of several individuals identifying a lack of ‘fit’ between themselves and the organisation and its purposes.

These findings suggest that all participants identified the importance of the high levels of meaningfulness they derived from their teaching. Engagement in the classroom was distinct from organisational commitment as participants invested themselves in the arena in which they derived more meaning – the classroom. This was a sustaining factor, even in the face of a lack of psychological safety within the centre or wider organisation and was highly influential on psychological availability. For the majority, their levels of psychological safety were high within the classroom but heavily influenced by local management styles and practices. In terms of availability, there was a distinct difference between those fully engaged in their role at work and those who bounded their work in terms of relationships, time, and mental space. Thus, the conditions that influence a person’s engagement in their role at work influence each other; but they may not always be equally influential in terms of impact. These findings suggest that, to some participants, doing the work of teaching is easier than establishing themselves as ‘professionals in the field’, thus the continued evolving professional identity of FET teachers may also have some impact on the psychological conditions of engagement in their role at work (Graham Cagney, 2019). Additionally, evidence from these findings appears to suggest that the sector is still in flux regarding organisational leadership, culture, systems and processes.

Participants highly valued their self-initiated/self-directed professional learning. However, the organisational provision of CPD was a mix of positive and negative experiences and less impactful than it could otherwise have been for participants. Despite the policy acknowledgement of the distinctive nature of their professional needs as dual professionals (SOLAS & ETBI, 2017) most participants found much of the provision to be general, irrelevant or inadequate. Conversely, their self-driven authentic learning and development was not valued by their organisation. Due to the complexity of the skills base of teachers in the sector, Broad and Lahiff

(2019) identify that policymakers in the sector should deliberately enable and empower FET teachers to share and develop practice and opportunities. Methods used to share practice for collaborative learning can have a significant impact on the success of the initiative. Our study also found that when these initiatives were not handled appropriately, it created a resistance to peer learning. Additionally, poor management processes and style encouraged an attitude of doing the minimum to meet the requirements while, often covertly, engaging in self-directed learning.

Our findings suggest that participants valued and had a wide definition of CPD and professional learning and development. The behavioural, attitudinal and intellectual components of professional development as described by Evans (2014) is something to consider in future research related to this topic. If approached in this way, CPD for FET teachers could be viewed as a means of ensuring their professional qualifications are up-to-date, provide opportunities for group and collaborative learning and sharing of 'know-how', and shared experiences of the latest innovations in mutual areas of vocational interest.

All participants appeared to hold a hybrid perspective of career progression. In the first instance, career progression as a teacher related directly to increasing their knowledge, skills and experience in their subject area and pedagogical skills, with a view to increasing their work opportunities to extend their subject range and QQI levels of teaching. The second view was that formal career advancement/progression opportunities lay in administrative and managerial roles, rather than clearly defined pathways to career progression as teachers. As many of the participants in this study came to FET from previous professional careers, their perspectives on whether it was a career or just a job may be quite a complex issue. Certainly, an issue well worth a future research study.

6 Conclusions

In this study, we further the research on FET teacher engagement in their role at work. Engagement, professional learning and career progression are mutually influential concepts. Research in teacher engagement needs to expand in FET to consider how new professional learning and development frameworks and approaches might enhance and support the evolving professional identity and agency of those working in the sector. FET teachers at all levels, have the shared responsibility to be the ones to formulate how their professional role as teachers and educators and their institution will move forward in the 21st century. Developing pathways to career progression through innovative and effective CPD and other experiences will give teachers the skills to connect their teaching to practitioner focused research that establishes a strong and professional 'voice' for the field of further education and training.

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Recognizing and Valuing the Tacit Knowledge in Production Organizations to Strengthen the Relationship Between Training and Work, and Between Workplaces and Professional Schools

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Abstract

Purpose: The aim is to improve the provision of professional knowledge to the Italian higher vocational schools (ITS) to strengthen the relationship between training and work putting into dialogue two theoretical approaches: Professional Didactics (PD) and Cultural Historical Activity Theory (CHAT).
Approach: Theoretical work; intervention research and case studies.
Findings: The CHAT influenced perspective draws the attention on the relevance of production strategies and motives in shaping collective activities and the tacit knowledge at work. The PD approach - to elicit the tacit knowledge gained by the professionals at work - considers the socio-technical and ergonomic aspects in the work situation analyzed. There is space to integrate the PD methodology with a wider acknowledgement of the relevance of the contextual and organizational elements related to the enterprises, the territory and the production chain.
Conclusions: It emerges that the collaboration between vocational education centers and production enterprises is pivotal in creating conditions to prepare professionals to become teachers in the higher vocational education in Italy, not only for the elicitation of the tacit knowledge, but also for the effective use of the knowledge and competence acquired in the higher vocational education.

Keywords

professional didactics, workplace learning, higher education, cultural-historical approach, activity theory

1 Introduction

The debate on workplace learning is at least three decades old (Billett, 2001; Boud & Middleton, 2003; Eraut et al., 2000; Evans et al., 2006; Forssberg et al., 2020; Fuller & Unwin, 2011; Garrick, 1998; Hager, 2011; Hodkinson & Macleod, 2010; Marsick & Watkins, 1990; Munro, 2002; Rainbird et al., 2004). It has been playing the role of drawing the attention of scholars, educators and policy makers to the baggage of knowledge distributed in the working practices in the workplaces, accessible through informal and incidental learning. Of course workplace

learning represents one opportunity for personal and collective growth, and educational systems keep retaining their function of preparing new generations to become responsible and active citizens and to prepare them to the world of work.

The transformation of work, driven by the technological development and the growing global competition, requires nowadays continuous learning in workplaces, and in training and educational centers. The connection between the enterprises and the educational centers varies across European countries and the most recognized model of connection is often represented by what is called "dual system", that is, learning based both on classrooms and workplaces.

In Italy the introduction of the dual system is recent. One of the most significant step toward this educational model is the creation of the ITS (Istituto tecnico superiore) in the higher education in 2010. ITSs are foundations supported by both educational institutions such as universities and polytechnics and enterprises, referring to a specific sector, for instance the agri-food or the automation or clothing&fashion. Teachers have to be professionals – coming from the production sectors - in a percentage of 50% at least in the ITSs, but Parliament is discussing to increase this proportion. A move which could indicate the willingness to strengthen the link between the two worlds, enterprises and educational centers. This goal of increasing the connection between education and work is also present in the recent PNRR (Piano Nazionale di Ripresa e Resilienza), the Italian program to take part to the European Union fund called "EU Next Generation". This represents the relevance of the issue. The Italian PNRR highlights the role of research centres in conducting investigations aimed to reduce the skills mismatch and to strengthen synergy between businesses and training.

However little space is devoted in the Italian policy makers' and practitioners' discourses to discuss how to guarantee the flow of knowledge and learning from the workplaces to the classrooms. It is usually taken for granted that being a professional is enough to transmit the professionalism.

In the international scholar debate, as far as we know, this latter issue receives attention, but limited to the one of pedagogists and social psychologists. The aim of this paper is to put into dialogue the pedagogical works on how to transmit professionalism developed in and out the workplaces with the sociological works on issues linked to workplace learning. The interest on this dialogue has its origin in the recent encounter between the two authors and researchers: a work psychologist and trainer (Chiara), and a sociologist (Cristina).

We engage in this dialogue focusing on the ITSs' task to support the professionals willing to become teachers to transmit their own vocational knowledge.

This ITSs' task includes the verification of the possession of training skills about pedagogical-didactic design, educational conduct and evaluation, and then the development of the insufficient training skills. This is what often ITSs focus on. However, that task also requires to identify what is the relevant professional knowledge to transmit, which is mainly a tacit knowledge, acquired in experience and within the enterprises (Magnoler & Pacquola, 2016; Magnoler et al., 2014; Pacquola, 2017). Therefore, it is necessary a methodological path to elicit the professionals' tacit knowledge so that it is possible to identify what knowledge to transmit and how to transmit it. The last steps are to transform the elicited knowledge into knowledge to be taught (Altet, 2003) and to develop tools for the didactic transposition (Develay, 1995).

While the ITSs aim at forming their teachers-professionals, these latter cope with the difficulties of working in two activities and with different positioning: in the professional activity they are considered experts, in the schooling they are novices. But there are also other organizational tensions and emerging contradictions among the two activities, as it surfaces in conclusive remarks of this paper.

This framework on ITSs implies psychological, pedagogical and organizational issues and requires to discuss theoretical models to both guide the research and the practices in this field.

This paper presents two theoretical perspectives, Professional Didactics (PD) (Pastré, 2011; Pastré et al., 2006) and Cultural Historical Activity Theory (CHAT) (Engeström, 1987, 2007, 2011, 2016; Leontiev, 1978, 1981; Minick, 1985), which both find their roots in the Leontiev's activity theory (Leontiev, 1978, 1981; Pastré, 2011), but focus on different issues. As said, the aim is to put them in dialogue to develop theoretical ideas to support practices in the ITSs' task mentioned above, taking into account the wider context in which the teachers-professionals are involved, but also their students.

2 The Theoretical Perspectives in Dialogues

2.1 Understanding the Job in the Work Activity

In doing expert work, there are different layers of knowledge related to the job, linked to individual and collective memories and recollections, to intimate and professional awareness, but also to routines and automatisms consolidated over the years and linked to different ways of acting, reacting and interacting in the work. Transmitting expert work therefore leads the professional-teachers to bring back memories of emblematic, exemplary experiences, of significant professional cases to show a specific professional posture, to guide the learning of gestures, actions, thoughts, effective, convenient rules, and to articulate a discourse around professional development. These memories and experiences are intimately connected to the contexts in which they have been elaborated. Therefore, the elicitation of the professional knowledge should also elicit the activity features in which it has taken shape.

In approaching the analysis, we start with a brief presentation of the founding elements of Leontiev's activity theory; the main concepts of the two approaches, CHAT and PD, will then be described: by making them dialogue, we intend to bring out the complexity of the components involved in the issue of the transmission of professional teachers' knowledge from an informal work system to a formal vocational training system, taking into account aspects of the wider productive and organizational context.

Leontiev's work developed the theory of activity, and, with that, how development of the activity and development of the subjects are connected (Leontiev, 1978, 1981). Vygotsky's and Leontiev's work derives from the Marxian Hegelian idea that the self is constituted in the activity, that is, in the social practice as labor is (Tolman, 2001).

According to Leontiev, any activity has a **three-level structure**: the object, the actions, the operations. Any action (practice) is part of an activity, because it is always linked - in one way or another - to other actions carried out by other subjects (e.g., workers). This interrelation is very clear in the workplace, with its division of labor.

Yet, according to Leontiev, what coordinates the actions is **the object of the activity**, not the division of labor. The object is what legitimates the activity: the object is its cultural-historical reason to be, it is what motivates the activity. Actions are aroused by the object/motive of the activity, but they are directed towards goals. Actions reveal their meaning only when they are related to the object of the activity. Actions become operations when – repetition after repetition – they become automatic. The participation of the subjects (e.g., workers) in collective activities is formative, for they internalize artifacts, that is, signs and symbols, which have an historical origin and mediate the human actions. However internalization of signs and symbols (knowledge) modifies these latter, for the subjects personalize them (making them – for example – coherent with personal past experiences) (Stetsenko, 2005). The knowledge internalized is then used to mediate actions and operations (externalization).

As Leontiev argues, the subjects also internalize motives through the participation in activities all along their lives, and give a personal sense to each motive. Let's stress that, in Leontiev's cultural-historical view, motives are objects of activities, and motives/objects drive activities. Therefore, the participation in activities contribute to the formation of personal

motives. Throughout participation, the subjects built their own **personal hierarchy of motives** which helps them to choose on which activity to invest more energy, emotions, commitments, competence, passion, and so on. The hierarchy of personal senses of motives is not fixed in time. Changes in personality and activities occur in the attempt of dealing with and solving contradictions, which are elements in any activity.

As Migliore argues, CHAT – with contributions from other disciplines such as political economy, sociology, organizational studies –allows to analyze the enterprises in term of their objects. Migliore puts forward the idea of referring to the production strategy as the object of an activity. The production strategies – discussed and analyzed in the aforementioned disciplines - are usually depicted through their correlates of labor process and work organization (Migliore, 2013).

Engeström's work, who expanded CHAT to work settings for the first time, can help the analysis of professionalism transmission with the concept of **activity system** (Engeström, 1987): Engeström revisits Leontiev's activity theory by adding other elements in the analysis of the activity: rules, communities, and division of labour. He also considers the functions of production, distribution, exchange and consumption. Among all the components of an activity system a continuous construction goes on. The Engeström's approach allows analyzing the complex interactions among the constitutive elements of the system seeing the internal tensions and contradictions as the driving force for change and development of the system. The primary contradiction is the one between the exchange value and the use value of commodities, which then creates other types of contradictions (Engeström, 1987). Simplifying it, this principal contradiction refers to the capitalistic mode of production, in which the aim of creating surplus produces a tension between what should be produced to respond to human needs and what is convenient to do to be able to sell the product in the market at a good price to create profit and to be competitive. Dilemmas, tensions and conflicts in collective activities originate from contradictions. The attempts to solve activity difficulties through "expansive learning" (e.g., Change Laboratory) produce change and transformation of the object of the activity and other elements in the activity (Engeström, 2016). Expansive learning, a concept put forward by Engeström, based on Bateson's "Learning III", is a collective learning process in which it is necessary to identify, not only the solution, but also the problem, and could lead to radical transformation of the activity (1987).

Being engaged in two activity systems – as our professional-teachers - means to cope with contradictions and tensions inside and between the two systems of work and education.

PD highlights other theoretical and methodological elements useful for understanding which knowledge (signs, symbols, tools) mediates the actions and operations of work activities, and how to make it explicit.

The PD approach combines the contribution of four disciplines: adult training methodology, ergonomic and work psychology, developmental psychology and discipline didactics. It provides a framework to elicit expert inner tacit work knowledge from the work practices with the aim to improve the training educational and training design, both in formal, no-formal and informal environments.

Among the various concepts taken up by Leontiev in the PD approach is that of activity: Leplat (1997), takes it up from an ergonomic perspective, proposing to distinguish and analyse the gap among the prescribed job, the redefined one and actual one. The aim is to answer the following questions: "what the person has to/does", what he "says he does", what he "actually does". In this way, the professional worker emerges as an active builder of his/her productive activity to respond to the prescribed task. Rabardel (2005) defines the subject as "capable", focused less on the acquisition of declarative knowledge and more on learning from activities in work situations. So, PD shows how the professional is at the same time an activity producer and constructor of a particular form of knowledge, the pragmatic concepts, which both organize

operationally and functionally the individual activity and nourish the collective professional community knowledge heritage (Pastré, 2011).

Another concept, the work instrument, with its material and cognitive-symbolic aspects, is taken up to highlight how artefact becomes useful for the worker's activity through a series of cognitive schemes of use, i.e. organizing his/her action thanks to the construction of mental schemes that allow him/her to use that instrument. Among mental schemes there are classes of situations, and families and domains of activity.

The definition of work situation with learning potential (Mayen, 2012) leads to consider how the constraints of the context, the organizational processes, the colleagues' contributions, the tasks to be performed, the tools available can, in particular circumstances, represent a privileged space for development and learning of the worker, leading him to reflect, to act, to transform the situation, redefining it, modifying it or adjusting the conditions to achieve the expected tasks.

Having briefly presented the two approaches to analyze work activities, we can now begin to see how the dialogue between CHAT and PD provides conceptual tools which allow to consider individual activity as belonging to wider and situated collective activities, that need a socio-economic, historical, and cultural view. In fact, the production (business) strategy impacts on the organizational dimension in which the professional works, and the work organization affects the degree of perception, understanding and engagement that the practitioner has about the object/motive of the activity (Migliore, 2018; Migliore, 2015). The awareness of the object gives meanings to the individual actions and operations and opportunities to develop personal senses, which – we can argue - are fundamental in the problem solving and in the expansive learning.

On the other hand, PD allows deepening the understanding of the construction of the professional knowledge which mediates the working actions and operations, which are one the focal points in CHAT. It shows how the professional, during his/her work, actively learns and conceptualizes in action: his/her knowledge, however, is often tacit, as we explain below. Therefore, the knowledge elicitation promoted through the PD methodology reveals what the professional knowledge is made of: it is constituted through a sharing of practices and a stratification of effective experiences that structure the subject's beliefs, the organizing concepts underlying his/her job, the system of rules of action that guides the perception, implementation and control of the action.

2.2 How to Analyze and Elicit "Knowledge in Action" and the Tacit Knowledge

The cognitive richness of these learnings that occur in the professional activities clashes with the difficulty of describing and explaining it: knowledge at work has an operational rather than an explanatory dimension. Indeed, it is based on the selection of information from the context in order to act effectively, as argued by Ochanine (1981), and not to form knowledge about that action apt to be transmitted.

Hence, methodologies and collaboration are needed to elicit and transform that operational knowledge. The activity of the subject in the situation thus becomes a relevant object of analysis, dialogue and mutual and collaborative exchange between the various institutions involved. The main actors in this operation are: research centers, training firms and production enterprises, (Pacquola, 2017, p. 167) with specifically the professional, the researcher and the expert in training methodologies engaged in the process. The aim is to bring out the knowledge still embedded in the action, recognize dignity to the status of professional teacher, and co-construct those knowledge-instruments (Altet, 2003) that allow to design training as not prescriptive.

It is possible to access the professional's knowledge, constructed during the completion of his/her job, by observing his/her activity and accompanying him/her in verbalizing it. This knowledge, characterized by laconism, is often tacit, (i.e., acquired not consciously), embedded

(predominantly stored in automatic habits and routines), and situated (specific and specialized to the context and work situations in which it has been acquired and exploited) nor easily explained: it needs specific investigation methodology.

The tools and methodologies of clinical work analysis, to which the PD refers for the analysis of the job, can be effective in accompanying the professional-teacher to the development of a reflective consciousness for the elaboration and reconstruction of his/her own knowledge and progressively eliciting, verbalizing, his/her knowledge. This step can take place, for example, by reviewing one's own action on video, after having previously videotaped it, together with the trainer-observer (simple self-comparison) (Theureau, 2004), commenting on the same videotaped images not only with the trainer, but also with a colleague with the same experience (Cross-comparison) (Clot et al., 2000). By confronting with his/her interlocutors on their understanding of his/her activity, the worker can conduct an individual and collective reflective activity on his/her work, favoring the increase of the capacity to transform objectives, means and knowledge of his/her professional activity.

Another method, the Elicitation Interview (Vermersch, 2005), is based on the reconstruction of the memory of the experience and favors the verbalization of the way (the procedural dimension of the action) in which a task was carried out. This is useful for verbalizing, for example, the genesis of errors, habitual and automated performances, routines, trial and error experimentation.

The stage of awareness-raising and reflective work on one's own representations and putting one's own work into words is a real challenge for the professional: relearning his work is a costly task in terms of time and cognitive load, because it means restructuring one's own thought system, from an operative to a semantic knowledge, for a different activity (training) and objective.

CHAT can contribute to this analysis and elicitation process as it focuses on certain elements of situated professional knowledge.

First of all, it sheds some light on those elements connected with the cultural and historical conditions in which the exercise of the profession took place, and especially on the activity object/motive and its transformation, with its effects on the labor process, its organization and the contradictions inherent in the activity system.

Secondly, CHAT contribution could support a wider conceptualization of the professional's tacit knowledge. The analysis of the professional's specific job situation can reach a first generalization of the elicited situated knowledge to the same job situations in other similar enterprises. However, it is possible to reach a broader generalization to take into account other enterprises with different business strategies. This could be achieved through a cross-comparison of the elicited professional knowledge with that of other colleagues carrying out similar jobs in other enterprises with different business strategies.

Moreover, CHAT draws attention to the possible tensions that can arise in a practitioner who has to manage two different systems of activity: doing the work and transmitting the work. Not everyone is willing to get actively involved in the process of reconstructing and reorganizing their knowledge, because, although they wish to transmit their knowledge, they might not have (yet?) internalized the motive of teaching with a pedagogical design and suitable didactic tools.

The positive outcome of this phase of elicitation can therefore give indications on the criteria for the selection of professional-teachers, which can also be operated on the basis of the variety and types of professional and organizational experiences lived, such as to represent a representative and congruent panorama with the possibilities of professional development offered by the territory; also, it gives indications on the costs of the "elicitation" challenge: a stratified baggage of diversified experiences (by organizational context) requires from the professional an important work of reconstruction and relocation of his/her own knowledge, on the

one hand of conceptualization, on the other of evaluation of the limits of generalization and abstraction of the contextual variables, constraints and conditions of exercise. The historical-cultural-organizational dimension of the object and purpose of the activity could enrich the concept of work situation with PD learning potential situation.

2.3 Translating Knowledge in Action in Knowledge for Training

Addressing the issue of knowledge transmission does not mean that knowledge is simply passed prescriptively from one subject to another, remaining unchanged. A professional teaching that refers to the analysis of the activity from a PD point of view, requires, at this stage, the formalization and representation of the knowledge that emerges from the action, which then becomes, from knowledge in action, knowledge for the training action. In order to model the regularities that guide his/her professional activity (Damiano, 2013), the professional has i) to develop "a knowing how to analyze" his/her own activities and experiences and ii) to build those knowledge-tools (Altet, 2003) that will be taught and subsequently learned by students.

In a perspective of collaboration between researcher and professional, a process of teacher training is activated with the aim of designing pedagogical-didactic devices able to collect the uniqueness of the knowledge emerging from the action in situation, but also to return a more generalized "knowledge" functional to be taught.

Once formalized, hence, they can finally become the basis for formative and didactic reflection. In this reflective stage, the professional-teacher, helped by researcher and training methodological expert, aims at realizing a didactical transposition. This purpose requires the following aspects (Iobbi & Magnoler, 2015): selecting the relevant work situations to be transformed into learning situations; setting the pedagogical progression and the sequence to develop them; choosing the Learning &Training activities consistent with the training objectives; choosing which kind of mediators to build and how to organize them; setting the typology of the questions to be asked; reflecting over the cognitive operations induced by the materials delivered; managing training time and space; defining the time required by students to be able to develop learning; problematizing the work activity and situation to transform them into learning situations; providing support to the student's devolution of tasks; designing formative assessment and self-assessment.

This pedagogical-didactic work is enriched with the attention of CHAT on the historical and cultural dimension, opening two possible reflections on the space-time of the professional activity to be taught. The first concerns the “territorial” validity and relevance of the knowledge to be taught, which has as borders the territory (or the production chain) and the productive organizations that share the same system of meanings, activities, tools, rules, in which students will then have to carry out the internship and be hopefully subsequently hired. The territoriality and the knowledge rooting in it is an element that distinguishes the ITS, which establishes with companies and other stakeholders synergistic relationships and close exchange of practices and knowledge.

A second reflection concerns the temporal mutability of a work activity, and of its related vocational knowledge. Consequently, training planning needs to be cyclically reconsidered in order to update it to the transformation of the work activity.

3 Empirical Studies: Research Intervention and Case Studies

Research-intervention conducted in the “Riviera del Brenta” Footwear District during the decade 2008-2018, commissioned by the district training body, the Footwear Polytechnic (the ITS “Politecnico della calzatura”), and by some companies in the area particularly attentive and sensitive to training issues, verified how the PD approach could bring training and work closer together. The main goal of the research was to understand, through the use of work and activity analysis, the ability of domain experts to conceptualize implicit knowledge and to make it

communicable in formal, informal, and non-formal learning contexts. Another objective of the research was to develop the ability of expert workers to make their practice explicit. If the expert is able to communicate what s/he does, the problems s/he encounters and the strategies s/he uses to solve them, s/he can contribute to the capitalization and transfer of the vocational knowledge to the work and the training.

A strand of the intervention-research covered how to bring work closer to professional training, accompanying expert professionals to become teacher-trainers in formal learning contexts, represented by the training offer of the Politecnico della calzatura, for the design of an innovative training of expert workers, able to improve the efficiency of the training-work relationship in the luxury footwear industry (Magnoler et al., 2014). Here is how the PD methodology helped to improve the effectiveness of the training design in the ITS CEC 5 training program of the course "Footwear collection manager" 2014-16. The course aimed to train a highly specialized technician in the process of design and development of new footwear products. This requires having skills that allow to make the prototype, the industrialization and the production process of luxury products, more effective and efficient to assert the "Made Italy". The course, recognized in Europe, has had a duration of two years, characterized by four semester sessions in a mixed structure that alternates training hours (1200 hours) with other courses (1200 hours) with internships in companies (800 hours).

The experimentation raised a particular question: should the teaching be carried out by an expert who has a good knowledge of the work (and who has been involved in the analysis of the work with PD methodologies) but who does not have the skills to carry out a didactic and pedagogical transposition? The decision was made to entrust the expert, supported by a particular accompaniment in different spaces and times, with the technical and professional teaching of the module "Methodology and techniques for the development of classic footwear models".

First, before starting the teaching course, the professional expert footwear patternmaker was involved in the analysis of his own activities with the methodology of the PD methodology to give him the possibility to reflect, to put into words, to make explicit the meaning of the professional gestures and the indicators that guide his professional action. Afterwards, he was asked to validate and complete/integrate/modify the results of the research already capitalized in relation to the crucial specific work situations (schemas, rules of action, pragmatic concepts).

In parallel, analyses of the patternmaker's work were carried out in two other SMEs with different business strategies and different internal organization and division of labor.

A subsequent phase saw the sharing of formalized knowledge by the senior with a group of professional teachers, involved in the ITS design and teaching activity. This phase was very formative for the expert and the collective of professional trainers because it gave them the possibility to transform their individual mental representations into words and concepts and to create a common representation about their work and about the significant activities and knowledge to transmit during training. A second accompaniment was provided during the design and conduct of the alternating activity between classroom and workshop. In the first phase, the expert was assisted by the research team in planning the course and in evaluating the results of the learning outcomes. In particular, the team helped the expert to plan the construction of learning materials based on the results of the job analysis. The goal was to better communicate the learning materials by planning simulation situations in a pedagogical progression and experiential learning cycle management approach. This phase allowed the expert to completely redesign his pedagogical mode in the classroom with the students, less oriented to the transmission of his knowledge, and more centered on the construction and conceptualization of knowledge through the laboratory experience. He also reflected on the didactic tools at his disposal and he then constructed a new didactic tools congruent with the pedagogical and didactic progression of the training content to be transmitted.

We now report the findings of a case study based on a CHAT influenced perspective to give empirical evidence of the relevance of production strategy in shaping motives to learning of older workers (OWs) in manufacturing shop floors. The case study was carried out in 2007-2008 as part of the PhD of one of the authors (Migliore, 2013). The focus of the research was older workers in industrial production and their motives for learning. On the basis of what explained in the previous section, the workers' grasp of what is going on in their enterprises is relevant for their engagement at work and for the formation of their vocational learning motives. Indeed, the possibility of grasping what is going on in the enterprise in which one works is pivotal in the development of the workers' professional knowledge for it provides the opportunity to give meanings to one's own actions and operations in the collaborative network in the enterprise.

Subjectivity (motives) is conceptualized through the ideas developed by A. N. Leontiev and briefly presented above (hierarchy of personal senses of motives). The research design takes the form of multiple embedded case studies, within two companies which approximate two types of production strategies, mass production (enterprise E1) and flexible specialization (enterprise E2) in the Turin area (Italian north-west). Mass production and flexible specialization are very different in applying the Taylorist principle of the separation between conception and execution, with the latter allowing more autonomy and discretion to the workers. The hypothesis is that more autonomy and discretion support a clearer image of the activity object. Older workers were interviewed about their professional lives to interpret their relationship with the activity object. The image of activity object emerged also through interviews to managers in both companies and the CEO in E2.

The subjective side of workplace learning surfaces as differentiated by the two types of production strategies. These strategies, together with other life experiences, create different opportunities for the older workers' subjective engagement. Motives for workplace learning are linked to the needs for learning in the workplace, and to the ideal image that older workers have of their workplace.

In E1, OWs have more difficulties to grasp which are the challenges of their enterprise and how those challenge shape the activity object, for their jobs are executive with little autonomy and discretion. Even if they feel frustrated by what they perceive as a bad work organization, they dream about the possibility of seeing some improvements in it and seem ready to welcome more training and learning.

In E2, OWs have larger autonomy and discretion, and receive more information about the object of their collective activity. This allows a higher level of engagement and has led to the development of their professionalism through their working lives. Thus, they think they don't need to learn more, but instead would like to be put in conditions to transmit what they have learned along their professional lives to the younger colleagues. Indeed, these older workers can be similar to senior and expert workers, the ones who hold vocational knowledge useful for the training centers, and could become teachers. Hence, some of them feel disappointed or sad about the idea that what they know is not valued enough by the management which does not always provide the conditions to facilitate collaboration with the younger colleagues.

The comparison between these two companies sheds some light on how different production strategies create different conditions for learning and developing professional knowledge. It also shows that professionalism could be not enough valued in the enterprises. This suggest that the PD approach could benefit from integrating its method of professional knowledge elicitation to enlarge the view on the working and organizing conditions in which that professional knowledge has been used and developed. As stressed by Leontiev, knowledge (artifacts) retains the features of the original activities through which it has been developing (Minick, 1985, p. 239). This opens up a discussion on whether the vocational education in the ITSs should include the construction of students' awareness of the existence of different organizational models they

could meet in the world of work, and so different opportunities to use their competence. We come back to this point in the conclusive remarks.

4 Conclusion

Accompanying professionals to become teachers of their own knowledge is a relevant factor in increasing the synergy between training and work and, consequently, in increasing the training effectiveness and quality expected from the Italian national recovery plan (PNRR) mentioned in the Introduction.

The dialogue between the two theoretical approaches, PD and CHAT, proposed in this paper to develop theoretical ideas to support the ITSs' process to train professionals to become teachers, leads to the following considerations.

First, this dialogue can strengthen the social dimension already present in the PD methodologies. PD methodologies look at the socio-technic dimension, but – by adopting a CHAT influenced perspective – they can widen the view to the production strategies of the enterprises, their organizational features, to improve the understanding of the knowledge developed by collectives of professionals. This i) helps reflect on the situated nature of the knowledge of the professionals and ii) invite to enrich the process of elicitation with other situated knowledge in order to cover a larger types of work situations.

Secondly, that theoretical dialogue, with its emphasis on the cultural-historical activity aspects, can help ponder that the vocational knowledge is keeping changing in the world of work, and therefore the process of elicitation need to include a way to consider this aspect. The elicited knowledge enriched with more cultural-historical elements could help the ITS's students develop consciousness of the continuous transformation of the work collective and the community wealth, which occurs through the workplace learning - and possibly the expansive learning. This would lead students-future workers to see how they could play a role in the development of the working practices by adapting the internalized knowledge at the ITS's and actively constructs their own vocational knowledge to enrich the work community.

Third, the previous points are linked to the issue of how the elicited vocational knowledge has been shaped by the features of the production activities in which it has developed. That same vocational knowledge, transmitted to the learners, would need similar or compatible organizational conditions to produce the expected effects. The organizational conditions are the ones of the enterprises, linked to their production strategies, and can vary in allowing workers' engagement and their participation in the enterprise development. Those conditions could extend till to include some aspects of the production chain and of the territory.

This leads to discuss the potential of transformation of these theoretical perspectives put in dialogue – PD and CHAT – to bring closer the work and educational systems, but also to bring about changes in both of these systems. Indeed, we can see that there is a transformative potential in the dialogue between the educational centers and the enterprises.

Four, this dialogue between the educational centers and the enterprises is necessary to support the process of the professionals who become teachers for they are engaged in two activity systems. As noted earlier, this means to cope with contradictions and tensions inside and between the two systems of work and education. For instance, becoming teacher could need a certain length of time which could not be easily accepted by the work and educational organizations in which the professionals are working. This could lead to an impoverished effectiveness of the educational functioning of the educational centers, showing once more how work and education are linked.

Last conclusive remark is about the epistemological issue which this PD-CHAT dialogue raises. In fact, what has emerged from this dialogue calls for a better understanding on how the new theoretical ideas affect the methodology of the elicitation process and what methodological development is possibly required.

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International Cooperation in VET: A Case Study of Expansive Learning in a German-Greek Project on Greening VET

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Abstract

Context: In Germany, vocational education is popular and enjoys a good reputation. German vocational training, especially dual vocational training, is considered an "export hit" and a guarantor of high quality and reliability. To address international needs in VET cooperation, the German Federal Ministry of Education supports projects which are supposed to foster reform activities in regional or national VET systems on the one hand, and/or which establish VET products in foreign markets on the other hand. Based on the in-depth analysis of one case study, the aim of the paper is to describe and understand the educational transfer process taking place within such international VET cooperation projects.
Approach: Based on the in-depth case study of one cooperation project called GRÆDUCATION, we use Engeström's activity theory and expansive learning approach to identify different forms of learning taking place in the transfer process. The qualitative empirical research is based on interview data and document analysis.
Findings: Focusing on three products generated within the framework of GRÆDUCATION, we identify different types of expansive learning processes already described in Engeström & Sannino, namely a) Train-the-Trainer as Boundary Crossing; b) Girls' day as Transformation of the Object; and c) Curriculum Development for EPAS Schools as a Formative Intervention.
Conclusion: Engeström's theory helps to understand the process of educational transfer and the learning processes in the sense of social policy learning. While the flexible and co-creative project management of GRÆDUCATION can be seen to support sustainable forms of educational transfer in the Greek VET system, the question whether a more linear and less participative approach to project management could also lead to expansive learning processes in the context of international VET cooperation cannot be answered yet.

Keywords

VET, vocational education and training, activity theory, international cooperation, Greece, Germany

1 Problem statement and Research Question

In Germany, vocational education is popular among youths and enjoys a good reputation. German vocational training, especially dual vocational training, is considered an "export hit" and

a guarantor of high quality and reliability. The reasons are its effective influence on economic and social development, not least on youth unemployment (Bohlinger & Wolf, 2016) and a country's competitiveness (OECD, 2015). The dual approach has also been attracting a great deal of attention from international and supranational organisations for several years (OECD, 2015; ILO, 2012). Furthermore, a demand from abroad for vocational training "Made in Germany" can be observed (Kühn, 2020; iMove, 2017).

To address this demand, the German Federal Ministry of Education (BMBF) supports 23 projects which are supposed to foster reform activities in regional or national VET systems on the one hand, and/or which establish VET products in foreign markets on the other hand.

The underlying programme theory is inspired by the concept of "transfer" (Dolowitz & Marsh 1996), i.e. a „process in which knowledge about policies, administrative arrangements, institutions etc. in one time and/or place is used in the development of policies, administrative arrangements and institutions in another time and/or place" (op. cit., p. 344). Accordingly, projects are designed following a linear input-process-output logic leading ideally to the establishment of dual VET programmes in the project country. Policy learning (Bennett & Howlett, 1992) is intended to be achieved through dissemination effects of the implementation projects.

Based on the in-depth case study of one of the projects funded within this programme, GRÆDUCATION, we aim at unlocking the black box of educational transfer and describe the learning processes involving the "donor" and the "recipient", so as to better understand the outcomes of the project. For that purpose, we opt for an empirical study based on the activity theory and expansive learning approach (Engeström, 1987, 2009), as it also accounts for incidental, unplanned learning processes and unexpected outcomes. Ultimately, we want to answer the following questions: In how far does expansive learning take place? To what extent does the project achieve intended as well as unplanned and unscheduled purposes? To what extent does activity theory explain and deliver insights into the process of educational transfer?

2 Research Design

Engeström's theory of activity or Engeström's theory of expansive learning – the terms are usually used synonymously by the author himself (Engeström & Sannino, 2010) – describes how existing work, structures or systems can be redefined by allowing the people involved to design and implement new things themselves. This refers to a development towards a more complex, multidimensional concept (of work, structures, or systems) (ibid.). Activity theory is a theory of practice with the help of which researchers want to understand how and with which interactions individuals and society engage in change (Geithner, 2012). Many stimuli do not lead directly to a reaction, but are mediated via artefacts, i.e., tools, such as language, written language, pictures, or numbers. Individuals use these tools in their activities, which determine the way in which people interact with the world. At the same time, the tools reflect the experience of people who have faced similar challenges.

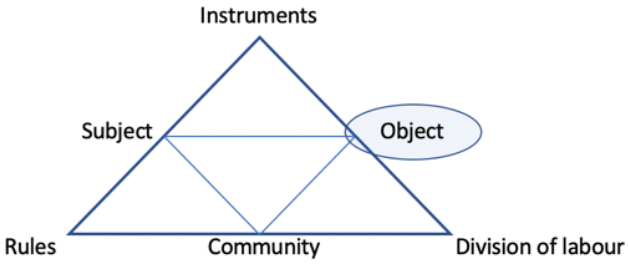
Figure 1 shows the central assumption of how all kinds of activity occur: A central acting person or organisation (**subject**) uses **instruments** (e.g., working tools) to transform a product or result (**object**) within a context (set of **rules**, **community** and **division of labour**).

The model of the activity system as an analytical construct is intended to describe and visualise activity in multi-layered social systems based on the division of labour.

The development of an activity system as well as of the actors is triggered by contradictions (Engeström, 1999). Contradictions arise from incompatible demands in the practice context and can become so-called double binds, a kind of hopeless situation (Bateson, 1972; Engeström, 2009). Double binds require questioning assumptions and principles of activity. In the activity system model, contradictions can arise within elements (e.g., within rules), between elements (between subjects and the division of labour, for example), or even between different activity

systems. Contradictions also arise when new elements, such as innovative ideas, are (or have to be) incorporated into the activity system from outside.

Figure 1
Activity system. Own compilation according to Engeström (1987, p. 78).



In our analysis, we have the project GRÆDUCATION as one activity system. The project enters the context of our second analysed activity system, the Greek VET system. In the following, we first introduce the Greek VET system and its specificities, then we describe GRÆDUCATION including its approach and project goals. In order to identify learning processes, we then examine interactions between the systems and the learning effects induced by contradictions pertaining to three different boundary objects, e.g. objects that are of concern for both activity systems. The analysis is based on project documents as well as ten qualitative interviews conducted with project team members and Greek actors involved in the project implementation.

3 Activity Systems: The Greek VET System and GRÆDUCATION

3.1 The Greek VET System

General Structure of the VET System
First elements of Greek vocational education can be detected in the 16th century regarding the craftsman apprenticeship Mathitia (μαθητεία). Here, young people started their vocation as apprentices with the aim to reach the qualification of master craftsman. The system was organised by guilds (συντεχνίες) and the apprenticeship ordinance, regulating duration, payment, clothing, nutrition, etc. (Wolf/Xerisoti-Wollmann, 2018). Over the 19th century, the medieval apprenticeship system declined and at the beginning of the 20th century, it had no legal framework and was not fulfilling its function anymore.

A first attempt towards establishing a formal VET system in Greece dates back to 1929 when the Greek government tried to systemise and organise the VET system. Since then, several policies, strategies, institutions and structures have been established to introduce VET and support its development as part of the educational system.

After World War II, industry and infrastructure had been destroyed and the demand for building industries and technical professions was high. In 1952, vocational schools were established, now called EPAS/OAED schools (within the responsibility of the Ministry of Labour).

Early in the 1990s, VET was a political priority because of changes in the global labour market and co-financing by the European Social Fund in programmes targeting young people and adults. In 1995, the Institute for Continuing Adult Education and the Vocational Training Centre of the General Secretariat for Adult Education were set up.

Today, young people continue to see vocational education as a last resort, despite unceasing efforts by the authorities to present it as an alternative of equal value with general education. Efforts to modernise VET and apprenticeship provision began in 2013 and have been going on

since then, not least under the pressure of the European Union and the Troika (including the European Central Bank and the International Monetary Fund) in the context of economic crises (Cedefop, 2018; Ioannidou & Stavrou, 2013).

The initial education and training system is structured into two different levels, upper secondary and post-secondary. In upper secondary education and training (three years of studies), vocational training is offered by Vocational Education Secondary Schools (EPAL), and by a new type of Vocational Training School, EPAS schools, which are of two years' duration (EQAVET, 2016).

Post-secondary non-tertiary education is offered by the IEKs operating in the context of non-formal education and leading to the acquisition of nationally recognized certificates after two years of studies. IEKs offer an informal initial vocational training to graduates of formal non-compulsory secondary education, and to EPAL graduates. Often, IEKs are run privately.

Formal upper secondary school-based VET programmes are offered by EPAL schools (vocational education schools) run by the Ministry of Education (Cedefop, 2018). The duration of an EPAL course is three years. In the first year, the contents are the same for all students, no matter what specialisation they chose. Available specialisations are grouped into three field, namely technology, services and shipping industry; examples within technology are engineering, automobile technology or electrical engineering. In the second and third year, contents are increasingly specialized and students are split in different classes depending on their specialisation (Wolf & Xerisoti-Wollmann, 2018). Which specialisations are offered depends on the demands of the region (e.g., economic conditions and needs of employers) as well as on the demands of the students.

EPAL

After three years of EPAL schooling, which is certified with a graduation diploma at level 4 of the national and European qualification framework, graduates may sit the Panhellenic examinations allowing access to higher education institutes like universities. Also, they can enter the labour market or they choose the post-secondary Mathitia to gain workplace experience. Here, they are paid 75% of the minimum wage. The official framing of Mathitia is the apprenticeship scheme, also known as EPAL apprenticeship year. It lasts one school year (9 months) and leads to qualifications at level 5 (Cedefop, 2018).

In 2018, 22.146 students graduated from EPAL schools in Greece (KANEP/GSEE, 2019, p. 36). The fields of study are engineering sciences, training in commerce and business administration, computer sciences, agriculture-forestry-fishing and shipping and arts.

EPAS

In 2018, a total of 4.060 students graduated from EPAS schools. Engineering sciences, health and hygiene sciences, training in commerce and business administration and professions of industrial production and technology account for 91.6 % of all students (KANEP/GSEE, 2019, p. 38).

The EPAS apprenticeship scheme is offered by OAED (Manpower Employment Organisation – the public employment service), supervised by the Ministry of Labour and responsible for operating 51 EPAS schools. Enrolment is open to students who have completed the first year of school-based upper secondary education, general or vocational programmes. Studies last two years (Cedefop, 2018, p. 40). Learners attend the EPAS schools three to four days per week for an average of two hours/day after working for their employers. For one day of the week they go to school, where subjects are offered both in classrooms and workshops.

A prominent critique of the EPAS structure is the limited progression opportunities for EPAS graduates, who are not entitled to move into higher education (Cedefop, 2018, 20).

Actors of VET

There are several actors who are relevant for VET in Greece. The Ministry of Education (MoE) is the most powerful authority. Together with IEP (Institute of Educational Policy) it is responsible for the EPAL schools. Vocational curricula for EPAL as well as for EPAS schools are developed by the IEP under the supervision of the MoE. Hereby, the IEP is not bound to any suggestions regarding curricula or educational profiles made by the social partners (Cedefop, 2018). Beyond this, the MoE and IEP are also in charge of supervising IEKs, the apprenticeship scheme, the coordination of occupational profiles and their updating, and certification of qualifications (op.cit.).

A look at the organisation chart of the Greek Ministry of Education shows that there is no dedicated instance in charge of VET (e.g., Directorate General). This leads, among other things, to Greek representatives in EU bodies and working groups (e.g., in the Advisory Committee for Vocational Training, ACVT or at the regular Meeting of the Directors-General for Professional Education, DGVET) or in bilateral cooperation often lacking proven expertise in VET as well as to a high turnover (Ioannidou & Stravou, 2013).

The Ministry of Labour (MoL) is involved in apprenticeship education with EPAS schools. EPAS schools are run mostly by the OAED, which is supervised by the MoL (Cedefop, 2018). It sets the overall framework for apprenticeship contracts and provides the link between apprenticeship provision and overall employment policy (ibid.). Employers must submit several documents related to the recruitment and training of apprentices electronically to the MoL, for instance to prove the fulfillment of formal requirements related to staff and training facilities. The goal of the MoL is to provide skills development for trainees and to upskill the unemployed and it is actively involved in the skills forecasting.

According to national legislation, OAED develops training programmes for apprentices. The programmes are based on research on labour market needs in the geographic area of each EPAS school and they are discussed with social partners and chambers at a local level through the career offices within the schools (Cedefop, 2018). According to Cedefop (2018, p. 68), the role of OAED has been weakened by recent reforms – for example, the OAED is included in the National Technical Committee of VET but not in the National Committee, with its more prominent role in decision-making (op.cit., p. 64).

Teacher Unions play a strong role in VET policies, as highlighted in several interviews conducted in Greece in 2019. They are generally perceived as being rather conservative and skeptical as regards recent reforms. Other trade unions and employers' association are not much involved in VET, although some express the strong wish to be more actively involved for instance in vocational guidance. They are absent of the National Committee of VET, which only includes the ministerial working level, as well as from the National Technical Committee of VET, which includes the IEP, OAED and the chambers. They participate in the National Coordination Body of Apprenticeship, but their role according to interview data is not clearly defined. At the local level, the role of employers' organisations in engaging and supporting companies within the apprenticeship system is minimal (Cedefop, 2018, p. 79).

In the field of bilateral cooperation, Greece has been working closely on apprenticeship reforms with Germany. Actors like the German Embassy or the German-Greek Chamber of Industry and Commerce (DGIHK) have an advising and consulting function, such as participation in round tables of VET in Greece.

Current Reforms and Developments

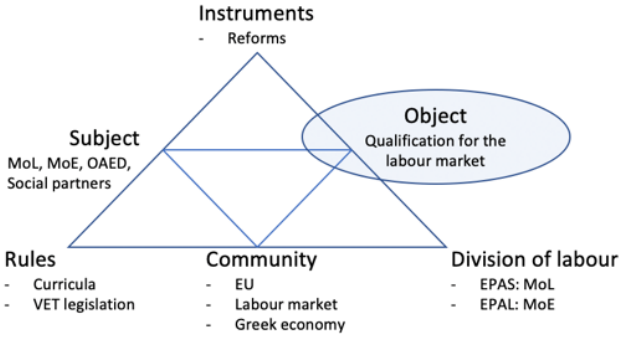
Between 2000 and 2013, several reforms have been enacted to regulate the domain of VET and lifelong learning with several intentions: Linking VET to the labour market; systematising and developing lifelong learning; as well as restructuring secondary education (Cedefop, 2014, p. 19). A new law provided for 1) setting up a monitoring mechanism to develop local partnerships

to promote apprenticeships in six Greek regions; 2) gradually involving employers and private sector funding in VET; 3) identifying future skills needs; 4) and matching VET provision with the needs of the labour market. However, in the first years after its adoption, operationalisation and implementation of the new law appeared slow and piecemeal (Cedefop, 2018). What is more, the major issues challenging the Greek VET system persisted after these reforms: The necessity to link VET closer with the job market and economy, the need for more vigorous involvement of the social partners, the need for decentralisation and greater school autonomy, the failure to attract more young people into vocational training, the need for improving the quality of initial vocational training and linking it more closely to further training and lifelong learning (Ioannidou and Stavrou, 2013).

Since 2016, the national strategic framework for upgrading VET including apprenticeships (also called 2016 VET strategy, or apprenticeship scheme) includes the step by step introduction of new apprenticeship structures in addition to the existing EPAS/OAED structure. Here, after three years of EPAL school, students can enter an apprenticeship ("fourth year") to achieve a level 5 qualification on the national qualifications framework. In 2020/2021 an evaluation of all existing schemes is supposed to lead to further decisions on the future structure (Cedefop, 2018, p. 17).

Summing up, the VET system is supposed to qualify young people in accordance with labour market needs (**object**, see Figure 2). Therefore, governmental organisations (MoE, MoL, IEP, OAED) and non-governmental organisations (social partners, teachers' unions, advising bodies) cooperate (**subject**) in different manners. EPAS schools are under the umbrella of the MoL, EPAL schools are supervised by the MoE (**division of labour**). Current reforms (**instruments**) try to strengthen the link between the Greek economy, the labor market and the training market as well as to fulfill European standards (**community**) while following the national VET legislation and curricula (**rules**). Permeability between education and training, innovation and progression within the education system, responsibilities (e.g., in terms of curriculum development), involvement of social partners and quality assurance in terms of competence development of trainers are current challenges of the VET system and subject of the international cooperation.

Figure 4
Activity System of the Greek VET System. Own compliation



As mentioned above, the Greek VET system is facing numerous challenges, of which some are linked to a series of internal contradictions to the activity system:

- The division of labour between the MoE and MoL is unclear and subject to changes depending on the political context. The MoL and its agency OAED, which have been losing power compared to the MoE in recent years, are under pressure by the evaluation of the VET system undergoing in 2020/2021.

- The implementation of apprenticeship reforms aiming at strengthening the link between VET and the labour market is slowed down by the opposition of teacher unions and a lack of communication between ministries and social partners.
- VET suffers from a negative perception among youths and their families. A strong preference given to academic education makes it difficult, even in innovative programmes, to recruit young trainees.
- Although it is commonly admitted knowledge that the ties between the VET system and the labour market need to be reinforced, social partners in Greece are not systematically involved in VET policy, curriculum development etc.

3.2 Project GRÆDUCATION

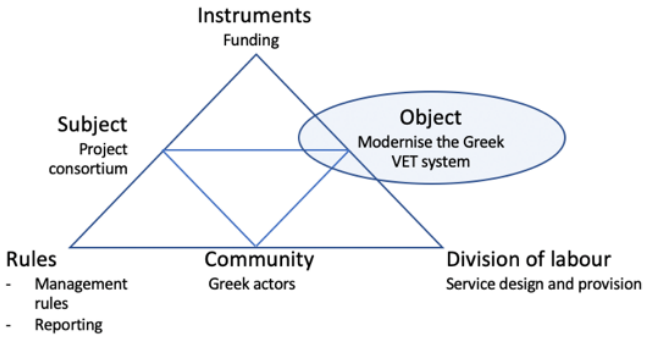
GRÆDUCATION is a project funded by the BMBF in the framework of a programme for the internationalisation of VET. The basic aim of the project was to develop training services in a customer-oriented process, to modernise the Greek VET system in the field of green technologies, based on the key principles of dual VET defined in the German government's strategy for international VET cooperation (**object**; see figure 3). The following four objectives are defined in the project's funding application:

1. Revision of existing curricula to include environmental and sustainability aspects;
2. Consultancy on the introduction of dual training structures in the existing training system;
3. Train-the-trainer qualification offer for companies and training institutions to support the introduction of modern, environmentally oriented content and dual training structures in existing training.
4. Development of a tool for career choice orientation and preparation of vocational qualification in schools, in the field of "environmental-technical professions".

The project runs from June 2017 to December 2021 and has a funding volume of nearly 1.8 million Euro (**instrument**). It is implemented by three German organisations (**subject**), including a not-for-profit private institute specialized in service development (coordinator), a regional chamber of crafts (service and training provision) and a private company specialising in local economic development (provider of the above-mentioned career-orientation tool, the EnergyLab). In Greece, the project collaborates closely with the DHIHK, which has been involved in the past years in several VET projects for the transfer of dual training elements to Greece. The project is designed according to a participative and co-creative approach (**rule**) involving Greek actors in the design and provision of training services, such as for instance the Greek ministries in charge of VET, social partners, schools and training companies (**community**). The co-creative approach theorised by the project coordinator (Große et al., 2020) implies a division of labour according to which the coordinator has a role as process-moderator. The two other German organisations funded by the project provide their VET expertise in the field of green technologies. The DHIHK acts as a door-opener to reach out to Greek actors, who themselves participate to various degrees to the implementation of the project (**division of labour**).

As it is embedded in a publicly funded programme, GRÆDUCATION follows the project management rules and logics imposed by German regulations, including for instance yearly reporting based on a work-plan and a financial plan agreed at the beginning of the project. In addition, the project is also expected to contribute to the programme's overarching goals, which include especially the support of VET reforms in the project countries for establishing dual apprenticeships on the one hand, and the internationalisation of German VET providers on the other hand (**rules**). As a consequence, tensions and contradictions are inherent to the project's design and implementation at different levels:

Figure 3
Activity System of GRÆDUCATION. Own compilation.



- The project management rules, which imply to follow a linear logic and which make adaptations of the working and financial plans to changing requirements cumbersome, contradict the co-creative approach put forward by the project team. This approach consists of designing services in a participatory and context-sensitive innovation process. It therefore includes a disruptive potential and requires some flexibility regarding timing and resources while also making it difficult to predict the outcomes of the process. This contradiction materialised in tensions within the project team between members who felt closer to either one or the other logic, but it was to some extent solved over time:

> The employees of the Chamber of Skilled Crafts Education Center are experienced in projects, but this project is different: In other educational cooperation, the topics were already determined at the beginning. In the GRÆDUCATION project, only a fairly broad range of topics was initially outlined. The process of matching supply and demand tried our patience during the first six months of the project. We now know that this patience has paid off. (Heine et al, 2019, p. 40)

- The funding, which is restricted to German organisations due to the BMBF budgetary rules, is a potential source of tensions, as the project cannot succeed without a strong engagement of Greek partners. As these do not have a dedicated budget for project activities, other forms of incentives and motivations must be found.
- The programme's objective of internationalisation of German VET providers is operationalised in the requirement to develop a business model for continuing self-sustained cooperation activities after the end of the funding period. This requirement, however, does not correspond to the project coordinator's objectives as a not-for-profit institute with no intention to set up a long-term consultancy business in Greece. Moreover, it may in principle even contradict a philosophy of empowerment according to which the project's success would imply that Greek actors take on the dual VET elements and carry on with developing their VET system without external intervention. This contradiction was solved in a way that business models were developed on the side of the project, while the focus of activities was set on systemic transformation of the Greek VET system.

4 Examples of Expansive Learning in Educational Transfer Activities

According to Engeström, learning results from contradictions or dilemmas within the activity system, leading the learners to get "involved in constructing and implementing a radically new,

wider and more complex object and concept for their activity" (Engeström & Sannino, 2010, p. 3). In order to shed light on learning processes taking place in relation with educational transfer, we focus on three examples of interaction between the Greek VET system and the GRÆDUCATIONproject: Train-the-trainer activities for EPAL-teachers, curriculum development for EPAS schools, and the vocational guidance event "Girls' Day" which took place in Athens in 2019. Each of these examples was chosen because it allows us to highlight a specific aspect of the theory of expansive learning and of its application in relation to educational transfer.

4.1 Train-the-Trainer as Boundary Crossing and Network Building

The apprenticeship reform launched in Greece in 2016 has put EPAL teachers under pressure to re-define their role as regards the practical training of students at the work place. By introducing an optional 9-months "apprenticeship year" following the school-based three-year course cycle at upper-secondary level, the reform has imposed a range of new duties on VET teachers. The apprenticeship year combines theoretical and laboratory/workshop sessions at school with practical training in companies and organisations. Teachers take up a pivotal role in managing learning processes across the different learning venues: "In addition to teaching, teachers' duties include supervising apprenticeship students in the workplace. The teacher must also handle the information system, which is responsible for the apprenticeship programme, supervise compliance with contract terms, write programme monitoring reports, record absences and check the accuracy of forms. In addition, the post-secondary school year apprenticeship teacher must contribute to the dissemination of practices such as project work, lifelong learning, digital skills improvement, effective communication, adoption of innovative practices, adherence to professional ethics etc." (Ioannis et. al., 2019, p. 834). These new tasks imply, among others, a direct interaction with the world of work. The challenges associated with this reform of the teachers' role in a short period of time and in a context of political pressure are vividly depicted by a representative of the MoE:

> It also would change the profile of the teachers. We cannot select the teachers. Teachers are under the supervision of the MoE. Our priority is to start schools on 11th of September. Teachers have to be there then. And sometimes it is not the best vocational teachers. And sometimes, when I present the scheme to the vocational community, I see that it requires more from the teachers: communication, you have to <u>like</u> your job. You cannot expect from someone who wanted to be only in classroom to change his role under pressure. (I_09)

While the MoE and its subordinated agency, the IEP, were supposed to implement the apprenticeship reform, national elections in July 2019 led to a situation where the project GRÆDUCATION was confronted with ministerial officers and IEP employees refusing to take any far-reaching decisions. As a result, it was not possible to work on the EPAL curricula for the apprenticeship year, as had been originally planned in the project. It was decided instead, in close consultation with the IEP, to develop train-the-trainer (TTT) offers for EPAL teachers, in an attempt to "*green the curricula in a bottom-up way*" *(I_10)*.

These offers were to support teachers in planning a part of the curriculum (around 25% of learning time), which is free of national prescriptions in order to better meet the requirements of local employers. The TTT offers would thus fit well into the overall trend of empowering teachers to take more responsibilities in strengthening the link between VET and the world of work. Based on a survey among teachers, five "green" and innovative topics were selected: solar cooling, heat pump, photovoltaics, entrepreneurship, and employability. One- and two-days seminars were conceived by the project partners in close consultation with IEP

representatives and a group of EPAL teachers. They were then piloted and implemented several times in partnership with companies and a technical university, which provided the venue and modern equipment for practical training. The participants, who received both theoretical and practical input during the seminar, were handed over training materials developed by the project and translated in Greek, which they can use to prepare their own teaching in EPAL schools and disseminate to colleagues. These materials, together with training materials developed in the framework of the seminars by the participants themselves, were submitted to the MoE for approval in order to be shared on the MoE's platform for educational resources.

By shifting their focus from curriculum development for the new apprenticeship scheme to TTT for EPAL teachers, GRÆDUCATION and the IEP were able to solve the contradictions raised by upcoming elections and subsequent political deadlock within their respective activity system. GRÆDUCATION, on the one hand, argued vis-à-vis its funding ministry that it was piloting a more flexible and "bottom up" approach for greening existing curricula by working directly with teachers. The IEP, for its part, was able to add new TTT offers to its programme for supporting teachers in implementing the apprenticeship reform. Under these circumstances, both activity systems had a substantial interest in engaging in collaborative expansive learning.

The process of educational transfer described above can be understood as a case of learning through boundary crossing and network building. Boundary crossing has been defined as "horizontal expertise where practitioners must move across boundaries to seek and give help, to find information and tools wherever they happen to be available" (Engeström, Engeström & Kärkkäinen, 1995, p. 332). Representatives from the IEP and from the project were motivated to step out of their usual networks and to look beyond their common practice. This is also true for the German training provider, who integrated some of the ideas developed in the TTT seminars for EPAL teachers into its own training programs in Germany. Together with a researcher from the TU Athens (**subjects**), they were engaged in an innovation process to design, test, evaluate and improve TTT concepts (**objects**). They hereby set up structures for the participative development of TTT offers (fiap e.V., 2019, p.6; Aidonnidou et al., 2020) (**division of labour**). As an outcome of this process, EPAL teachers are expected to act in the long run as boundary-crossing change agents, using the materials received at the end of their training to develop new learning arrangements for EPAL students and disseminating green and innovative teaching practices within their schools (**community**).

4.2 Girls' day as Transformation of the Object

Greek young people have several options for vocational guidance, e.g. counselling services by OAED (30 vocational education career offices within EPAS schools) or specialised centres offering counselling and vocational guidance. An agency responsible for lifelong counselling and vocational guidance (EPOPEP) is responsible for helping to design and implement national counselling and vocational guidance policy, inter alia (Athanasouli et al., 2016). Still, the National strategic framework for upgrading VET and apprenticeships (apprenticeship scheme from 2016) explicitly refers to the need for an expansion of the guidance services (ibid.).

This claim seems to be justified with regard to youth unemployment in Greece, which was about 32.5 per cent in 2019 (ILO, 2020), nevertheless VET is regarded as a second-choice option:

> VET is the second-choice option in Greece. Everyone wants to go to university. Our problem is a huge youth unemployment. [...] We have to make people understand that VET is not a second choice. (I_04)

The goal is to make the population aware that VET means a high employability:

> There has to be a high likelihood of finding a job after vocational training to make this type of education appear attractive. Young people in Greece desire a stable working environment the most. (I_06)

GRÆDUCATION takes up this thread as the Greek VET actors are interested in vocational guidance, especially in a new format, namely the Girls' day. The idea developed within vocational orientation days in holiday camps organized by OAED and GRÆDUCATION in Athens and in Thessaloniki in June 2018. Students, especially girls, showed great interest in GRÆDUCATION's "energy suitcase". The energy suitcase, which are developed by one of the project partners in Germany, includes several experiments and hands-on tasks to explore green technologies and related occupational fields. In May 2019, EPAS and EPAL schools as well as some general schools participated in the first Greek Girl's day, which took place in spectacular premises on the roof of the Stavros Niarchos Foundation in Athens with more than 300 participants. The energy suitcases were used during the event and many of the participating students expressed their desire to learn more about job profiles, new technologies, Green Skills, VR applications - and to have more frequent opportunities to experiment with new technologies in order to discover their own potential. The energy suitcases became a key instrument around which OAED and the project partners in GRÆDUCATION have been further developing career guidance options in the field of green technologies. In September 2021, another Girls' day is being prepared and the event is supposed to be institutionalized. Furthermore, the DGIHK has bought ten more energy suitcases, which can be borrowed by teachers to be used in vocational orientation events all over the country.

Engeström and Sannino (201, p. 8) describe how the changes of the object of an activity system can be seen as qualitative turning points, leading to a transformation of possibly all the elements of the activity system. In the Greek VET system, the external impulse came from GRÆDUCATION and triggered the development of vocational guidance approaches (**object**), using especially the energy suitcase (**instrument**) as well as a new way of collaboration between stakeholders **(subjects and division of labour**) and, ideally, a stronger linkage between labour market needs and youths as future workers (**community**).

In the activity system of the project GRÆDUCATION, the object was transformed by extending it. Vocational guidance was already in the original project plan (see above: Development of a tool for career choice orientation and preparation of vocational qualification in schools, in the field of "environmental-technical professions") but had to be specified. Within the process of the co-creative dialogue between project actors and Greek VET stakeholders (**subject**), the object became more concrete and extended to have an impact all over the country, as it included not only the Girls' day, but a whole series of events and the possibility for any teacher to borrow energy suitcases at the DGIHK.

4.3 Curriculum Development for EPAS Schools as a Formative Intervention

In 2017, within the projects' exploration phase, a negotiation process started between the German project and the Greek VET representatives to find the EPAS curriculum that should be modernized as foreseen in the project plan. OAED, IEP, Greek teachers and company representatives decided in collaborative workshops with the GRÆDUCATION to work on the curriculum for electricians, in order to make it more attractive and up-to-date. In a process lasting several months, the existing curriculum was then turned into a completely modern and innovative curriculum, including components that are not even included in the German vocational training curriculum, such as smart home. It took ten months from the idea of the new curriculum to its implementation in OAED schools all over Greece in September 2018.

Sannino et al. describe that expansive learning

> [...] distinguishes itself by its focus on learning within and between activities in society at large, beyond the confines of school. Expansive learning is a creative type of learning in which learners join their forces to literally create something novel, essentially learning something that does not yet exist. (2016, p. 603)

For the new Greek curriculum, we find this expansive learning as a formative intervention (Engeström and Sannino, 2010, p. 15). Contents of formative interventions are subject to negotiation processes and the kind of the intervention is eventually up to the subjects. Furthermore, a key outcome of formative interventions is agency among the participants (ibid.). Historically formed contradictions (here: outdated curricula) are solved by learners' collective efforts to understand and manage these contradictions and by creating a learning process (Sannino et al., 2016, p. 600).

In the activity system of the Greek VET system, GRÆDUCATION helped to overcome the outdated curriculum of the electrician using co-creative workshops and moderated communication processes (**instrument**). An attractive curriculum (**object**) was developed by actors from OAED, IEP and teachers (**subject**) in a bottom-up-approach (**rules**). As a result, the new curriculum is now used throughout the country in all OAED schools (**community**). Since 2020, three more curricula are being reinvented with the support of GRÆDUCATION following the same method and co-creative approach. Furthermore, the idea of a "green VET campus" was born during this process and is being realised in Kozani by now, including one EPAS school and one IEK.

A key success factor for the formative intervention process lies in the participative approach developed and implemented by the project coordinator. This approach highlights the participation of the "recipients" of the transfer process in the project:

> Sustainable projects are those that implement something in concrete terms, which is then taken up and continued in the Greek society, like the modernized curriculum for electricians. I understand this adaptation as sustainable, as it remains in the Greek system. Greaducation takes the wishes of the Greek side, implements them and continues them. (I_01)

5 Discussion and Conclusion

In our paper, we analysed the project GRÆDUCATION with regard to the following research questions: In how far does expansive learning take place? To what extent does the project achieve intended as well as unplanned and unscheduled purposes? To what extent does activity theory explain and deliver insights into the process of educational transfer?

Firstly, using Engeström's theoretical concepts, we identified three cases of expansive learning taking place in the Greek VET system as well as in the project context. In all three cases, the actors involved engaged in a process which led Greek project partners to re-conceptualise their activity (e.g., implementing the new apprenticeship scheme, curriculum development, vocational guidance) by integrating new (environmental but also interdisciplinary) aspects to it. Moreover, in the processes their networks and communication processes evolved, creating new modes of interaction. With the support of GRÆDUCATION, we notice a development from instrumental policy learning towards social policy learning (May, 1992): The "coaching" process from an external actor (GRÆDUCATION) broke up consolidated political elites by new ways of communication between different ministries and between public institutions and private or civil society (e.g., unions, trade associations, companies).

Secondly, the case analysis shows how the flexible and co-creative approach chosen and designed by the project's coordinator contributed to the success of the international VET project. The extent to which GRÆDUCATION could depart from the traditional linear project

management approach underlying such kind of funding programmes is revealed by the unplanned results (such as the TTT, the Girls' Day, etc.) achieved so far. These results were triggered by a series of contradictions inherent to the activity systems involved or brought about by external contextual factors, such as the 2018 national elections. As the learning processes taking place in this project allowed the different actors to solve some of these contradictions in a productive way, the outcomes of the transfer process can be expected to be sustainable. In particular, Greek VET actors have had the opportunity to overcome, at least within the scope of the project, one of the biggest challenges confronting the Greek VET system: asymmetrical information among the different stakeholders, resulting in contradictory phenomena, such as high youth unemployment coupled with significant skills shortages. "*As GRÆDUCATION shows, there are real opportunities to introduce and strengthen [vocational] education which is more closely linked to the world of work: Reaching less educated groups, avoiding dropouts and addressing the skills shortage, avoiding brain drain, addressing youth unemployment*" *(I_01)*. The project thus initiated a process which could eventually contribute to strengthening the VET system and making it more performant.

As our research shows, Engeström's expansive learning theory opens the black-box of international educational transfer by providing a conceptual framework for a better understanding of processes taking place among the different actors involved in it. The rich body of empirical research based on this theory offers a good basis to operationalise its core concepts and identify different types of learning processes. Taking the case of GRÆDUCATION, three types of expansive learning were reconstructed based on empirical data: Learning as boundary crossing and networking, learning as transformation of the object, and learning as formative intervention. Based on Engeström & Sannino (2010), other types of learning could probably be identified through further research, such as "learning through cycles of learning actions" or through "movement in the zone of proximal development" (op. cit). Leaving this for further research is one of the main limitations of this paper, which does not claim to explore all the possible forms taken by expansive learning in international education transfer. Other limitations include some shortcomings concerning data triangulation due to problems in the access to the field and missing language skills for proper understanding of Greek project documents.

Compared to other international VET projects funded by Germany under the same budget line, GRÆDUCATIONpresents some specificities. In particular, it is based on a co-creative approach (Große et al., 2020) which, per se, seems to fit well with the pre-requisites of expansive learning and boundary crossing (Kerosuo & Engeström, 2003). As a consequence, there is a question whether Engeström's theory would be as powerful to describe and understand educational transfer in other settings, including less participative and less flexible project designs. Existing research in other funding contexts strongly hints towards a positive answer (e.g., Peters, 2019). Nevertheless, it seems highly desirable to conduct comparative case studies based on most different cases in order to further explore the potentials and limitations of this theory for understanding international transfer of educational policies and practices.

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Teaching Practices & Early Leaving From Vocational Education and Training: An Empirical Approach & Intervention Project

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Abstract

This project aims to contribute to the reduction of early leaving from Basic Vocational Education and Training (BVET) and Intermediate Vocational Education and Training (IVET).

Recent research confirms the influence of the teaching styles and pedagogical practices of teachers on the development of student engagement, as well as academic performance, and the prevention of early leaving from education and training. Thus, taking the Self Determination Theory (SDT) as a theoretical reference, this project focuses on the analysis of the teaching styles and practice of teachers in secondary vocational education and on their influence on the educational performance of students and on the prevention of early leaving from vocational education and training (ELVET).

The methodology is mixed and is structured in two phases: an initial descriptive-explanatory phase in which teaching practices are identified and analysed based on the administration of two validated questionnaires (Situations in School – SIS – and the Teachers' Sense of Efficacy Scale – TSE) and a second phase that corresponds to the implementation and transfer of successful educational practices as a strategy for preventing ELVET.

The results will enable us to provide evidence, strategies, and instruments that will contribute to the improvement of knowledge concerning the teaching styles and pedagogical practices of teachers and the bearing these have on students' academic performance, as well as the transfer

of tools and successful pedagogical practices for the prevention and reduction of early leaving from these levels of education.
This project is subsidized by the Spanish Ministry of Economy and Competitiveness within the framework of the 2019 R&D&I Programme aimed at overcoming social challenges (reference PID2019-108342RB-100).

Keywords

vocational education and training, teaching practice, early leaving from vocational education and training, dropout.

1 Background and Contextualisation

Spain is one of the developed countries with the highest rates of early leaving from education and training (ELET) and with the lowest figures of participation in vocational education and training (VET). The rate of ELET corresponding to 2019 was 17.3%, much higher than the mean of the EU28 which was 10.3% (Ministry of Education and Vocational Training, 2020). The percentage participation in VET out of the total number of students in upper secondary education stands at around 35% as opposed to 48% on average for the EU as a whole, and 46% for the OECD (Cedefop, 2017; OECD, 2017).

Various studies point out that a high participation in secondary vocational education contributes to a decrease in ELET (Alegre & Benito, 2010; Rahona López, 2012; Cedefop ReferNet-Spain, 2015a, 2015b; Cedefop, 2016). Meanwhile, the results of the project, "*Itinerarios de éxito y de abandono en la formación profesional del sistema educativo de nivel 1 y 2*" [Pathways leading to success in or dropout from vocational education and training, levels 1 and 2], ref. EDU2013-42854-R (henceforth, IEAFP) revealed the existence of a positive relationship between student engagement with teachers and perseverance in education. These results point towards the convenience of delving further into empirical knowledge on the issue given its potential as a factor in the prevention of early leaving from secondary vocational education.

A person is considered to be an early leaver from VET (ELVET) when they have not achieved a qualification corresponding to upper secondary education, have dropped out of a VET course leading to a higher qualification than the one they currently have, and are no longer in education (Cedefop, 2016). This term is also used in a more general way to refer to students who have not achieved a qualification corresponding to upper secondary education and have dropped out of a VET course leading to a higher qualification than the one they currently have, since the most widespread situation is not having information on whether or not they are pursuing other studies.

The available data show a fairly stable rate of allocation of qualifications in IVET (relationship between the number of people enrolled in the first year during a certain academic year and the number who obtained the corresponding qualification the following year), around 50% (Cedefop ReferNet-Spain, 2015a, 2015b), with significant differences observed between autonomous communities (Salvà-Mut et al., 2020).

The data obtained in the framework of the IEAFP project show that 21.6% of BVET and 22.5% of IVET students thought of giving up the studies during the first three months after starting the training; 31.9% of BVET and 29.7% of IVET dropped out of the studies between the first and second year; and 54.62% of BVET and 43.9% of IVET had dropped out of the studies three years after starting them, with enormous differences observed between the different education centres making up the sample (Salvà-Mut, 2018).

In this context, the concept of student engagement, developed since the 80s in research on early leaving from secondary education, is key to the analysis of successful pathways and early leaving in secondary vocational education and training.

International literature points out the importance of student-teacher engagement as a protective factor against dropping out of education (Davis & Dupper, 2004; Archambault et al., 2009; Jang et al., 2010; Lessard et al., 2010; Whannell & Allen, 2011). This evidence is also confirmed through the results obtained in the framework of the IEAFP project (Pinya et al., 2017; Cerdà-Navarro et al., 2019; Pinya & Salvà-Mut, 2021).

Further, key to our project are the papers that show the influence of the teaching styles and pedagogical practices of teachers on academic results. There is evidence of the important role teachers play in student engagement, motivation, and learning (Wentzel, 2009; Taylor & Parsons, 2011), three factors that are key to fighting against early leaving from education and training.

One of the most developed conceptual models for the study of the influence of pedagogical practices on the development of student engagement is the Self-Determination Theory (hereafter, SDT) (Vansteenkiste & Ryan, 2013; Ryan & Deci, 2017). This theory focuses fundamentally on the different types and sources of motivation and their impact on behaviour, establishing the continuum of autonomy and control as the central dimension in order to differentiate types of motivation (Ryan & Deci, 2017).

Intrinsic motivation may be volitional and reflect the interests and values of the person, but it may also be the result of coercion or external pressure. Thus, it could be possible to differentiate, respectively, between intrinsic motivation – so-called autonomous – and the one known as controlled motivation. Factors that generate in students the perception of being externally regulated and/or being incompetent have a negative bearing on their motivation; whereas the ones such as opportunities for choice, positive feedback, and acknowledgement of their internal framework, have a positive bearing on the intrinsic motivation of students as they support their perceptions of autonomy and their feelings of competence. Extrinsic motivation, however, refers to the instrumental behaviour of the person to achieve an external reward, social approval, or the achievement of a valuable result. Hence, four types are distinguished: external, introjected, identified, and integrated. The first is the most controlled while the last is the one that involves a more autonomous motivation of students (Ryan & Deci, 2004, 2017).

The usefulness of this theory in research in education is obvious. According to the SDT, intrinsic motivation has positive consequences on students in terms of engagement, well-being, and learning (Gottfried et al., 2008; Tsai et al., 2008; Taylor et al., 2014; Froiland & Worrel, 2016).

Further, research on school dropout in secondary education (Vallerand & Bissonette, 1992; Vallerand et al., 1997; Hardre & Reeve, 2003) has shown that self-determined motivation of students towards school influences their intentions to continue with their education, whereas non-self-determined motivation towards school influences students' intentions to leave education. Empirical research concludes that students with autonomous motivation obtain good academic results and benefit from the support of teachers in their autonomy. It also concludes that teaching style (teachers' style of motivation) is malleable and that the theoretical concept of support in autonomy is reflected in the pedagogical practices carried out in the classroom (Reeve, 2004; Kember et al., 2009; Berger & Girardet, 2016; Cheon & Reeve, 2015; Aelterman et al., 2019). According to the SDT, when teachers encourage student autonomy, competence, and personal relationships with their teaching styles and practice, student engagement improves as their internal motivation increases. The pedagogical practices that have a component of extrinsic motivation turn into students' motivational self-regulations (Deci & Ryan, 2000).

The SDT defines two important dimensions in relation to teachers' teaching style: support for student autonomy and the provision of structure in the teaching. Both dimensions correlate positively, which suggests that support for student autonomy is generally linked to the provision of structure and order in the classroom. Both dimensions predict the behavioural engagement of students (Jang et al., 2010; Aelterman et al., 2019). Meanwhile et al., (2009)

defend that the support for autonomy and structure in the teaching proposed by teachers promotes self-regulation learning (SRL) as it enables the basic psychological needs of students to be met: need for autonomy and need for competence. The way in which teachers promote SRL is important as it encourages students' motivational self-regulation, which is key to academic success (Zimmerman & Pons, 1986). In accordance with the SDT, support for autonomy implies enabling and encouraging students to pursue their personal goals (Assor et al., 2002).

The SDT postulates that students' ability to perform will be conditioned by their intrinsic motivation and this depends on their perceptions of autonomy and on their feelings of competence (Ryan & Deci, 2017). Thereby, when teachers promote student autonomy, competence, and relationships, their engagement improves as their intrinsic motivation increases. The pedagogical activities that have a component of extrinsic motivation turn into students' motivational self-regulations.

In this context, teachers' teaching style appears as an especially critical element, with the style involving a high degree of structuring of the teaching and support for student autonomy being associated with positive educational results. However, the style that entails a high degree of control is associated with negative results (Aelterman et al., 2019). The conceptualisation of teaching styles and their translation into pedagogical practices has progressed on the basis of empirical research, one of the latest studies of which is this author's. According to this model, teachers' teaching styles can be classified in four dimensions:

- Support for autonomy. Teachers seek to identify and nourish the interests, preferences, and feelings of students so that the latter engage with classroom activities. Two sub-styles can be distinguished: participative and adaptative (attuning).
- Teaching structure. Teachers provide strategies, help, and assistance to students in accordance with the latter's skills and abilities, thereby they feel competent to carry out the classroom activities. Two sub-styles can be distinguished: guiding and clarifying.
- Control. Teachers require students to think, feel, and behave in a certain way and impose their own agenda and requirements upon students without respecting their opinion. Two sub-styles can be distinguished: demanding and domineering.
- Chaos. Teachers leave students alone, which means it is confusing for students to discover what they are to do, how to behave, and how they can develop their skills. Two sub-styles can be distinguished: abandoning and awaiting.

In this sense, it is worth noting some papers such as that of Reeve (2004, 2009) and Pelletier and Sharp (2009), which point out several reasons why teachers adopt a controlling style, highlighting the following: relative absence in teacher training programmes of content on teaching styles that promote student autonomy, underestimation by teachers of students' abilities for autonomous motivation, feeling of impossibility of putting into practice teaching styles that promote student autonomy, and administrative pressure.

Berger and Girardet (2016) place special emphasis on the relationship between different teaching styles and pedagogical practices, and teachers' beliefs. Although the way in which they are related is complex and is influenced by teaching context (students' characteristics, pressure on the contents to be taught, influence of mentors or fellow teachers, and the effect of the school itself), teachers' feelings of self-efficacy are related to a lesser need to act in accordance with traditional teaching models and to the development of an autonomy-supporting style. Thus, according to the SDT, it is necessary to take into consideration how, as a teacher, one's own perceptions of professional autonomy, of competence linked to personal effectiveness, and of interpersonal abilities condition not only beliefs and intentions but also teaching practice and, consequently, bear a direct relationship to student engagement (Deci & Ryan, 2000;

Solomon et al., 2000; Battistich et al., 2004; Dalton & Smith, 2004; Stefanou et al., 2004; Vansteenkiste et al., 2005; Niemiec & Ryan, 2009; Reyes et al., 2012; Van Uden et al., 2013).

Our research proposal is based on studies such as the above, with a two-fold objective: (a) to delve further into the knowledge on teachers' teaching styles in secondary vocational education (BVET and IVET) and on their relationships with academic results, as well as on the conditions for their development; and (b) to design, implement, and evaluate actions that promote the generalisation of the most beneficial teaching styles in terms of prevention of ELVET.

2 Objectives and Methodology

The research project is clearly in line with the Europe 2020 strategy, amongst whose objectives lies the reduction in the rate of ELET to 10% (15% in the case of Spain due to the starting situation at the time of the agreement). According to the data in 2019, this rate stood at 17.3% (21.4% in men and 13% in women) in Spain, and 24.2% in the Balearic Islands (28.1% in men and 20.3% in women) (Ministry of Education and Vocational Training, 2020). Within this framework, three starting hypotheses are proposed:

1. The teaching styles and pedagogical practices of teachers in BVET and IVET are key elements for improving students' academic results and preventing early leaving from education.
2. Identification of the teaching styles and pedagogical practices of teachers that are related to students' good academic results and low rates of leaving BVET and IVET will provide scientific evidence for the development of successful practices in these educational levels.
3. Transfer of these successful practices throughout the teaching staff in these educational levels will have a positive influence on students' academic results and on the prevention of their dropout.

The general aims of the project are as follows:
(1) Obtain new knowledge on the characteristics of teaching styles and pedagogical practices, as well as their relationship with academic results and the prevention of early leaving from vocational secondary education (BVET and IVET). This aim is related to Hypothesis 1.
(2) Establish the characteristics of successful practices in BVET and IVET based on scientific evidence derived from the study of the teaching styles and pedagogical practices of teachers, and their relationship with academic results. This aim is related to Hypothesis 2.

In order to respond to these, the study designed is to be carried out in two phases: an initial descriptive-explanatory phase, and a second phase of application and transfer of results. The first phase will consist of identifying and analysing the teaching styles, pedagogical practices, and feeling of self-efficacy of teachers in BVET and IVET, and their relationship with students' results. Additionally, conditions for the development of successful practices will also be identified.

According to the supply of BVET and IVET in the Balearic Islands (academic year 2019-2020), the total number of teachers is estimated to be 268 for BVET and 543 for IVET. The sample will be made up of 157 BVET teachers and 239 IVET teachers. Data collection will be carried out through the administration of two self-completed standardised questionnaires (SIS: teachers' teaching styles and TSE: teachers' feeling of self-efficacy) and another one drawn up ad hoc in accordance with the objectives of the project that will collect two types of data:

- Academic results (school year, subject/s, number of students, pass and fail results).
- Sociodemographic (date and place of birth and sex) and professional data (seniority, technical or secondary specialty, subject/s imparted, initial and ongoing training).

Teachers' teaching styles will be analysed using the Situations-in-School instrument (SIS) developed by Aelterman et. al (2019) within the framework of the SDT. This instrument covers 15 different situations for each of which the teacher scores between 1 and 7, where 1 is not at all descriptive and 7 is totally descriptive of the respondent's teaching practice. This questionnaire describes15 dimensions: class rules, lesson plan, start of lesson, student motivation, discipline, objectives for students, support, action in situations of anxiety, transition between activities, disruptive behaviour, practice, conflict resolution, assessment, resits, and homework.

Teachers' feeling of self-efficacy will be gathered through the Teachers' Sense of Efficacy Scale-TSE, which consists of 24 items; it uses a numerical scale ranging from (1) Not at all to (9) Completely. The instrument consists of three dimensions:

1. Efficacy in Engagement with students: items 1, 2, 4, 6, 9, 12, 14, 22
2. Efficacy in Teaching strategies: items 7, 10, 11, 17, 18, 20, 23, 24
3. Efficacy in Classroom management: items 3, 5, 8, 13, 15, 16, 19, 21

The sample will be obtained using a proportionate stratified random sampling procedure. The analysis of the data obtained through closed answer questions will be conducted through the statistical methods most frequently used in this type of research studies, consisting of obtaining descriptive statistics and contingency tables. Further, regression analyses will be performed which will enable students' academic results to be explained based on the characteristics of teachers' teaching styles and pedagogical practices in BVET and IVET. The tools for this quantitative analysis will be the software programmes MS Excel, and STATA.

The second phase consists of the elaboration, implementation, and evaluation of a pilot plan in two education centres in which successful pedagogical practices will be put into place as a central strategy for the prevention of dropout from the first year of secondary vocational education. Subsequently, the conditions will be identified to enable transfer to other education centres of the actions carried out in the framework of the pilot plan.

During the study, ethical criteria of negotiation, collaboration, confidentiality, impartiality, equity, and commitment to knowledge will be followed (Taylor & Bodgan, 2002). In line with the peculiarities of the study and the objectives proposed, a perspective of methodological complementarity will be adopted, by including quantitative and qualitative approaches. The results obtained will provide evidence on successful teaching styles and practices. Based on these, a pilot plan will be drawn up for the purpose of implementing it in several centres and gathering data on its viability and impact on the reduction of ELVET.

The proposal also consists of a phase of paramount importance, which is evaluation. Any innovative experience must be evaluated to enable it to be institutionalized. Institutionalisation of the new practices is the final indispensable phase that is necessary so that the innovation can be considered part of the culture of the education centre and, as such, be adopted as one more of the characteristics that define the centre and their educational project. Evaluating these practices involves collecting evidence, but also reflecting on the practice in itself, sharing it, and discussing it collaboratively in order to eventually corroborate it with other professionals (Tejada, 2010). Meanwhile, an important aspect to address is the evaluation of the transfer, for which we will be guided by Kirkpatrick's transfer evaluation model (1975). This model will enable us to assess the pilot plan developed, verify the progress as far as the students and staff at the centre are concerned, measure the repercussion of the different successful experiences carried out, determine the impact of the strategies and instruments put in place in order to reduce dropout, and reinforce the innovative school culture that characterises the participating schools.

For each centre, a specific project will be drawn up, tailored to their conditions, jointly with the research team. The contents will be defined based on the real practices and resources

of each one and in all cases special attention will be paid to planning and gathering of evidence, which will enable an accurate evaluation.

The school projects will be discussed in work sessions with the involvement of the participating schools and members of the research team for this project. Once a consensus has been reached, the projects will be put into practice. The pilot plan will define their evaluation characteristics by articulating qualitative approaches that will include the voice of the different actors. The qualitative approach will make use of instruments such as in-depth interviews, discussion groups, and anecdotal record:

- Anecdotal record: teachers will gather data when the different practices are put into place for the prevention of dropout. This instrument will enable us to collect the information the teacher considers important regarding a situation, whether it be at the organisational level, or in terms of impressions, perceptions, attitudes, behaviour…
- Discussion groups: two discussion groups will be held in each of the year groups in which the pilot plan has been implemented, with at least six students and at most ten in order to collect their impressions on the educational practices carried out in terms of viability and usefulness for the prevention of early leaving.
- Interviews with teachers: all the teachers participating in the pilot plan will be interviewed in depth, whilst their anonymity is respected.
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This data collection will be audio recorded for its subsequent transcription and discourse analysis using the software NVIVO.

A follow-up of the whole implementation process will be performed and will include an intermediate evaluation for the purpose of obtaining some initial results that will enable possible improvements to be defined and the planning of the pilot plan and of the specific projects in each education centre to be readjusted for the proper development of successful teaching practices. The evaluation of the impact of the pilot plan will be made based on both objective (comparative to other groups, schools, and the results obtained in previous years) and subjective data (assessment by participating people). This will be conducted in terms of: satisfaction of the people involved, evaluation of viability, and review of dropout rates and of academic results.

Finally, the project includes the elaboration of support material for teachers who wish to bring about a change for the prevention of ELVET. This material will be elaborated jointly with those involved in the pilot plan and in the different stages of the project, thereby ensuring the closeness of the proposals to classroom reality in secondary vocational training. Teaching staff in BVET and IVET will participate in the project through two routes: on the one hand, as an adviser and expert in teaching; and, on the other hand, as a performer of the proposals in the pilot plan, and in the subsequent gathering of evidence and discussion of results.

3 Results and Conclusions

The results of the project will enable solid, scientifically based evidence to be provided on the prevention of ELVET based on the research, analysis, and development of successful teaching styles and practices that will allow greater engagement between students and teachers. The project design makes it feasible to: identify and analyse the existing knowledge on the issue and create new knowledge on successful practices, teachers' teaching styles, and the procedures and results of the intervention through a pilot plan focused on the prevention of ELVET in Basic and Intermediate Vocational Education and Training.

We understand that the impact of these results at the scientific-technical, social, and economic level nationwide will be relevant with regard to the challenge to which it is intended to contribute, for several reasons:

(a) It addresses one of the central issues of Spanish education, society, and economy: the high rates of ELET and ELVET in a context in which the requirements of personal, social, and economic development have led upper secondary education to be considered the minimum level required to obtain access to employment, to lifelong education and, more globally, to the exercise of citizenship rights.

(b) The transfer of the project results is an element of substantial importance in the development thereof. On the one hand, a proposal will be drawn up for the transfer of the results obtained with the implementation of a pilot plan in two education centres to other vocational education and training centres. On the other hand, the elaboration of a catalogue of tools and successful practices to improve academic performance and prevent ELVET will enable their transfer and dissemination on a larger scale. All of this endorses the use of the results by vocational education and training centres and by the organisations responsible for them (Regional and national education administration), as well as initial and continued teacher training.

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From Training for Companies to Training With Companies: Learning Through Dual VET in Spain

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Abstract

Context: A so named dual VET was implemented as a top-down policy in the school-based VET system in Spain in schoolyear 2013/2014 (Marhuenda-Fluixá, 2015, p. 61). This process was supported by the recently created Spanish Chamber of Commerce and has been fostered by different private groups such as Bertelsmann Foundation and Bankia FPD Foundation, both behind the Spanish Alliance for dual VET. However, there has been no specific empirical research about the impact of dual VET upon learning of students and to what extent it can prove successful.
Approach: In this paper we present results of a research conducted within a cooperative Spanish VET school. We analyse the data on the implementation of dual training in the Higher Vocational Education and Training course in Early Childhood Education and Care. We focus upon tools employed for the assessment, and the criteria applied to gain evidence about the students' performance in the workplace.
Findings: More involvement is needed on the side of the company to identify and register technical and soft competences acquired by the student. Dual VET promotes pedagogical integration of different knowledge areas and the understanding of situations in working life, and students relate better their practical experience to the learning acquired in the VET school.
Conclusions: Dual training can be extremely diverse and complex, and it is not a guarantee of better quality by itself. According to the findings, the scenarios displayed in the workplace during the training and the quality of the information provided by the in-company trainer during the assessment of students are two decisive variables for the success. Simplified training design and evaluation tools are needed to streamline the bureaucracy involved in dual training programs.

Keywords

work-based learning, employers' engagement, higher vocational education

1 Introduction

Dual VET systems in Europe are highly valued and often considered the best option to train and prepare professionals (Kotthoff, 2011), even if they themselves face challenges (Deissinger & Gonon, 2021; Gessler et al., 2021; Sauli, 2021). After the Great Financial Crisis of 2008,

without previously conducting a needs and opportunities analysis (Echeverría, 2016, p. 297), a dual VET system was introduced in Spain as an improvised reaction of the Government. Royal Decree 1529/2012 rules the conditions of apprenticeships *and*[1] introduces a so-called dual VET under different shapes. Together with the Spanish Education Law (LOMCE, 2013) regulate the legal framework[2] to which the 17 Spanish autonomous regions must adapt to provide a quality VET able to respond to the requirements and demands of the different sectors, understanding their specific professional context and adjusting the curricula and the educational offer to every specific geographical area (Pozo-Llorente & Poza-Vilches, 2020, p. 4).

Dual Vocational Training is defined as the set of actions and training initiatives, mixing employment and education, that aim to provide workers with a vocational qualification in a regime of alternance of work in a company and training provided within the framework of vocational education or vocational training (Royal Decree 1529/2012, art. 2).

It is worth pointing to the fact that dual VET in Spain has had the support from the Spanish Chamber of Commerce[3] as well as other private institutions such as Bertelsmann Foundation[4], who promoted the Spanish Alliance for dual VET[5] as well as Bankia Foundation for dual VET[6].

According to the newest data provided by the Ministry of Education and Vocational Education (MEFP), during the schoolyear 2018-2019, students enrolled in all levels of formal vocational education (basic, intermediate, and higher VET) amounted 30% of all students in post-compulsory education. Out of those, hardly a 3.1% were under one of the modalities of dual VET, while all other students in VET still had to conduct their compulsory on-the-company work-based learning module (FCT being its acronym in Spanish and which weight is at least 20% of the VET curriculum). Even if these numbers have considerably increased along the past decade, it still lies behind the OECD average which is 34% (OECD, 2020). Regarding the number of VET schools offering dual modalities of VET, the trend is growing and between one fourth and one third of VET schools have offer that chance[7] even if with huge variations across regions, with the Basque country and Catalonia rating much higher than the rest. There are no data on the number of companies involved in these programs, even though the best-known examples are those of large companies often owned by foreign capital. It is worth since there is a registry of VET schools offering dual VET, as it has little to do with the situation in countries with dual VET systems, where the dual offer is run by the social agents, not the schools. In fact, dual is a choice for individual students but hardly for a group of them, with certain exceptions.

Our attempt in this paper is to present empirical data of the impact of the implementation of dual VET upon students' learning and to what extent it proves successful: how do students in dual VET integrate the learning acquired in the school and in the company? How does the student shape its own vocational identity along this process?

2 Conceptualizing dual VET

There are two features that, despite being different, are usually employed to characterize dual systems: first, alternance between the educational institution and the workplace at the company;

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1 The emphasis is ours, to stress the fact that dual VET and apprenticeships are considered different in Spain, dual not relying upon apprenticeship contracts.

2 This context has been changed in December 2020 by a new Education Law (LOMLOE), still pending of legislative development; as well as there is currently a proposal for a new VET Law as of June 2021. However, none of them are still actively implemented.

3 https://www.camara.es

4 https://www.fundacionbertelsmann.org/es/home/formacion-profesional-dual

5 https://www.alianzafpdual.es

6 https://www.dualizabankia.com

7 https://www.observatoriofp.com/datos-interactivos/porcentaje-de-centros-con-fp-dual-educativa-s-total-centros-de-fp

second, apprenticeship as the labour relation that has the aim to train someone towards a vocational qualification. This is what Euler (2013, p. 30) names the 'dual principle', that facilitates integration of theoretical and practical knowledge in systematic ways and based upon real experience (Pineda et al., 2019, p. 17). We have discussed elsewhere the differences between apprenticeship and alternance and the fact that we can label as dual the training where the apprenticeship contract is lacking (Marhuenda-Fluixá, 2021).

The prestige of dual systems is so high that its implementation in countries with other traditions is often applauded and supported at national level, as well as promoted and favoured by international organizations such as the OECD, the CEDEFOP or the European Alliance for Apprenticeships among others (Gessler et al., 2019; Marhuenda-Fluixá et al., 2019; Rego-Agraso, 2018). However, certain structural elements are required to implement it properly (Eichhorst, 2015; Vila & Chisvert, 2018; Vossiek, 2018). According to Pineda et al. (2019, p. 18), some of the most critical dimensions to implement dual VET in Spain are: the role of the in-company trainer, able to combine training with good technical, professional and pedagogical skills (Alemán, 2015; Euler, 2013); the articulation of expectations and responsibilities of the different actors involved (Euler, 2013); appropriateness of the jobs and apprentices (European Commission, 2013; Valiente, 2016); equilibrium between the standardization (of the curriculum, the organization of training modules, occupational profiles and qualifications) and flexibilization in order to allow dual VET so adapt to different companies, sectors, and to the profiles of the apprentices (Euler, 2013; Chisvert-Tarazona et al., 2021); as well as the common consensus among the different social actors in all regions (Alemán, 2015; Echeverría, 2016).

3 Aim and context of research

The issue around which we focus our attention is on how the competencies most valued by companies are integrated into the curriculum, and how dual training facilitates curricular revision and updating processes engaging schools and companies.

Regarding the context, the curriculum review that we analyse has been carried out in collaboration by the VET school Florida[8], and the company Ninos Gestió Educativa[9]. Florida is a cooperative school located in Catarroja (Valencia, Spain). It was founded in 1977 and offers a wide range of VET courses on five main areas: ICT (8), business (6), engineering (2), education (1), sport (2) and health (1). Ninos is also a cooperative, and it runs a network of 16 nursery schools distributed throughout the Valencian Community. Both cooperatives share a common path, since they are integrated within the Florida Educational Group.

The study that we present is based on a dual training plan designed for the first time in this VET school in 2013 for the students of the Higher VET course in Early Childhood Education and Care. This training course lasts 2000 hours structured in two academic years[10]. It is arranged by the Ministry of Education and Vocational Training, and it is publicly funded.

Dual VET gives the students the opportunity to combine training between the school and the company from the first schoolyear. According to the Royal Decree 1529/2012, the dual training program must have a minimum of 33% of the training hours with the participation of the company. This percentage may be increased depending on the characteristics of each professional module and the participating company.

In full-time training, the student attends a total of 1,560 hours at the school (960 hours in the 1st year + 600 hours in the 2nd year), and at the end of the 2nd year, there is a 400-hour

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8 Florida Centre de Formació, where one of the co-authors works: https://www.floridauniversitaria.es

9 https://www.escolesinfantilsninos.com/es/

10 The Royal Decree 1394/2007, of October 29 approved by the Ministry of Education establishes the title and sets its minimum teachings, which is specified in the Order of July 29, 2009, approved by the Department of Education of the Valencian Autonomous Community.

module of compulsory training in companies (FCT) plus a 40-hour Final Project. However, dual VET students, start training in the company from the first year. The training hours in the company, as we mentioned above, can vary between 33% and 49% of the total hours of the course. For example, in the schoolyear 2013-2015, the dual VET student spent 832 hours in the company (272 hours in the 1st year + 160 in the 2nd year + 400 hours of FCT), which means 41.6% of the total hours of the course, more than double than the classmates who completed full time training at the school.

However, not all students can undertake dual training, and this is due to several reasons. First, the lack of consensus between the government and business organizations during the process of implementation of dual training has led to insufficient supply of internships, and therefore, the schools- and more specifically, teachers perform as sales representatives of dual training, making companies aware of its benefits and trying to attract new places. Secondly, the shortage of tutors to offer adequate support to students. If we analyse the multiplicity of tasks that the school tutor must attend to, we will understand the magnitude and complexity of the work involved.

In Table 1 we present some figures on the students and companies involved in dual training from 2013 to the current academic year.

It is important to mention that until 2016, the course was taught both face-to-face and blended[11].

As shown in Table 1, out of a total of 281 enrolled students from 2013 until present -both face-to-face and blended-, 58 students have participated in dual training programs, which represents 20.6%, much higher than the Spanish average, hardly above 3%; showing the commitment that Florida is taking in this development.

On the other hand, the percentage of students who receive a scholarship from the company is 81%, although it should be noted that this figure has been increasing over time: if we analyse the data from the schoolyear 2016-2018, the percentage is 94.1%, and from 2018-2020 to the present, the number of students in dual training receiving a scholarship[12] is 100%.

Regarding the percentage of completion of dual training, 81% of the students manage to complete it successfully, while 19% do not conclude[13]. In relation to the causes that motivate the request to withdraw from dual training, those students who find a paid job in another company stand out in the first place, with 37.5%. The second cause with 25% is low academic performance, so the school decides that the student returns to the full-time course. Finally, in a minority percentage, we find the request to drop out from the course, and request from company because the student does not accomplish the objectives of the training program.

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11 Even though the number of students in blended learning in dual training is very small (only 4 students), it has been considered convenient to show the data separately, to analyse the information in more detail.

12 Not a proper legal apprenticeship contract.

13 The data for the 2019-2021 schoolyears have not been included to extract the completion and interruption percentages of dual training, because it was interrupted by COVID-19. Data for the year 2020-2022 have not been included either, since completion data are not yet available.

Table 1
Figures for the Dual Training Program. Higher VET Course in Early childhood Education and Care.

Schoolyear	Students enrolled in Classroom-Based Learning (CBL)	Students enrolled in CBL dual VET	Students enrolled in Blended Learning (BL)	Students enrolled in BL dual VET	Total Students enrolled	Students Starting dual VET	Students Completing dual VET	Grant	Companies involved	Ninos' Nursery Schools involved
2013-2015	32	2	12	0	44	2	2	2	2	2
2014-2016	31	13	11	1	42	14	13	5	11	1
2015-2017	32	5	13	3	45	8	7	8	7	4
2016-2018	30	7	10	0	40	7	4	6	6	2
2017-2019	28	5	0	0	28	5	3	4	5	3
2018-2020	27	6	0	0	27	6	5	6	5	2
2019-2021	28	8	0	0	28	8	4	8	7	2
2020-2022	27	8	0	0	27	8		8	7	2
Total	235	54	46	4	281	58	38	47	50	18

Note. Source: Authors

If we analyse the percentage of companies involved in dual training, it is worth highlighting that 36% of them are Ninos' nursery schools, which is a high percentage if we consider that these schools not only participate in dual training programs, but also are active collaborators in the compulsory internship programs, organizing study visits to different nursery schools, workshops, and seminars for the students.

After the approval of the Royal Decree 1529/2012 that rules the implementation of dual training, VET teachers and advisers from the company began a collaborative work. In the meetings held, the following questions were discussed: What skills and abilities should a student have acquired at the end of their training? And, what learning environments can the company facilitate so that the student can develop these skills?

4 Method

This research is conducted within the Higher Education VET course in Early Childhood Education & Care described above.

We developed a questionnaire designed to collect data based upon our analysis of the content of the two legal documents that define the professional profile: the mandatory curriculum[14], and the vocational qualification[15] defined in the National Catalogue of Qualifications (NCQ).

[14] The Royal Decree 1394/2007, of October 29 approved by the Ministry of Education, that rules the title and sets its minimum teachings.

[15] https://incual.educacion.gob.es/servicios_cualificaciones

Royal Decree 1538/2006 rules the general organization of vocational training in the Spanish educational system and defines the structure of vocational training qualifications, based on the NCQ, the guidelines set by the European Union and other aspects of social interest. In the same way, it specifies the professional profile, which will include general competence, professional, personal, and social competences, qualifications and, where appropriate, the units of competence of the NCQ. The NCQ does, however, includes a description of 'other skills' that do not appear in the curriculum description and that the participating company in the context of this research perceived as fundamental for a good professional performance.

The evaluation questionnaire was built based on these 'other skills' and it includes:

a) A classification into 5 categories covering 24 indicators of students' performance on a rating scale from 1 to 5, -including a 'not done' option-, on the following competencies:
   a. basic professional competencies (attendance, punctuality, complying with norms, integrity, order, hygiene)
   b. communication (with children, staff, families, in-company trainer)
   c. teamwork (active participation, responsibility, respect, cooperation, self-evaluation)
   d. initiative (interest to learn, decision taking, autonomy, self-confidence, commitment)
   e. innovation and creativity (research new resources, analyse and look for new ways to improve reality, share the ideas with colleagues, apply some ideas to context)
b) A quantitative measurement in which performance in workplace is ranked 1 to 10.
c) Three qualitative questions to provide more detailed information about the training:
   a. outstanding details on the students' performance
   b. events which may have altered students' performance
   c. suggestions of improvement about the students' learning at school

The questionnaire is filled by in-company trainers and by students, who use it as a self-assessment tool to register their level of achievement for each stage block in the company. Therefore, the questionnaire is used 3 times: at the end of the third term of the 1st year (May), at the end of the first term of the 2nd year, (October), and at the end of the second term, of the 2nd year (February), after the students finish the dual training and before they start the compulsory in-company training (FCT). Data collected from 2 dual training students[16] throughout the 2018-2020 academic year in the three moments of evaluation by the instructor and self-evaluation by the student are presented below.

5 Results and discussion

The main objective of the research has been to verify the correspondence between the data provided by the two informants in order to:

- identify if there is a correlation between quantitative and qualitative information
- compare the results between the data of the student and the instructor to determine if there are coincidences or discrepancies between both evaluations.

Before answering these questions, we must address other overall results: First, the fact that most teachers and students involved in dual VET, did not comply with the assessment documentation, resulting in a lack of registration of information that does not facilitate proper subsequent planning. This is a valuable result itself, and it shows the increasing workload that dual

[16] Despite the huge effort developed by Florida to accurately plan dual VET, the amount of workload caused that only one teacher and two students and their trainers completed all evaluation documentation.

VET implies for teachers and students, also for trainers in the companies, which might be considered as an indicator of the problems of a school-driven dual VET.

Second, the different use made of the planning and assessment tools by teachers, trainers, and students. It is not only the workload of teachers, but also of students engaged in dual VET (also confirmed by the fact that some students returned to full-time VET for dual VET implied a pressure that was leading to insufficient performance). Trainers in companies, furthermore, have not received training nor proper acknowledgement of their function, and therefore they tend to perceive the assessment tools as external workload not part of their role. This neglect, however, must be attributed to the role of companies rather than of trainers themselves.

Third, there is a significative amount of work related to dual VET that is not bureaucratic or managerial but rather pedagogical. Our results indicate that most teachers, even in a committed school, are not properly prepared for this. Students are also not used to this way of addressing their training, and they lack the support of the group for dual VET becomes very individualized. Trainers in the companies, on their side, are often overwhelmed by the pedagogical indications provided by the school and they feel the lack of support of their managers in the companies, for whom dual VET is hardly perceived as an investment.

Fourth, dual VET is however useful beyond the planning conducted by the school. Even without the pedagogical arrangements and demands, dual VET is seen by students as an individual choice that adds pressure but may become an alternative in terms of getting in touch with the labour market, therefore including a differential value.

Fifth, company-school relations are demanding, and the weight of that responsibility relies upon the school, which is a particular feature of dual VET in Spain, making of it a school-driven dual VET, which might be perceived as an oxymoron, for dual VET in Europe is seen as a company-driven arrangement (Gessler, 2017; Moso, 2018).

Sixth, we have not been able to gather information on the impact of dual VET upon performance of students once they are back in their FCT, neither have we been able to collect data on the difference in terms of FCT among full-time students and dual VET students. These data would be relevant in terms of checking the added value of dual VET with regards to FCT, the well-established work experience placement that students enjoyed in VET since the early 1990s.

We now move back to our questions based upon the results of the two students providing full assessment records of their dual VET experience. Table 2 provides a summary of findings about the quantitative information on the scores for each of them.

Our interpretation of these results is the following: First, the workplace experience provided by dual VET is diverse and rich in terms of learning and therefore the results in terms of performance is also reassuring. This, however, must be handled carefully insofar students, teacher and trainers showed a commitment that their mates in other dual VET experiences have not shown.

Second, dual VET itself is not a guarantee of better quality, and the stress laid upon pedagogical arrangements, communication with students and trainers, and the appropriate use of assessment tools both employed as external and self-assessment procedures have been relevant to provide feedback to the students to make the most out of their dual VET experience.

Third, more involvement is needed on the side of the company to identify and register technical and soft competences acquired by the student, even if the companies were already aware of the relevance of such skills in a vocation like nursery care.

Fourth, dual VET promotes pedagogical integration of different knowledge areas and the understanding of situations in working life, and students relate better their practical experience to the learning acquired in the VET school once they are assessed, they conduct their own self-assessment, and they exchange feedback with trainers and teachers.

Table 2.
Quantitative assessment of students' performance in dual VET.

	Student A						Student B					
	1st Term		2nd Term		3rd Term		1st Term		2nd Term		3rd Term	
	Tr	St	Tr	St	Tr	St	Tr	St	Tr	St	Tr	St
Basic skills (T)	30	30	30	30	30	30	30	30	28	30	30	30
Communication (T)	20	20	17	20	20	20	16	18	17	20	20	20
Teamwork (T)	25	25	22	22	24	25	17	23	19	24	25	24
Initiative (T)	25	23	19	19	25	23	17	24	15	19	25	25
Innovation & Creativity (T)	20	18	17	17	20	18	13	16	14	20	20	19
Total	**120**	**116**	**105**	**108**	**119**	**116**	**93**	**111**	**93**	**113**	**120**	**118**
Final mark	**10**	**10**	**9**	**10**	**10**	**10**	**7**	**9**	**9**	**9**	**10**	**9.5**

Note. Source: Authors; (Tr) In-company Trainer; (St) Student

6 Conclusion

Our research indicates that the learning scenarios that occur in dual VET are extremely diverse and complex. We understand that this training modality does not guarantee success itself.

According to the data obtained, we find a series of variables related to how the involvement of the company can influence the learning process. Among these. the quantity and quality of the information provided by the company tutor in the evaluation of students, and the attitude towards co-responsibility in the training of future workers, as well as the diversity in learning scenarios offered to the student.

Similarly, we find the need to design new and simplified tools that allow teachers, trainers, and students to fulfill them and use them in their follow-up sessions, as well as they might allow us to obtain more precise information about the learning process that occurs in students who study dual VET. Simultaneously, the possibility of adding indicators associated to the performance of the technical skills required for the degree is considered. Throughout the training process that takes place in the company, the student receives daily from his manager -tutor or other employees of the company- orientations and feedback on their level of performance of these skills. However, this information is currently not recorded and, therefore, we are unable to provide information nor data in this regard. The will and the effort to register information has been up to now laid by the school and the teachers, but trainers' needs, context and conditions should be considered to make tools usable.

Concerning the integration of knowledge by students, the results indicate that dual VET favors the globalization of the different areas of knowledge and the understanding of problems and situations that usually occur in the workplace. Whether this is the way to address school-company cooperation in the country is yet to be seen.

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Inside TVET: Challenges and Needs for TVET in South Africa – Cape-VET Vol. 1

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Abstract

Context: In South Africa's current technical vocational education and training (TVET) system, local research, though dedicated, reflects not only a need to improve professional practices at the country's TVET colleges, but also the potential to expand cooperation throughout the TVET sector to meet the demands of the labour market (Needham, 2019). In response, the current challenges and needs facing TVET lecturers have to be identified in order to strengthen TVET and to design study programmes for the long term. This contribution reflects the current status of the research project "Capacity Building for VET in South Africa (CAPE-VET)" funded by the German Bundesministerium für Bildung und Forschung (BMBF; German Federal Ministry of Education and Research).
Method: The binational, multidisciplinary team from South Africa's Centre for Community Engagement and Work-Integrated Learning (WIL) at the Cape Peninsula University of Technology (CPUT) and from Germany's Institute of Vocational Education, Work and Technology (biat) at the Europe University of Flensburg (EUF), examines the TVET sector in South Africa. Due to the COVID-19 pandemic, however, it became impossible to execute the originally planned method: which was to accompany TVET lecturers to conduct situational participatory observations of their authentic work life. As an alternative, the method was adapted to allow the team members to meet and collaborate with TVET lecturers in online colloquia to explore their personal perspectives as part of a qualitative, esteem-oriented participatory approach to characterizing current challenges and needs based on insights of the TVET staff, especially during the COVID19-pandemic (Becker & Spöttl, 2008; Bless et al., 2006; Kawulich, 2005; Marshall & Rossman, 1989).
Findings: The current situation in education, including in the TVET colleges in the Western Cape (WC), calls upon practitioners and leaders to act with resilience and innovation in the provision of teaching and learning in order to reach their students. The motivation and willingness to teach and learn are present amongst teachers and students. This in direct contrast to the challenge of inequitable access and lack of decentralized online teaching and learning, and the lack of internet, communication devices and adequate data for lecturers and students.
Conclusions: The findings of the research will contribute to the formulation of recommendations for the collaborative development and design of an appropriate sustainable model for the professionalisation of the TVET lecturer education, as a key activity of the CAPE-VET project.

Keywords

international cooperative and participative VET research, professionalisation of TVET lecturers in South Africa, teaching and learning in times of the Covid19-pandemic

1 Introduction

In South Africa's (SA) National Development Plan (NDP) 2030 vocational schools: Tertiary Vocational Education and Training (TVET) colleges (formerly known as FTE Colleges: Further Education and Training Colleges) are seen as an important continuing *"key driver of change"* in addressing the country's skills shortage and are recommended as a focus of immediate measures to improve quality and innovation (RSA 2012, p.31, 143, 399). The research activities of the project CAPE-VET, *Capacity building for VET in South Africa. Cooperative investigation of the prerequisites for a successful design of qualification programs for vocational teachers* (BMBF, 2021), are aimed at improving structures for the qualification and professionalization of vocational training staff in South Africa. In terms of partnerships, the research is a collaborative process with partners from the Western Cape (WC) Province in South Africa and northern Germany. The partners consist of the Service-Learning and Civic Engagement Unit, Centre for Community Engagement and Work Integrated Learning at the Cape Peninsula University of Technology (CPUT, SA), the Institute of Vocational Education, Work and Technology (biat, Berufsbildungsinstitut Arbeit und Technik at the Europa-Universität Flensburg; EUF, GER), and the German Universities of Applied Sciences in Flensburg (HSFL) and Wismar (HSW). Jacqueline Scheepers (CPUT) and Jonas Gebhardt (biat @ EUF), the CAPE-VET researchers, focus their investigations on gathering data on the meso-level of the TVET sector, especially on the current demands and challenges of TVET colleges and their practitioners in the Western Cape Province (WC). This paper discusses the results of different methodological instruments accompanied by the observations of their investigations, as well as the first insights of outcomes that are still in progress and which are impacted by the pandemic.

The aim of CAPE-VET project is to conduct a binational cooperative investigation of country-specific requirements for the establishment of a university qualification programme for lecturers in vocational education (CAPE-VET, 2020). This process is based on the data gathered and interpreted from the authentic insights from TVET lecturers, leaders and industry stakeholders and includes the transfer of adaptable elements from the German vocational training system. A binational and transdisciplinary lens of the South African-German research group enhances the scope of the study. Building a functioning vocational training sector capable of absorbing millions of unemployed youth, and equipping them with the skills that the economy urgently needs, is still a major challenge in South Africa. The actual unemployment rate of the 15-24-year-old band is 63.3% (see Figure 1). 32.4% of these unemployed youth aged 15-24 are neither in employment, education nor training (NEET rate, see Figure 2). In conjunction with this NEET rate, the labour market rates of the 1st quartal of 2021 describe a difficult situation for the youth.

In addition, the challenges brought on by the COVID-19 pandemic in the TVET sector were brought to the fore. Despite these challenges, the professionalisation of TVET lecturers remains a central focus of the study. In the long term, the CAPE-VET consortium intends to expand on knowledge transfer and the transfer of research results to educational and economic partners in the sub-Saharan region, for example, TVET colleges, industry partners and/or universities. Professionalisation of the TVET sector needs to become a more popular topic, as well as the demand of participative democratic collaboration in research networks for a successful international vocational training cooperation.

Figure 1
Labour market rates by age group in South Africa

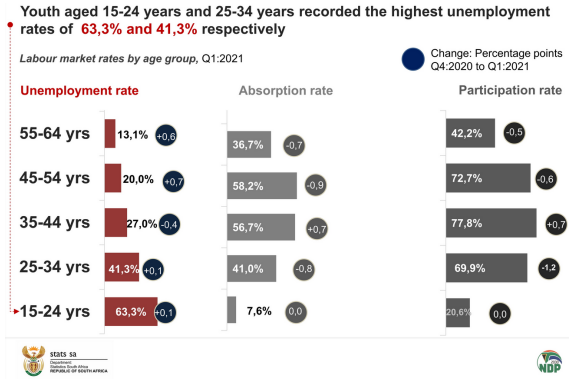
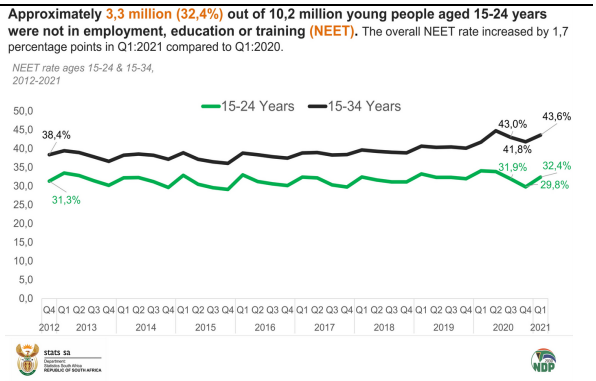


Figure 2
NEET rate (RSA, 01. June 2021)

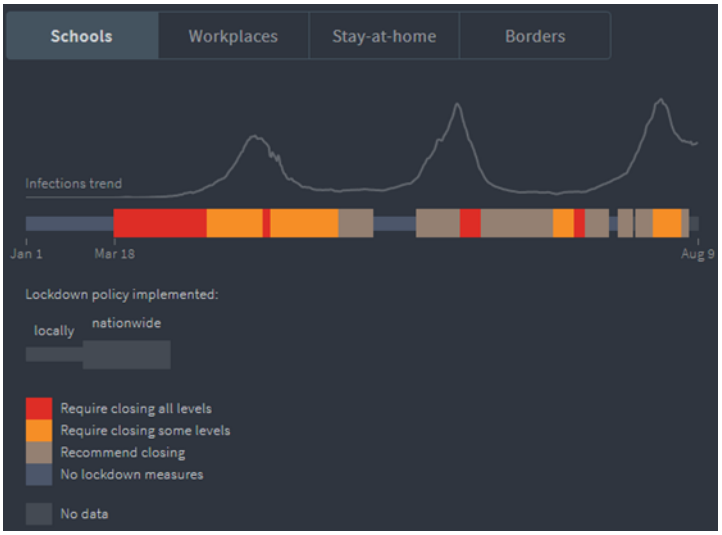


2 Methodology and Current Situation

CAPE-VET follows a situational, participative and adaptive research approach on three levels: i) At a micro level, empirical surveys are conducted in companies using vocational science methods to analyse and critically evaluate factors for successful vocational training cooperation; ii) At the meso level, TVET colleges, colleges and universities are involved in the research activities; and iii) At a macro level where political, social and economic influencing factors shape vocational training cooperation which are also analysed in the project.

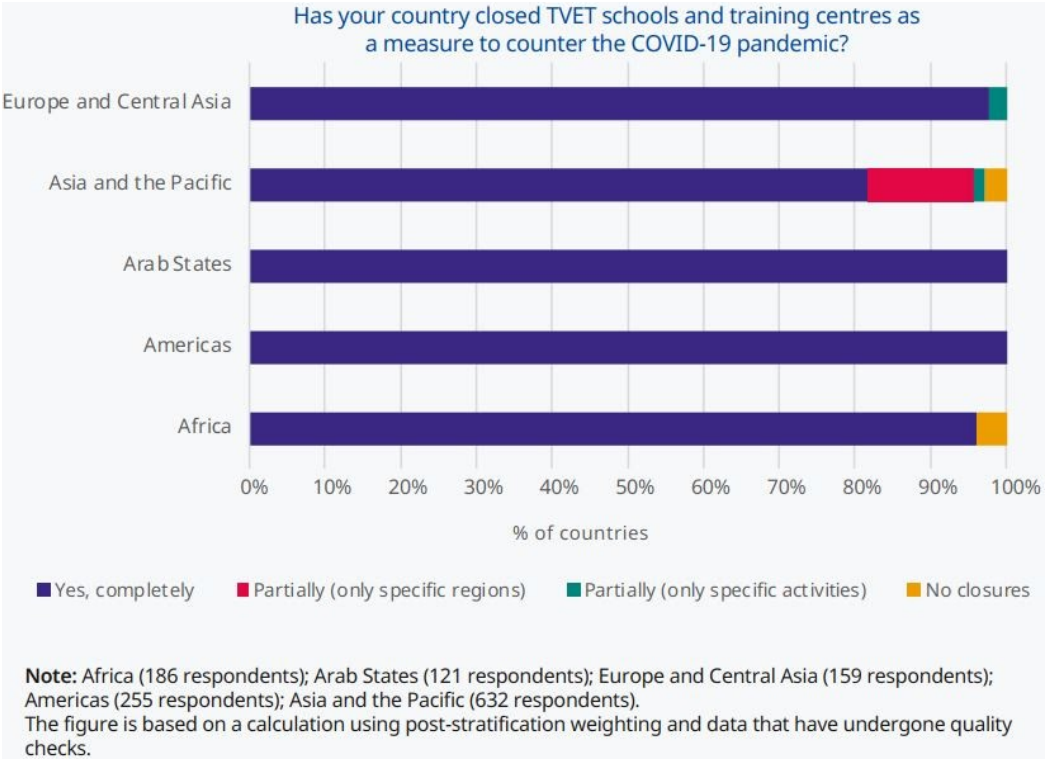
It was planned to use the vocational educational research method such as qualitative situated-participative observation studies in the authentic environment of teaching and learning situations in the everyday work at TVET colleges and with network partners to gather different practitioner perspectives through dialogue to enrich the data (Becker & Spöttl, 2008; Bless et al., 2006; Kawulich, 2005). These participating observations in the practice should then result in a triangulation of perspectives (Flick, 2015) by enabling direct insight of demands and challenges of the TVET-staff. These surveys should, if possible, be carried out in an everyday and authentic environment and to gain acceptance, within the situational, participative and adaptive research approach of CAPE-VET. These qualitative empirical instruments are a benefit to any international project. The interests of the local actors, for example, in the WC region, play an important role in the future implementation, in the establishment of a community of practice and for the design recommendation of a VET-study programme at the CPUT. The instruments origin is in the observation of skilled workers and in the exploration their skills and competences in the process of performing their work. The term “ownership” describes the basic prerequisites such as interest, commitment and shared responsibility. With this cooperative investigation with the South African project partner, ownership is shared and lived. By integrating a joint capacity building approach, it is already clear that much initiative is taken for changes in practices. The figure 3 explains the current situation of lockdown level in South Africa.

Figure 3
Lockdown Measures School System in South Africa, (REUTERS, 10. August 2021)



Due to the COVID-19 pandemic and lockdown-restrictions (closing of educational institutions in the whole country and worldwide, see Figure 1 and 2), it became impossible to execute the originally planned method to travel to South Africa to accompany TVET lecturers to conduct situational participatory observations of their authentic work life. Figure 4 shows the closure of TVET institutions around the world.

Figure 4
TVET schools closing in the pandemic (UNESCO, 2021, p. 8)



As an alternative, the research method was adapted to allow the team members to meet TVET practitioners in online colloquia. In these dialogical spaces team members could explore their personal perspectives as part of a qualitative group discussion, esteem-oriented participatory approach and to characterize current challenges and needs based on the insights of the TVET staff. TVET-Leaders, lecturers, CPUT-staff and representatives of the Department of Higher Education and Training (DHET) participated in these digital colloquia of CAPE-VET, which are ongoing. The pandemic will thus also become an intensifying gauge of the resilience of the TVET system to reach their students even in a lockdown situation through resistant ways of learning and teaching. Of significance is the preparation of lecturers, their professional competences and existing infrastructure in the TVET colleges.

The higher education sector and thus the TVET sector and its employees have currently been prioritized for vaccination, including TVET colleges from the WC region (e.g., False Bay College). A vaccination centre has also been set up on the CPUT campus. The Minister of Higher Education, Science and Innovation, Dr Blade Nzimande's statements on the Covid 19 vaccination roll out plan for the post school education and training sector are provided below:

> [...] We will also utilize the capacity of our public facilities to provide vaccination services to other eligible sections of the wider community, working in close consultation with the National Department of Health.
>
> I have already visited some of our vaccination centres in our PSET institutions, including CPUT, UP and Mthashane TVET College.
>
> [...] The vaccination of PSET staff of 35 years of age and above – comprising approximately 70% of all staff in our sector – will formally commence tomorrow, Saturday, 24th July and should be completed within a month. So tomorrow (24. July 2021), some of our colleges and universities, such as the staff of False Bay TVET College at a site in Woodstock, South West Gauteng TVET College at a site in Roodeport, Tshwane North TVET College at a site in Centurion, University of Johannesburg at a site in Midrand will commence vaccinations simultaneously.
> This will cover over 120 000 staff from universities, TVETs and CET colleges in the next 2-3 weeks. [...].(RSA 23. June 2021).

As of July 29, 2021, less than 5% of South Africans were fully vaccinated. An increase in the number of fully vaccinated citizens could allow safer access and a resumption of teaching and learning activities to the TVET college campuses. This would enable the team to return to the proposed methodology, provided that no support is provided for online teaching is possible.

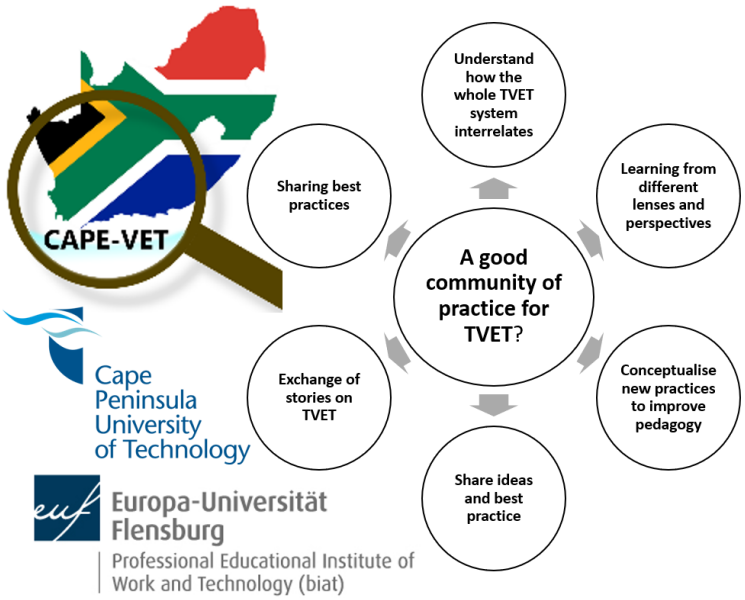
3 Preliminary Findings

Much has been articulated on the challenges prevalent in the TVET sector, including in the professionalization of TVT lecturers. Blom (2016:6) suggests that even if there is an acknowledgement that TVET pedagogy should follow a different approach, where applicable, TVET lecturers should access diverse approaches that can be adapted to meet with the changes in subject content, learner needs and rapidly changing understanding of work. Gamble (2009: 3) notes that vocational pedagogy needs: …a mix of different forms of knowledge, drawn from both non-empirical (conceptual) and empirical (situated in everyday life) domains, for the curriculum to enable both knowledge progression and occupational progression.

The tentative results of the recent engagements with TVET college lecturers and principals, university staff and governmental representatives, indicate that although many challenges exist, there is also evidence of creative strategies being implemented.

a) In the initial workshop lecturers were introduced to the research project CAPE-VET and were requested to respond to the question: ***What are your hopes for a good community of practice for TVET?*** as illustrated in Figure 5 below.

Figure 5
Characteristics of a good community of practice for TVET in WC



The positive response to the formulation of the TVET community of practice indicated the willingness of the TVET lecturers to embrace opportunities to share their experiences and learn from one another. Lecturers recognised the value of reflecting on their practices in order to improve on their teaching. There was also a realisation that they were a diverse group and that their experiences and contexts differed.

b) The second task given to TVET lecturers was to describe: ***A day in the life of a TVET lecturer in SA.*** The daily realities of teaching at a TVET college in SA were expressed by the lecturers in the workshop as articulated below:

- One participant observed that the "pandemic just exacerbated existing inequalities" which became worst when the pandemic hit SA. For example, many students had "no data and laptops before COVID 19". According to one lecturer, "It is not the lecturers but the students who have no access to IT/laptops/Internet". An observation was made that "students with cell phones can download data from the college URL". Another lecturer acknowledged that "there is Moodle, but not all students and lecturers have entry to such blended learning approaches". Rural colleges in particular stressed their lack of resources (teaching and learning, ICT, and so on). The comment: "Virtual teaching is a challenge as the lecturer cannot reach out to all students – some of them are introverts" indicates that not all students engage during online lectures. In addition, colleges posted "paper-based learning material"

to students to ensure that those with no access and no devices could still continue with their studies.

- Another lecturer observed that many students were “from rural areas” and therefore this affected their attendance. “During the COVID-19 Pandemic, only 50% of students attended campus as rural students have other challenges”. Travelling to and from college remains a constant challenge for students. “Many students are young mothers” which means that when the schools are closed and their children are kept at home, these students are unable to leave their children to attend college.
- Some colleges noticed the “hunger of students (challenge to find food and clothes)” and that some “lecturers use their private money to help students”. There was an observation that “lecturers and students are stressed and tired” and as a result of the staggered lectures approach during the pandemic “lecturers are doing double lessons“.
- The responses to this topic were diverse and contextual. In addition, the feedback from lecturers on this topic was framed mostly within the context of the pandemic.

c) For the third task, lecturers were asked to: ***Characterise the ideal skills and qualifications required by TVET lecturers in 2021.*** The following observations were made:

- What is basically needed is a "spirit of wanting to learn" in relation to "new" digital ways of teaching;
- Get the college to a blended learning system;
- For a sustainable future, we have to move forward and not stay on a paper-based model of learning;
- It is hard to think out of the box ... almost a resistance to the new - even before the pandemic;
- Internet-access should be a human right;
- We are talking about the 4th industrial revolution, […] we need to have standards;
- Need soft skills for future lecturers (it is not only about technology), it is about communication and connection/ inter-disciplinary and the understanding of contexts;
- to effect positive delivery by lecturers and students;
- Adaptability is an important skill for a lecturer because we often need to hit the ground running and deliver curriculum and administrative duties, policy and budget changes […]

The current research results of the CAPE-VET project allow the authentic statements of the TVET lecturer to be seamlessly integrated into the current VET/TVET investigation of the World Bank Group, the International Labor Office and the United Nations Educational, Scientific and Cultural Organization on skills development in the Time of COVID-19. In the report with over 1353 individuals from over 126 countries, the findings about the current challenges of the VET/TVET sector are reported heterogeneously, but with big disruption of teaching and learning (UNEVOC 2021). The current situation in education, including in the TVET colleges in the WC, calls upon practitioners and leaders to act with resilience and innovation and in the provision of teaching and learning to reach their students. The motivation and willingness to teach and learn are present amongst teachers and students. This in direct contrast to the challenge of inequitable access and lack of decentralized online teaching and learning, and the lack of internet access, communication devices and adequate data for lecturers and students. What is recommended is the collaborative development and design of an appropriate sustainable model for the professionalisation of the TVET lecturer education, as a key activity of the CAPE-VET project.

4 Outlook

This paper is just a precursor to a more in-depth analysis of the professionalization of TVET college lecturers. An article in the Sowetan on 14 February 2019 with the headline: **TVET colleges need serious attention from government** highlights the labour struggle of TVET lecturers. Stanley Ncobela, an economics lecturer reports that there was an undertaking from the National Education, Health and Allied Worker's Union to engage in industrial action regarding i) the unmoving salaries and benefits of lecturers from TVET colleges; ii) the incorrect scale for salaries that was used by the DHET; iii) non-compliance of Labour Relations Act section 198B(8)(a) relating to qualified contract workers; iv) the transfer of all paid college staff to the department and v) a new staff salary dispensation. Ncobela (2019) further brings into question whether the national government is able to navigate the college system in order to meet the 2030 objectives of the white paper for post-school education and training by 2030. Some further issues and concerns raised by Ncobela (2019) in the article are:

- the college system is not co-ordinated and therefore it appears that it operates separately from the wider higher education system;
- although progress has been made there is a need to build and grow the TVET college system to become more effective and integrated;
- developmental needs of the colleges should be flagged so that TVET colleges could be strengthened in line with international standards;
- the development of college lecturers through programmes will lead to their improved capacity, status in the sector and in relation to their livelihoods;
- the slow of pace of the professional development programmes is affecting the college lecturers; and
- the transformation of salaries has not been addressed.

A quotation from Professor Ronel Blom's research paper (2016) where she identifies the main barriers in colleges, is quoted in the article: "It has emerged that current conditions of service and the casualisation of work in general have had a major impact on TVET lecturers' motivation to learn and to update their skills to meet the additional demands." In addition, TVET teachers' "perceived low status and the lack of a professional identity, compounded by apathy of institutional managers and restrictive funding regimes, seem to exacerbate the situation" (2016). There is a need for lecturers to be supported and well-resourced states Blom (2016) as this will have appositive impact on their motivation which in turn will lead to more efficient and effective governance.

TVET colleges, traditional universities and universities of technology should continue to form collaborations and communities of practice to develop and strengthen the teaching in TVET colleges for a multi-perspective design of study-programmes for the professionalisation of TVET lecturers. In order to do so effectively, the DHET should continue to provide support for the development of training and capacity building programmes. Continuing research, by using such perspective exploring research-instruments in the field and the strengthening of regional, national and international partnerships in this respect should yield results which can guide and inform this sector, by additionally collecting the views and opinions of the current TVET practitioners and incorporating them into design recommendations for TVET study programs, in the sense of a participatory, comprehensible approach of international VET-research. This can be made possible through access to funding streams both locally and globally.

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Research on the Internationalization of Vocational Education and Training: Current State and Future Perspectives

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Abstract

Context: Vocational education and training (VET) is a key driver of the development of educational, social, and economic policy and practice. To date, however, systematic knowledge about VET models and approaches, which differ widely between nations and cultures, remains limited yet highly diverse, as can be observed in the fragmentation of research frameworks from different disciplines. Against this background, this paper provides an overview of the current state of research on the internationalization of VET in German-speaking areas. A major part of the study was conducted in the context of the funding program "Research for the Internationalization of Vocational Education and Training," established by the German Ministry of Education and Research, which aims to improve national and international VET by implementing a systematically connected, (inter)national research network for the field.
Methods: To systematize the current state of research, we have differentiated major thematic fields therein. Our methods included a systematic review of literature in these fields, the documentary analysis and structured content analysis of relevant research projects.

Findings: This paper focuses on selected research fields, discusses major ongoing research activities in German-speaking countries, and identifies promising directions and implications for future research both nationally and internationally.
Conclusions: To gain a comprehensive understanding and to promote further development of research on the internationalization of VET, further expansion of knowledge and integration of different disciplines and actors are needed. This requires a long-term and systemic research vision and the establishment of a multidisciplinary research community at the national as well as the international level.

Keywords

vocational Education and Training, VET, internationalization, research review, documentary analysis, content analysis, Germany

1 Introduction

Vocational education and training (VET) is a key driver of the development of educational, social, and economic policy and practice. In recent times, VET has seen an increase in attention all around the world (OECD, 2014). We use the term 'VET' to refer to the highly diverse field of (technical and) vocational education and training, which covers all types of education and training with a clear relevance for employment and the labor market. Nationally and internationally, there is a great demand not only for expertise in VET but also for the sustainable and effective development of VET structures (McGrath et al., 2019). To date, however, systematic and comparative research about models and approaches in VET, which differ widely between nations and cultures, remains limited yet highly diverse (Evans, 2020; Pilz & Li, 2020). In particular, numerous studies and reports address the field from a national or regional perspective, as can be observed in the fragmentation of research and various frameworks from different domains and disciplines (Evans, 2020; Lauterbach & Mitter, 1998; Pilz & Li, 2020). Given the importance of VET, a more systematic understanding of the current state and future perspectives on the internationalization of VET is required.

In Germany, the importance of international cooperation in VET has been well recognized in recent years, especially with the new funding initiative "Research for the Internationalization of Vocational Education and Training" (Internationalisierung der Berufsbildungsforschung (IBBF)), established by the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung (BMBF)). The aim of the initiative is threefold: (1) strengthening the expertise of universities and other institutions in the research on international vocational training projects and the training of academic vocational training staff; (2) integrating that expertise more closely into the BMBF's international vocational training cooperation; and (3) making the research outcomes accessible to foreign partners to promote a shift toward more practice-oriented VET, in both its initial and continuing forms (BMBF, 2017). This program currently includes eleven international projects with partners in Europe, Central America, South Africa, and Asia, and a "Metaproject on Research for the Internationalization of Vocational Education and Training" (MP-INVET). Although the funding period of these research projects is limited to three or four years, the metaproject aims to improve national and international VET by implementing a systematically connected, (inter)national research network to improve the cross-national connectivity of the new research initiative in the long term.

Though the term 'internationalization' spans a broad range of activities, in this study, we refer mostly to research in VET that covers international perspectives and projects with international partners in VET. Against this background and based on the ongoing funding initiative, the study presented here focuses on major fields in research on internationalization of VET in German-speaking countries, discusses ongoing research projects, and identifies promising

directions and implications for future research and network-oriented activities, both nationally and internationally.

2 Methods

The purpose of the study is to examine the current state of and prospects for research on the internationalization of VET in the context of the German funding initiative "Research on the Internationalization of Vocational Education and Training." The study methods include a literature review, a documentary analysis, and a structured content analysis - all focused on eleven research projects. To systematize the current state of research, we conducted a literature review of research on the internationalization of VET and differentiated six major research fields therein: (1) international cooperation and development in VET, (2) international (policy) transfer in VET, (3) European cooperation and governance in VET, (4) VET in the context of service-focused research, (5) VET in the context of corporate research, and (6) research on networks in VET (for details, see Gessler et al., 2020, p. 8f.). We subsequently used this categorization to classify the eleven projects chosen for this study. To that end, a structured content analysis of these projects was undertaken to interrelate and aggregate their focal research themes. In addition, political and working documents addressing strategic and program-related approaches to internalizing VET were analyzed and implications as well as future directions for network activities within the initiative were identified.

3 Results

3.1 Research on the Internationalization of VET

Research on the internationalization of VET can be characterized as diverse, broad, and complex, involving numerous strands and focuses, various conceptual and methodological approaches, and different actors and structural elements (Evans, 2020; Lauterbach & Mitter, 1998; Pilz & Li, 2020). Despite its high relevance to researchers, policymakers, and practitioners in Germany, however, neither a unified conceptualization nor a unified understanding of internationalization of VET exists to date. In this paper, we understand internationalization as follows:

> A series of international activities such as […] mobility for students and teachers; international linkages, partnerships, and projects; and new, international academic programs and research initiatives. For others, it means the delivery of education to other countries through new types of arrangements such as branch campuses or franchises using a variety of face-to-face and distance techniques. To many, it means the inclusion of an international, intercultural, and/or a global dimension into the curriculum and teaching learning process. Still others see international development projects and, alternatively, the increasing emphasis on trade in […] education as internationalization. Finally, there is frequent confusion as to the relationship of internationalization with globalization. (Knight 2004, p. 5f.)

Although this definition spans a broad range of activities, we refer mostly to research in VET that cover international perspectives and projects with international partners in VET.

Regarding specific topics from a German perspective, research on VET has focused primarily on the transfer and transferability of initial VET, the so-termed dual apprenticeship model, as well as on so-called "training-on-the-job" approaches, whereas hybrid qualifications with university and vocational components (Ebner, 2013; Euler, 2013; Deissinger, 2015) have only recently received attention (Fromberger, 2019; Graf et al., 2014). Overall, the state of research on internationalization of VET in the German-speaking areas can be systematized into six main fields, some of which extend well beyond VET (Gessler et al., 2020):

(a) *International cooperation and development in VET* (i.e., "development studies") focuses on capacity building in initial and continuing VET as a subfield of development studies (Clement, 2012). Research and recommendations for action refer to the modalities of international VET cooperation and its underlying (political) strategies (Arnold, 1989; Stockmann & Resch, 1992; Greinert et al., 1997; Georg, 2006), their trends and transformations (Stockmann, 1997; Wallenborn, 2006; Arnold, 2006), and their effectiveness (Stockmann, 1996; Stockmann & Silvestrini, 2013).

(b) *International transfer in VET* (i.e., "transfer studies") focuses on questions surrounding the transfer of (German) VET (dual) systems and/or elements to other countries (Baumann et al., 2020; Euler & Wieland, 2015; Deissinger, 2015). Some approaches draw on political science findings subsumed under policy transfer (Bohlinger, 2018; Barabasch & Wolf, 2009, 2010, 2012).

(c) *European cooperation and governance in VET* (i.e., "European studies") focuses primarily on European cooperation and, more recently, on questions regarding multilevel governance in the European Union (Bohlinger, 2015; Bohlinger & Wolf, 2016; Rasmussen, 2014; Milana & Klatt, 2019).

(d) *VET in the context of service research* (i.e., "service studies") focuses on questions of service development, provision, and distribution, and the promotion of international business relations (Fraunhofer MOEZ, 2012; Kühn, 2021; Muylkens, 2013; Heusinger, 2014; Jonda & Heusinger, 2016). The German providers' initiatives, including "iMove: International Marketing of Vocational Education and Training" launched in 2001 and "Vocational Training Export" launched in 2008, represent the area.

(e) *VET in the context of corporate research* (i.e., "corporate studies") focuses on shifts in production, services, and human resources across countries and regions for entry into new markets and development of new approaches to vocational training in companies (Fuchs et al., 2016; Gessler, 2017; Holle, 2019; Peters, 2019; Pilz & Li, 2014; Pilz & Wiemann, 2020).

(f) *Research on networks in VET* (i.e., "network studies") focuses on social networks in general (e.g., Castells, 1990, 2006) or on the conditions for successful regional (vocational) education and training cooperation (e.g., Buschfeld et al., 2016; Payer, 2008; Schröder, 2019).

Albeit overlapping and incomplete to some extent, this classification is useful for structuring, systematically discussing, and consolidating the numerous ongoing research activities in the context of VET and for identifying promising directions for development. The research areas presented can also be understood as a categorization framework of the eleven research projects, as described in the next section.

3.2 Research for the Internationalization of VET in the Context of the IBBF Funding Program

The "Research for the Internationalization of Vocational Education and Training" is one of the most important research initiatives in Germany, covering a wide range of topics, as illustrated in Table 1. The initiative upholds three funding priorities (BMBF, 2017): (A) current issues in VET research in the context of VET cooperation, (B) research on the prerequisites for successful VET cooperation in countries with existing BMBF cooperation in VET and in other countries and regions, and (C) the development of joint pilot measures for capacity building in VET research in the BMBF's partner countries.

Table 1
Research projects and funding priorities (Gessler et al, 2020, p. 12)

Acronym and project title	Location(s)	Institution(s)	Duration	Funding priority
CAPE-VET: Cooperative Investigation of the Prerequisites for the Successful Design of Higher Education Qualification Programs for Vocational Training Staff	South Africa	Europa University of Flensburg, Flensburg University of Applied Science	2019–2022	B
CodeVET: Competence Development in VET: A Comparative Analysis of Intended and Implemented Curricula in the Field of Business Administration	China, Russia	University of Cologne, University of Osnabrück	2019–2022	A
CoRi VET: Costa Rican Vocational Education and Training	Costa Rica	University of Osnabrüc	2021–2025	C
DualReg: Locally Rooted– Worldwide Linked Up: Mexico–Success Conditions for Transfer of Vocational Education and Dual Practices	Mexico	University of Cologne	2019–2022	B
efach: Factors for Successful Cooperation in Vocational Training with People's Republic of China: A Comparison of State, Civil Society and Private Sector Concepts	China	Saarland University	2019–2022	B
IntVET: Success Factors of International Business Models for the Export of Vocational Training to Vietnam	Vietnam	Leipzig University	2019–2022	B
KuPraMex: Cultural Practice of Non-Academic Work in Mexico	Mexico	University of Kassel	2019–2022	B
PeruDual: In-Company Training Quality and Role of Trainers in Dual VET in Peru	Peru	Technical University of Dortmund	2019–2021	B
ProWoThai: Progressing Work-Based Learning of TVET System in Thailand	Thailand	Technical University of Dortmund	2019–2023	C
QualIndia: Quality Analysis of Indian Vocational Education and Training Institutions with a Focus on Industrial Training Institutes and Polytechnic Colleges	India	University of Cologne	2019–2022	A
VoCasian: Development of Capacities and Graduate Schools as well as the Implementation of a PhD Program for Vocational Education and Training Research in Georgia	Georgia	Otto von Guericke University Magdeburg	2020–2023	C

Table 2, presenting the focal fields of the eleven research projects, shows that the major research fields in this area are reflected in the IBBF initiative, with the exception of European studies. However, the projects mostly focus on development studies, which need to be subdivided further. For example, CodeVET implements international comparative research on curricula at the level of teaching, whereas QualIndia addresses organizational development processes, with a focus on industrial training institutions and polytechnic colleges. KuPraMex, by comparison, focuses on the societal/cultural aspect and examines the 'cultural artifacts' of non-academic work. Therefore, the development studies comprise a broad range of specific research questions: e.g., KuPraMex focuses on the macro level and examines not only the usual political or economic factors but also sociocultural conditions; CodeVET focuses on the "black box" of

teaching and learning activities at the micro level. Similar to development studies, transfer studies usually occur in connection to other fields (e.g., development studies or corporate studies; for examples, see e.g., CAPE-VET, CoRi VET, efach, PeruDual, QualIndia, VoCasian, ProWoThai). Finally, service studies and network studies are represented by only one project each: IntVET and DualReg, respectively. Overall, the projects in the IBBF program are characterized by a variety of approaches and disciplines, all to seek out the most promising avenues of research advancement.

Table 2
Research focuses of the 11 projects. X = main focus; (X) = side aspect (Gessler et al., 2020, p. 13)

Project	Research focus				
	Development studies	Transfer studies	Service studies	Corporate Studies	Network studies
CAPE-VET	(X)	X			
CodeVET	X				
CoRi VET	X	(X)			
DualReg		(X)			X
efach	X	(X)			
IntVET			X		
KuPraMex	X				
PeruDual		(X)		X	
ProWoThai		(X)		X	
QualIndia	X	(X)			
VoCasian	X	(X)			

4 Conclusion and Future Perspectives: Towards Integrated Research and Knowledge Transfer

In its current state, research on the internationalization of VET is often conducted in a disciplinary manner with corresponding delimitations, exclusions, and confinements. Overall, the VET research is marked by fragmentation in the research landscape. At the same time, the research community focusing on international VET, is multidisciplinary. The considerable diversity and intersection of different domains often leads to getting "Lost in VET" (Wiemann et al., 2019; Pilz & Li, 2020) but also offers possibilities for open dialogue and development of the field (Evans, 2020). To support further research development, an interdisciplinary research network has been established as the focus of the research meta-project MP-INVET. The goals of developing and maintaining a research network therefore, are focused on systematically consolidating and integrating the various disciplinary approaches around VET to overcome the research fragmentation. Therefore, the overarching question of MP-INVET's networking perspective is: how can we enable interdisciplinarity and integration of different perspectives in the research on the internationalization of VET? Furthermore, the internationalization of VET as a research topic is characterized not only by diversity in disciplines and approaches but also by social, institutional, and temporal complexity. It therefore becomes a so-termed "wicked problem" (Coyne, 2005): a complex, partly contradictory dilemma that cannot be solved or overcome by the research system alone. Instead, it requires a transdisciplinary approach involving other (non-research-related) actors, including VET providers and institutions. The second overarching question of MP-INVET's network is therefore: how can transdisciplinary be used to integrate and transfer current knowledge from different domains and actors?

In answering both questions, it is important to identify the connections between the numerous approaches, theories, and best-practice models that exist in the national and international context to make them specifically connectable and transferable for international VET

cooperation and to integrate and consolidate them in the form of an inter- and transdisciplinary research network. The IBBF funding initiative has initially served to improve and expand institutionalized research on the internationalization of VET as a core principle of cooperation in international VET. With that objective, however, this initiative simultaneously focuses on strengthening research on the internationalization of VET in German-speaking countries in two ways: by promoting project-based work and by establishing a cross-program research community at the national and international levels in the long term.

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The Role of Research Partners in Funded Model Projects in the Context of the Internationalisation of VET: Research Partners as Promoters

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Abstract

Context: The programme, Internationalisation of Vocational Education and Training (IBB), launched in 2017 and funded by the German Ministry of Education and Research (BMBF), supports projects of German vocational education and training (VET) providers that focus on the needs, developments and testing of innovative, sustainable VET programmes as well as implementation perspectives abroad. Two characteristics of IBB are scientific monitoring at the programme level and a scientific accompanying research partner[1] at the project level. It is assumed that innovative projects have a better chance of succeeding if the project actors take on promoter roles. It is assumed that research partners also act as promoters and that the respective roles have been clarified and defined at the beginning of the project.
Approach: Based on the promoter model, the first step is to use descriptive quantitative data to show whether there is role clarity in the projects by analysing the self-perceptions and external perceptions of the research partners. In a second step, a review of selected studies on the role of scientific accompanying research and research partners is given. In the third step, the findings from the first two steps are deepened. Qualitative data are used to determine the extent to which the roles were clarified at the beginning of the projects and to identify which promoter roles the research partners assume from their perspective and how these partners arrange these roles.
Findings: Every project needs a good foundation upon which to build a mutual understanding for good cooperation. Our research has shown that role clarification occurred at the beginning of the projects. However, from the research partners' perspectives, the mutual expectations were not sufficiently clarified; consequently, there is role ambiguity in individual projects at the beginning of the project. The research partners in IBB support the projects primarily as process, technical and relationship promoters.
Conclusion: There is a need for a longer clarification process of the respective roles of the individual project partners at the beginning of a project. Research partners primarily contribute to knowledge development, process development and network development.

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1 The funding body BMBF refers to this role in its programme announcement as *Studienpartner* (study partner). A common equivalent concept for the tasks indicated is *Wissenschaftliche Begleitforschung* (scientific accompanying research). We therefore use the term *scientific accompanying research partner* or simply *research partner.*

Keywords

VET, model projects, research partners, promoters, role clarity

1 Introduction

The demand for dual vocational education and training (VET) has increased at the political and international levels since the global economic crisis of 2007–2008. One example of this is the funding landscape of the German Ministry of Education and Research (BMBF). The BMBF has developed funding programmes that support the transfer of VET abroad. Therefore, the funding programme, Vocational Training Export by German Providers, was launched in 2009 and ended in 2017 (42 funded projects). In 2017, this was followed by the funding programme, Internationalisation of Vocational Education and Training (IBB).

In IBB, the BMBF fund 23 projects, which are divided into four streams: Stream A projects (bilateral exploratory projects on the prerequisites and topics of VET cooperation) consist of at least one commercial partner, one partner focusing on science and research (research partner) and an adequate partner from the target country. Stream B projects (support the model implementation of bilateral VET cooperation) and stream C projects (demand-oriented model implementation of initial and VET services) consist of at least two providers of initial and VET services, possibly a commercial partner and, preferably, a research partner.

The streams focus on insights into VET demands, relevant institutions and implementation perspectives. In particular B and C projects focus on the development and testing of innovative, sustainable VET programmes for the international education market.

Stream D (funding in the areas of VET research, evaluation and networking activities at the programme level) consists of one project: the scientific monitoring project (WB-IBB) of IBB (Bundesministerium für Bildung und Forschung, 2016).

Accordingly, the role of scientific monitoring is at the *programme level*, and the role of the research partner is at the *project level*. From an institutional point of view, research partners can be universities or research institutions, non-university research institutions, consultancies and other institutions "that provide research contributions and/or are active in the field of vocational education and training" (Bundesministerium für Bildung und Forschung, 2016; translated from the German by the authors).

In stream A to stream C, the projects are model projects; thus, they are innovation projects (Kauffeld, 2001). It is assumed that innovation projects have a better chance of succeeding if they are supported by the above-mentioned promoter roles (Gessler, 2019; Peters & Gessler, 2019).

2 Research Approach

2.1 Quantitative Analysis to Study the Role of Clarity in the Projects

As part of a secondary analysis of the data from an online survey (conducted by WB-IBB), we first examined the clarity of the roles of the research partners in the individual collaborative projects in the context of IBB (Siemer & Gessler, 2020). Based on the promoter model, we compared the project coordination's perception of the role of the research partners in the collaboration (external assessment) with the research partners' assessment of their own role in the collaboration (self-assessment). The promoter model distinguishes four core roles (Witte, 1973; Hauschildt & Chakrabarti, 1988; Gemünden & Walter, 1998; Gemünden et al., 2007): the power promoter, the expert promoter, the process promoter and the relationship promoter. The power promoter with hierarchical potential, drives the project. The expert promoter possesses specific knowledge that is necessary for the innovation process. The process promoter contributes organisational knowledge and internal networking skills to the project. The relationship

promoter strengthens the group's external networking (Witte, 1973; Hauschildt & Chakrabarti, 1988; Gemünden & Walter, 1998; Gemünden et al., 2007).

This research approach can be applied to VET transfer and cooperation and thus to the project networks in IBB. Against this background, WB-IBB analysed the promoter roles of all collaborative partners of the funded projects at the beginning of IBB using the promoter model and a standardised online questionnaire (from 2018 and 2019). Data collection was based on social science survey methods (Döring & Bortz, 2016).

If the assessments of each promoter agreed, it was assigned a score of 1. A score of 0 was given if the assessments did not match. Since four promoter roles are assessed, 4 is the maximum score that can be achieved, which corresponds to a perfect match (interpreted as role clarity).

Table 1

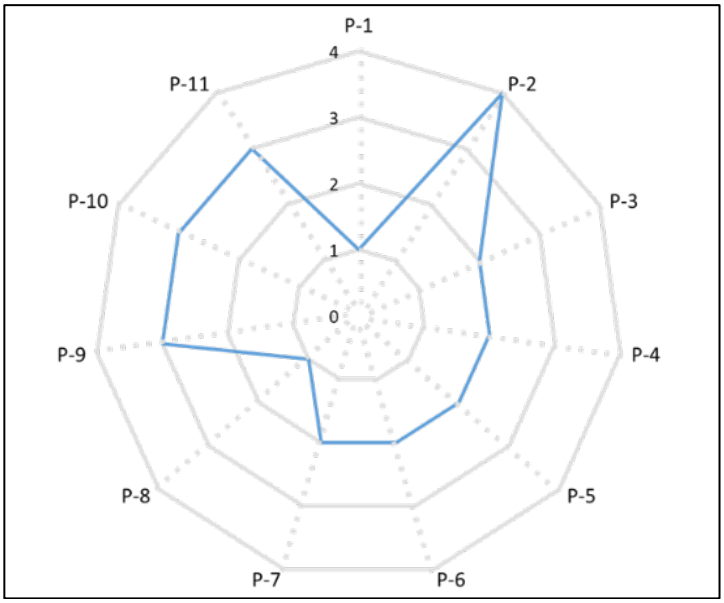
Role clarity assessment (Siemer & Gessler, 2020)

	Power Promotor	Expert Promotor	Relationship Promotor	Process Promotor
Research partners evaluate themselves	1	1	0	0
Coordinator evaluates research partners	0	1	1	0
Concordance	0 (no)	1 (yes)	0 (no)	1 (yes)
Result			2	

A high degree of concordance represents role clarity. A low degree of concordance indicates that there is role ambiguity in the projects. Due to the focus on the role clarity of the research partners, a step-by-step case selection of the projects was conducted. The secondary analysis did not include projects that had not yet been surveyed (N = 4), projects without a research partner (N = 1), incomplete data sets or no evaluation by the research partners (N = 3) and projects in which the coordinator is also the research partner (N = 4). In the following descriptive analysis, 11 projects with a total of 21 responses from the project partners were considered.

Figubere 1

Role clarity of the research partners (N = 21) (Siemer & Gessler, 2020)



The analysis showed that the no role clarity case (0) does not exist, and complete role clarity (4) exists in one project. The result indicates that in about 60% of the projects, the role of the research partners is not sufficiently clarified between the project coordinator and the research partner.

Interim conclusion

We were able to identify the role ambiguities. Against this background, this paper deepens the outlined quantitative analysis by discussing the findings of the qualitative guideline-based expert interviews in order to shed light on the role clarification and promoter role of the research partners.

The following research questions are addressed in this paper:

1. To what extent did a clarification of roles occur at the beginning of the IBB projects?
2. What promoter role do the research partners perform in the projects, and how do they arrange their role?

2.2 Literature Review

Due to the unclear distribution of roles, we were interested in the current state of research on the role of research partners in projects.

To determine the current state of the art on the role of research partners in model projects, we conducted a review of the literature (Grant & Booth, 2009). The problem of role ambiguity led us to search for academic articles that addressed the role and types of research partners. Selected journal articles from the literature review are discussed below:

Sloane (2005) analysed scientific work in model projects. The aim of his contribution was to show the types of research that are implemented in those types of projects. Accordingly, he investigated the question of how scientific accompanying research in pilot projects can be designed and how knowledge is generated and transferred. The result showed that there are three types of accompanying research: distanced accompanying research, intervening accompanying research and responsive accompanying research. Distanced accompanying research can be divided into an empirical-analytical approach and a phenomenological-textual approach. The former examines a theory, the latter includes documentation and evaluation; intervening accompanying research can be divided into action research and organisational development, which seeks to arrange and change practice; responsive accompanying research can be divided into three variants: the responsive evaluation, which first evaluates and then intervenes, science-practice communication and design-based research, which looks at the interactions between research and practice (Sloane, 2005).

The distanced accompanying research and the intervening accompanying research have "opposing interests of knowledge and action" (Sloane, 2005, p. 335; translated from the German by the authors); the former seeks to improve theory and the later seeks to improve of practice. According to Sloane (2005), it is possible to combine the approaches by having the scientific accompanying research take over the documentation of the project process and the advisory activities. Sloane (2005) noted that scientific accompanying research has a "double-sided observer role" (p. 338; translated from the German by the authors) and functions as a mediator between science and everyday life; it becomes active in both areas in an advisory capacity in both areas.

Kremer et al. (2017) noted that the role of researchers in each project should be clarified. That study stated that researchers' roles can change throughout the project, for example from an interacting developer role (conception phase) to a distanced observer role (implementation and transfer phase).

In her paper, Schemme (2003) tried to work out the relationship between scientific monitoring and evaluation. Based on the literature, she identified four functions of scientific monitoring: (1) the theoretical and methodological foundation, (2) the process-oriented monitoring and optimisation of new learning concepts (formative evaluation), (3) the documentation (summative evaluation) and (4) the cooperative acquisition of new knowledge (Schemme, 2003). The article pointed out that there is a risk that the different functions overlap in the process, which is why it is necessary to ensure a "consistent clarification of the different roles" (Schemme, 2003, p. 31; translated from the German by the authors).

Interim conclusion

As seen in the previous research discussed above, different terms are used for a research partner within the research landscape. We continue to use the term research partner. The role has a certain degree of flexibility due to changes in the roles within the role. Accordingly, we assume that research partners can also perform several promoter roles. Therefore, role ambiguity can be explained by the fact that although a clarification of the roles occurs at the beginning of the project, repeated clarification of the roles during the project did not take place.

2.3 Qualitative Analysis to Study the Role Clarification and Design of Promoter Roles

To answer the research questions, the study presented in this paper focused on analysing the role of research partners in projects for the internationalisation of vocational education and training. According to Kauffeld (2001), the effectiveness of a team is reduced when role ambiguities prevail. Based on the role ambiguity identified in the first step, semi-structured expert interviews were used as the survey method in the second step. According to Flick (2011), qualitative methods are used when the research questions focus on the subjective perspectives of the interviewees and their diversity. The interviewees should, as far as possible, describe their subjective experiences and their self-perception of their promoter role as research partners in the context of IBB.

The interview technique was supported by a semi-structured guideline (Friebertshäuser & Langer, 2013). For the qualitative content analysis, the dimensions of structure orientation and person orientation were taken up following Kauffeld (2001) and expanded by subcategories, which were merged with the approaches of the promoter model and the team diagnostic tool. To answer the research questions, the subcategories, role clarification (structure orientation) and promoters (person orientation), are discussed in this article.

Deductive categories were used, and the interviews were analysed according to content-structured qualitative content analysis based on Kuckartz (2014).

2.4 Sample

The sample selection was based on the selective case selection of Siemer and Gessler (2020). For the qualitative survey, a total of 10 projects were considered. Only research partners of the collaborative projects were interviewed, using a semi-structured guide.

The research partners represent organisational types, universities (8) and private research institutions (2), as well as subject areas, educational sciences/vocational education (4), business administration/business psychology (1), business management (1) and innovation management (4). The role of the research partners is partly represented by two persons in the projects. A total of 15 persons were thus interviewed. These were three individual interviews and six interviews with two persons each.[2]

[2] Complete transcripts of the interviews according to the specifications of Dresing and Pehl (2015).

3 First Interim Results Based on the Research Questions

To what extent did a clarification of roles occur at the beginning of the IBB projects?
Due to the role ambiguity identified in the first step of our research, we were first interested in the extent to which role clarification had occurred at the beginning of the projects. The research partners who were interviewed will be anonymised in the following section with the letter B:

From the research partners' perspectives, the clarification of roles resulted from the work packages described in the project application with the corresponding distribution of tasks. The objectives and work steps were partly concretised again during the kick-off meetings, for example, against the background of changes in market demand, which was followed by a further clarification of the roles of all the project partners. Although these two steps were used to clarify the roles, it was difficult for B5 to recognise, at the beginning of the project, which person had which role and how this was clearly defined. According to B5, this was due to the variety of different partners that came together to work on a project.

B14 noted that it appears that there is a lack of knowledge on the part of the company partners regarding the scientific methods and procedures of a university. For example, according to B14, at the beginning of the project, it was unclear to the company partners why the research partner needed certain data or why a lead time was necessary for certain work by the research partner. For B15, mutual understanding between the project partners is important, but this must first be created as a basis for cooperation. In retrospect, B5 noted that more time would have been helpful to clarify the exact roles of all the project partners, and added that cooperation in the target country with the foreign partners was difficult at the beginning of the project.

The roles in projects with an international character are diversely distributed and, for B2, there was a demand to find an agreement in order to harmonise the different roles. Therefore, it is not only a question of delimiting the roles from each other; the aim should be to see how the roles can support each other.

What promoter role do the research partners perform in the projects, and how do they arrange their role?

From the perspective of the research partners, they primarily take on the roles of process promoter, expert promoter and relationship promoter.

For B1, the role of process promoter is already given simply by the nature of the research partner. According to B2 and B5, the role of the research partner is characterised by the internal networking capability and, thus, by the fact that contact with the project partners is maintained bilaterally within the project. B6 explained the role of the process promoter based on the task of evaluating the collaborative project. B6 accompanied the entire process of the project and is responsible for the conception and monitoring of the evaluation, which, for example, assesses the process of the project in the conception phase of the curriculum analysis and development by means of a formative evaluation. B6 also takes on the role of the expert promoter, noting that because as "[...] a continuing education partner, they can fill this in practice, but they probably wouldn't have been trusted with the development".

At this point, the research partners indicated that the role of the expert promoter implies scientific expertise. Thus, the research partners do not see themselves as subject experts for the field of practice; rather, they enrich certain fields due to their competences and the orientation of the field, such as vocational and industrial education or competences in the field of didactics and curriculum development. B8 also reported that such projects would not work without the subject-specific knowledge of the research partner. Therefore, development work can only be successful if the research partner contributes his or her own expertise. At the same time, the research partner looks at the process of the project at the meta-level. For B8, the roles of

technical and process promoter are not conflicting. Thus, the study partners contribute to knowledge development.

From the perspective of the research partners, the role of the relationship promoter is primarily characterised by networking activities.

Research partners bring along their existing networks due to pre-funding projects, which could open many doors for the IBB project in the target country. Through bilateral talks, contact with relevant stakeholders in order to establish new relationships in the target country in addition to the existing ones.

Companies in the target country are recruited by the research partners and relationships are established with networking partners who act as multipliers; this includes, for example, cooperation that adds innovative technological approaches to curricula in order to strengthen the social appreciation of VET in the target country. B11 explained that it is important to support the partners in the target country with regard to the services to be developed and to enable partners to co-develop the project programmes that will later be offered on the market. The partners in the target country will market the educational services. Therefore, it is important for B11 to motivate these partners. Consequently, B11 dedicates himself to partners in the target country and arranges cooperation through attention, guidance, feedback and exemplary examples. B7 also stated that they have networked with other universities in the target country.

Only one research partner also represents the role of power promoter, in that many results within the project depend on the research partner, and the research partner also awards contracts to the partners in the target country for the evaluation.

One research partner expands the usual promoter roles by adding the role of "critical friend", who brings a different or conflicting opinion to the project. The interest is not to block the project, but to point out e.g., a different implementation strategy. Thus, the critical friend generates alternatives and tries to introduce them into the project discourse.

4 Conclusion

The study's results indicate that, at the beginning of the project, the phase of role clarification in the network was insufficient; thus, the mutual expectations could not be clarified. From the perspective of the research partners, the predefined work packages and the kick-off meetings at the beginning of the projects do not go far enough in clarifying the individual roles. This confirms the role ambiguity that was identified. Therefore, the expectations of the research partners are insufficiently clarified in IBB and the projects sometimes begin with unclear expectations, which can negatively influence the success of the project. In particular, against the background of an international context and due to the encounter of interdisciplinary project actors, from the research partners' perspective, it is preferable to clarify the individual roles at the start of the project. For following funding programmes, the recommendation should be made at this point that the kick-off events should increase the attention for team finding and role clarification. In the future, it makes sense to implement a communicative discussion process over several days to clarify the project roles. An interdisciplinarity approach in projects, as described above, facilitates success, but it also brings together different working cultures, understandings and perspectives, which should be made transparent for each project member in IBB projects. As mentioned above, this process could foster mutual support in the project work (additional to delimiting the roles from each other).

Based on the promoter model, the study discussed in this paper shows that research partners primarily contribute to knowledge development, process development and network development and that the role of research partners is accompanied by a certain degree of heterogeneity.

Research partners expand their network through new partners, from which social capital can be derived. In addition to their networking function, research partners contribute knowledge to the project or support the project goal through their own expertise. Advisory activities are

emerging here. It has been shown that research partners lead processes through such things as evaluative activities.

5 Limitations and Further Research

The extent to which the analysed promoter roles are transferable to other research partners is unclear. Due to the specific context of IBB, we initially assume that the results only apply to the research partners in IBB. The study does not allow any conclusions to be drawn about the success of the individual projects. Thus, no conclusions can be drawn between the role ambiguity and the probabilities of success for individual projects.

Based on the qualitative data, we assume that different types of research partners with different characteristics can also be found in IBB. In the future, we will investigate the extent to which the research partners in IBB can be assigned to one of the role types identified in the literature review described above, among others, or whether a new role type is emerging. From a scientific perspective, it would also be interesting to know how extensive the personal network of the research partners is in a project entailing international VET cooperation.

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Educational Inequalities in the Swiss Canton of Ticino: The Role of the VET

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Abstract

The purpose of this paper is to describe the transition from compulsory to the post-compulsory school or vocational tracks and the completion of the post-compulsory education of seven cohorts of youngsters living in the Swiss canton of Ticino. The approach consists in the analysis of the school pathways in order to illustrate the educational tracks followed after completing lower secondary school highlighting typical features, delays and reorientation needs in the following 5 years (8, for the 4 older cohorts). School pathways are put into relation to variables such as gender, social origin and nationality. The results of the longitudinal analysis indicate that within eight years from the lower secondary school, around 60% of students belonging to the socially most deprived group have completed a VET programme while less than 20% are in possession of a high school baccalaureate. These percentages equal 40% and ca. 43% respectively among the upper class students. Both in the lowest and in the highest social group 13% are NEETs or people who are untraceable. The conclusions are that, if VET promotes social inclusion of the most vulnerable youngsters and improves their chances to integrate as skilled workers in the labour market, the biggest concern are people who could not enter or could not complete the VET. Moreover, the risk on inequality at a further stage of the working trajectory depending on the type of upper secondary education and of vocational qualification should be taken into account.

Keywords

Vocational education and training, transitions, longitudinal studies, educational inequalities

1 Introduction

In many countries there is a debate concerning the risk to see the chances of downward mobility prevail on those of upward mobility (Bukodi & Goldthorpe, 2018). The UK's decline in opportunity, for instance, has been described as a squeeze at the bottom. While privileged elite university graduates continue their path on a golden route populated with perks and higher pay, non-graduated, who once followed an alternative route into good jobs, are now pulled away the rungs of the social ladder and trapped in precarious gig jobs (Major & Machin, 2020). Employment, in facts, has grown more at the top and bottom end of the skill distribution and less in the middle, where technologies have replaced many middle-skill roles. Similar trends are observed in the US, where opportunity gap has dramatically grown between kids from have and have–not backgrounds (Putnam, 2016) and where in the economic stagnation areas the college educated become healthier and wealthier and adults without a degree are literally dying from pain and despair (Case & Deaton, 2020). Far from acting as an equalizer, education has contributed

to tear apart the fabric of our societies and to bring new anxieties and anger (Collier, 2018). Like in an arms race, well-off families today push harder to ensure their offspring have a path to security and success (Doepke & Zilibotti, 2019) and biggest losers are the school leavers with no qualifications or skills at all (Major & Machin, 2018). COVID-19 has exacerbated the existing inequalities (Jæger & Blaabæk, 2020) and the need of radical policies to create a more inclusive and better functioning economy has become more pressing.

In the receipt for a fairer and more inclusive society, many authors point out the necessity to rethink education (Atkinson, 2015; Major & Machin, 2018, 2020; Sandel, 2020; Collier, 2018; Putnam, 2016). The mantra 'college for all' has ended up labelling young people with other talents – creative, vocational and technical – as failures, with a consequent wastage of talents in particular among people from disadvantaged background. VET not only is recognised as playing a key role in combating early leaving from education and training, but it also attracts and reintegrates young people in education and training, including those who drop out of general education (Cedefop, 2016; European Commission/EACEA/Eurydice/Cedefop, 2014). Switzerland, whose vocational courses are typically three to four years long, where firms pay half of and where VET is very popular among young people because they receive an attractive pathway into employment, help to develop the skills required in the labour market, relevant work experience and get paid, is often cited as an example to imitate (Collier, 2018). Moreover, around one quarter of all learners who currently conclude a VET certificate course in Switzerland also acquire a federal vocational baccalaureate. The latter, which entitles young people to continue on to a university of applied sciences, or in some cases to universities of teacher education or, if an additional examination is taken, to a university, has according to some authors a socially balancing function being primarily acquired by academically stronger young people from socially disadvantaged households (Jäpel, 2017).

This contribute aims to describe the transition from compulsory to the post-compulsory school or vocational tracks and the completion of the post-compulsory education of seven cohorts of youngsters living in the Swiss canton of Ticino and to put them into relation with variables such as gender, socio-economic origin and nationality. This contribution will provide an answer to questions such as:

- How many youngsters belonging to the more at risk of early school leaving groups complete a VET qualification?
- How many dropouts of baccalaureate schools does the VET reintegrate in education and training?
- How many children from socially disadvantaged households can potentially continue on to a tertiary education thanks to the VET?

In Ticino, compulsory education starts at the age of four years with the first learning cycle of kindergarten and continues to elementary school. After completing elementary school, pupils attend the lower secondary school for four years, which include two years of 'observation' and two years of 'orientation'. While during the first two years at lower secondary school all students are taught the same curriculum, during the second two-year period pupils are assigned to three different performance-based groups and are offered three separate learning pathways. Differently from most of the cantons, which adopt a selective school system, Ticino is a region characterized by a relatively comprehensive school system in which tracking is postponed to the 8th grade (and limited to two subjects, German and math). The advanced requirements curriculum is aimed at the most talented pupils with good skills especially in these two subjects; the intermediate requirements curriculum is offered to pupils with good skills in either math or German; the basic requirements curriculum is intended for pupils with a poor performance especially in the two subjects mentioned above. Attendance of the advanced course, combined

with a certain final average mark for all subjects taught in the fourth year are necessary requirements for admission to the baccalaureate school i.e. a type of school focusing on general studies granting access to a university or a polytechnic at a later stage. Attendance of the other two courses - intermediate and basic – together with a specific final average mark, allows accessing vocational schools. In Ticino the strong work-based vocational training system is similar to the rest of the country and has guaranteed until today a relatively smooth school-to-work transition. Vocational training and education courses can be 'full-time' or else offer 'dual education courses' combining on the job education at a company and classroom lessons at a vocational school on a weekly basis.

2 Methods

As announced, in this paper the school pathways of seven cohorts of students (totally ca. 21,000 youngsters, living in the canton of Ticino[1]) are analysed in order to illustrate the educational tracks followed after completing lower secondary school (from school year 2008/09 to 2014/15) and in the following 5 years (8, for the 4 older cohorts). Data used belong to the Ticino's Department of Education, Culture and Sport, who has developed an application that makes available - in the form of database - student-specific information, including some social and biographical details, data on the student's past and current training, subjects studied, grades and end of the year results. The database (called 'GAGI' - literally meaning: Management of Students and Institutes) is very complete. Nevertheless, should a student attend one of the schools or courses not captured in the database, or else leave Ticino and move to a different place, a gap appears in the database and it is not possible to say whether he or she is real a dropout. In this case, young people come into the 'destination unknown' category.

3 Results

3.1 One Year After the Last Year of Compulsory Education

After the lower secondary school, in each of the seven cohorts considered, around 40% of youngsters enroll in a baccalaureate school (high school or Canton school of commerce) and a percentage comprised between 36% and 46% in vocational training (Figure 1). Within the latter, there is a drop of about 6 percentage points in the share of enrolled students from the cohort attending the last year of the lower secondary school in the 2009/10 school year to the one completing the lower secondary school in the 2013/14 school year, probably partly attributable to the economic cycle (Lüthi & Wolter, 2020). The 'unknown destination' column shows higher percentages of students attending the last year of the lower secondary school from the 2008/09 school year to the 2012/13 school year. This depends on the fact that it also includes those enrolled in the transitional solutions (e.g., pre-apprenticeship integration program, pre-apprenticeship orientation program, motivation semester and individual support in vocational training), entered in the database only starting from 2014. The transitional solutions, aimed at young people who could not find any apprenticeship after the lower secondary school, bridge the gap between the end of compulsory schooling and the beginning of a training. These measures generally last from six to twelve months and aim to fill educational gaps and to support young people in the elaboration or implementation of a training project. As we can see, every year about 6% of youngsters at the end of the lower secondary school enroll in this type of training.

Boys' propensity to enroll in dual vocational training is twice if not three times the girls' one. In Ticino, as in the rest of Switzerland, there is a certain horizontal segregation in

[1] The number of students of each cohort varies between 2973 (cohort attending the last year of compulsory school in the 2017/18 school year) and 3118 (cohort attending the last year of compulsory school in the 2014/15 school year).

vocational training, which means that males have more training opportunities (Reisel et al., 2015; Falcon, 2016; Heiniger & Imdorf, 2018) which directly affects the opportunities for access to the labor market, as well as career opportunities (Zanolla, 2015). Girls, however, show a greater tendency to choose full-time vocational training and baccalaureate schools.

With regard to socio-economic origin[2], students whose parents are highly educated show a greater propensity to enroll in a high school, while vocational training is more the prerogative of less educated groups as well as of young foreigners[3]. In the cohort that attended the last year of the compulsory school in the 2014/15 school year, the VET is chosen by 33% of the youngsters belonging to the most advantaged social group, while 51% enroll in a high school. The above-mentioned percentages equal 52.5% and 22% respectively among those belonging to the lowest social stratum.

3.2 Five Years After the Last Year of Compulsory Education

Five years after the beginning of the fourth year of the lower secondary school, a certain uniformity among the cohorts can be observed. Over one third of the students of each cohort have achieved a vocational qualification (which, in most of the cases, is a federal VET diploma or a federal vocational baccalaureate), just over one fifth have obtained a high school baccalaureate and almost 30% are still in education (Figure 2). Of the latter, about 10% are enrolled in a baccalaureate school and the remaining 20% in a vocational training. A percentage between 12% and 16% neither are enrolled in any education or training nor have obtained any post-compulsory qualification in Ticino.

In each cohort, girls register higher percentages of high school and vocational baccalaureates and lower percentages of federal VET diplomas or certificates. As for youngsters who do not have achieved any post-compulsory qualification or are in training, in each cohort boys outnumber girls by one or two percentage points.

For what regards the socio-economic origin, in each cohort youngsters from the most advantaged social group register the highest percentages of high school and Canton school of commerce baccalaureates (from 28% to 33.5%) and of those still enrolled in a baccalaureate school (from 11% to 13%). The intermediate social group shows the highest percentages of federal vocational baccalaureates (from 11% to 16%) while children of low-skilled parents register the highest percentages of those who hold a federal VET diploma or certificate and of those who have neither achieved any post-compulsory qualification in Ticino nor are in training. A percentage between 15% and 22% of Italian youngsters and between 16% and 22% of non-Italian foreigners fall into the latter category. Among foreigners, both Italians and youngsters from other countries, the highest percentages of federal VET diplomas or certificates are observed (between 22% and 30% depending on the cohort).

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2 The socio-economic origin of the students was calculated using the ISEI index (International Socio-Economic Index of Occupational Status), based on the profession of the parents. In the calculation procedure the professions of both parents are classified according to the categories of the Swiss standard classification of professions CH-ISCO-19, which adds to the four levels of the International Standard Classification of Occupations (ISCO-08) a fifth level which takes into account the particularities of the Swiss labor market. The dominance criterion is applied which consists in selecting the highest status score among those of the father and mother. Each individual is then assigned one of the following levels of socio-economic origin (see OECD, 2018): highly qualified professions (refer to ISCO professional groups from 1 to 3); moderately qualified professions (professional groups from 4 to 8); low-skilled professions (professional group 9). In the ISCO-19 classification, code 1 refers to managers; 2 to the intellectual and scientific professions; 3 to intermediate technical professions; 4 to office employees; 5 to professions in commercial activities and services; 6 to specialized personnel involved in agriculture, forestry and fishing; 7 to artisans and skilled workers; 8 to plant and machinery operators and assembly workers; 9 to unskilled professions.

3 Students with only Swiss nationality were classified as "Swiss" as well as the ones with both Swiss nationality and from another country; those with only Italian nationality or with both Italian nationality and nationality from another foreign country were classified as “Italians” and all those neither Swiss nor Italian were classified as “other”.

Figure 1

School or training attended one year after the last year of compulsory education (GAGI).

		Compulsory education last year	Pre-apprenticeship integration progr.	Pre-apprenticeship orientation progr.	Motivation semester	Individual support in vocational training	VET dual system	VET full time	Canton school of commerce	High school	Unknown destination
Total		2008/09	NA	NA	NA	NA	23,9%	11,5%	8,2%	31,2%	25,1%
		2009/10	NA	NA	NA	NA	27,0%	20,1%	8,9%	28,3%	15,7%
		2010/11	NA	NA	NA	NA	25,2%	20,7%	9,1%	29,7%	15,4%
		2011/12	NA	NA	NA	NA	25,7%	19,8%	8,3%	29,2%	16,9%
		2012/13	NA	NA	NA	NA	21,0%	21,8%	9,1%	29,9%	18,1%
		2013/14	0,0%	5,8%	0,6%	0,0%	20,9%	20,7%	7,8%	32,2%	11,9%
		2014/15	0,0%	5,5%	0,1%	0,0%	21,5%	21,9%	7,5%	30,6%	12,9%
Gender	Females	2008/09	NA	NA	NA	NA	14,6%	13,7%	9,1%	35,8%	26,7%
	Males		NA	NA	NA	NA	33,2%	9,3%	7,3%	26,7%	23,5%
	Females	2009/10	NA	NA	NA	NA	17,1%	24,1%	10,7%	31,7%	16,4%
	Males		NA	NA	NA	NA	35,8%	16,5%	7,3%	25,3%	15,1%
	Females	2010/11	NA	NA	NA	NA	15,3%	23,9%	9,4%	33,9%	17,5%
	Males		NA	NA	NA	NA	35,1%	17,5%	8,7%	25,5%	13,3%
	Females	2011/12	NA	NA	NA	NA	15,3%	22,8%	11,2%	33,6%	17,1%
	Males		NA	NA	NA	NA	36,0%	16,8%	5,4%	24,9%	16,8%
	Females	2012/13	NA	NA	NA	NA	12,8%	23,2%	10,7%	33,8%	19,5%
	Males		NA	NA	NA	NA	29,1%	20,5%	7,6%	26,1%	16,7%
	Females	2013/14	0,1%	5,2%	0,8%	0,0%	13,6%	20,9%	9,5%	35,5%	14,4%
	Males		0,0%	6,4%	0,4%	0,0%	27,7%	20,5%	6,2%	29,1%	9,7%
	Females	2014/15	0,0%	4,6%	0,1%	0,0%	13,7%	24,6%	9,2%	33,8%	14,2%
	Males		0,0%	6,3%	0,1%	0,0%	29,3%	19,3%	5,9%	27,4%	11,7%
Socio-economic origin	High skilled workers	2008/09	NA	NA	NA	NA	13,3%	11,8%	6,7%	47,6%	20,6%
	Middle skilled		NA	NA	NA	NA	26,5%	14,0%	6,6%	26,3%	26,5%
	Low skilled workers		NA	NA	NA	NA	31,5%	14,8%	13,0%	11,1%	29,6%
	High skilled workers	2009/10	NA	NA	NA	NA	16,3%	17,6%	10,3%	42,3%	13,6%
	Middle skilled		NA	NA	NA	NA	35,2%	22,8%	7,4%	18,2%	16,3%
	Low skilled workers		NA	NA	NA	NA	40,7%	26,9%	7,6%	8,3%	16,6%
	High skilled workers	2010/11	NA	NA	NA	NA	17,3%	17,1%	9,0%	43,9%	12,7%
	Middle skilled		NA	NA	NA	NA	32,2%	24,0%	9,6%	18,1%	16,1%
	Low skilled workers		NA	NA	NA	NA	35,6%	22,6%	10,3%	9,6%	21,9%
	High skilled workers	2011/12	NA	NA	NA	NA	17,7%	17,1%	7,8%	43,2%	14,3%
	Middle skilled		NA	NA	NA	NA	32,6%	21,6%	9,2%	19,2%	17,4%
	Low skilled workers		NA	NA	NA	NA	33,3%	31,9%	7,4%	7,4%	20,0%
	High skilled workers	2012/13	NA	NA	NA	NA	15,0%	18,1%	8,7%	42,5%	15,6%
	Middle skilled		NA	NA	NA	NA	25,4%	25,2%	9,7%	20,4%	19,3%
	Low skilled workers		NA	NA	NA	NA	30,6%	24,3%	9,0%	11,8%	24,3%
	High skilled workers	2013/14	0,0%	2,7%	0,3%	0,0%	14,5%	17,7%	8,0%	46,0%	10,9%
	Middle skilled		0,0%	8,4%	0,6%	0,0%	26,8%	24,3%	7,7%	20,6%	11,7%
	Low skilled workers		0,7%	10,5%	1,4%	0,0%	26,6%	21,7%	8,4%	15,4%	15,4%
	High skilled workers	2014/15	0,0%	2,7%	0,0%	0,0%	14,8%	18,2%	7,9%	43,3%	13,1%
	Middle skilled		0,0%	6,8%	0,1%	0,0%	27,9%	25,3%	7,7%	19,8%	12,4%
	Low skilled workers		0,0%	16,1%	0,0%	0,0%	23,1%	29,4%	7,7%	14,0%	9,8%
Nationality	Swiss	2008/09	NA	NA	NA	NA	23,2%	11,8%	8,5%	35,5%	21,0%
	Italian		NA	NA	NA	NA	30,0%	10,6%	5,9%	20,9%	32,6%
	Other		NA	NA	NA	NA	25,3%	9,2%	8,3%	17,9%	39,2%
	Swiss	2009/10	NA	NA	NA	NA	26,1%	19,2%	9,3%	31,8%	13,6%
	Italian		NA	NA	NA	NA	30,2%	22,7%	8,3%	19,1%	19,8%
	Other		NA	NA	NA	NA	30,6%	24,7%	7,1%	13,8%	23,8%
	Swiss	2010/11	NA	NA	NA	NA	23,6%	20,2%	9,6%	33,1%	13,5%
	Italian		NA	NA	NA	NA	36,3%	16,4%	7,1%	20,3%	19,9%
	Other		NA	NA	NA	NA	26,4%	27,8%	7,0%	15,4%	23,3%
	Swiss	2011/12	NA	NA	NA	NA	24,8%	18,8%	8,7%	32,3%	15,3%
	Italian		NA	NA	NA	NA	32,5%	18,9%	8,3%	21,9%	18,5%
	Other		NA	NA	NA	NA	25,3%	26,5%	6,1%	17,7%	24,5%
	Swiss	2012/13	NA	NA	NA	NA	20,4%	20,7%	9,7%	33,2%	16,0%
	Italian		NA	NA	NA	NA	25,0%	22,8%	7,0%	22,5%	22,8%
	Other		NA	NA	NA	NA	21,3%	28,3%	7,9%	18,4%	24,1%
	Swiss	2013/14	0,0%	4,3%	0,4%	0,0%	20,4%	19,8%	8,4%	35,6%	11,1%
	Italian		0,0%	9,4%	0,3%	0,0%	23,2%	20,5%	5,9%	27,6%	13,2%
	Other		0,3%	11,6%	2,2%	0,0%	22,1%	27,5%	6,5%	17,0%	12,9%
	Swiss	2014/15	0,0%	4,2%	0,1%	0,0%	21,3%	20,7%	8,5%	33,1%	12,1%
	Italian		0,0%	8,3%	0,0%	0,0%	23,1%	22,6%	4,5%	28,5%	13,1%
	Other		0,0%	11,0%	0,0%	0,0%	21,2%	29,8%	4,4%	18,2%	15,4%

Figure 2

School or training attended, or qualification achieved five years after the last year of compulsory education (GAGI).

		Compulsory education last year	VET dual system	VET full time	Federal VET diploma or certificate -	Federal VET diploma or certificate -	Federal vocational baccalaureate	Still at the high school	Still at the Canton school of commerce	High school baccalaureate	Canton school of commerce baccalaureate	Other	Unknown destination
Total		2008/09	12,7%	6,0%	17,1%	2,3%	10,9%	6,3%	3,5%	17,3%	4,0%	4,2%	15,9%
		2009/10	13,3%	5,4%	19,6%	3,6%	12,1%	5,6%	3,1%	16,8%	5,2%	1,8%	13,5%
		2010/11	12,8%	5,9%	18,7%	3,8%	13,7%	6,7%	3,5%	17,1%	4,2%	1,7%	11,9%
		2011/12	13,2%	5,9%	20,0%	3,4%	12,3%	6,2%	4,1%	16,2%	3,8%	1,8%	13,1%
		2012/13	14,3%	5,4%	16,2%	3,8%	12,5%	6,9%	3,6%	17,2%	4,6%	2,1%	13,4%
		2013/14	13,9%	4,9%	18,5%	4,2%	10,9%	6,8%	3,4%	18,5%	4,0%	1,9%	13,0%
		2014/15	13,7%	5,7%	17,2%	4,2%	12,8%	6,6%	3,1%	18,1%	3,7%	1,6%	13,3%
Gender	Females	2008/09	9,2%	6,9%	13,6%	3,2%	11,6%	7,3%	4,0%	19,7%	4,4%	4,9%	15,2%
	Males		16,1%	5,0%	20,5%	1,5%	10,1%	5,3%	2,9%	14,9%	3,6%	3,5%	16,6%
	Females	2009/10	9,7%	5,7%	14,6%	4,1%	15,4%	5,9%	2,9%	19,5%	7,0%	2,8%	12,5%
	Males		16,5%	5,1%	24,0%	3,1%	9,1%	5,3%	3,3%	14,4%	3,6%	1,0%	14,4%
	Females	2010/11	9,8%	6,4%	14,8%	5,1%	14,6%	7,3%	3,3%	19,9%	5,1%	2,6%	11,1%
	Males		15,8%	5,3%	22,6%	2,4%	12,8%	6,1%	3,7%	14,2%	3,4%	0,9%	12,8%
	Females	2011/12	9,4%	6,3%	15,6%	4,9%	13,2%	6,4%	5,3%	19,0%	5,2%	2,9%	11,1%
	Males		17,4%	5,6%	25,1%	2,0%	11,9%	6,1%	3,1%	13,8%	2,6%	0,7%	12,8%
	Females	2012/13	9,6%	5,0%	13,2%	5,4%	14,0%	7,1%	4,4%	20,3%	5,8%	3,2%	12,2%
	Males		19,0%	5,8%	19,2%	2,4%	11,0%	6,6%	2,9%	14,1%	3,5%	1,1%	14,6%
	Females	2013/14	11,4%	5,2%	15,5%	5,3%	10,4%	6,2%	4,1%	21,5%	5,2%	3,2%	11,9%
	Males		16,2%	4,7%	21,3%	3,1%	11,3%	7,3%	2,8%	15,8%	2,8%	0,7%	14,0%
	Females	2014/15	9,8%	6,6%	12,4%	5,4%	14,5%	7,3%	4,0%	20,0%	4,3%	2,6%	13,1%
	Males		17,5%	4,7%	22,1%	3,0%	11,2%	5,9%	2,2%	16,1%	3,1%	0,6%	13,6%
Socio-economic origin	High skilled workers	2008/09	8,4%	5,2%	8,2%	2,8%	10,5%	9,4%	2,4%	29,4%	3,6%	4,1%	16,1%
	Middle skilled workers		12,9%	5,9%	18,0%	2,9%	12,1%	5,9%	2,9%	14,9%	3,3%	5,9%	15,4%
	Low skilled workers		13,0%	1,9%	24,1%	0,0%	11,1%	1,9%	5,6%	7,4%	5,6%	7,4%	22,2%
	High skilled workers	2009/10	9,8%	6,0%	11,9%	2,3%	11,3%	7,7%	3,6%	27,1%	6,5%	2,2%	11,7%
	Middle skilled workers		16,2%	5,1%	26,3%	4,2%	14,0%	3,6%	2,4%	9,8%	4,3%	1,6%	12,5%
	Low skilled workers		17,9%	4,8%	26,2%	4,8%	11,7%	4,1%	3,4%	1,4%	2,8%	0,0%	22,8%
	High skilled workers	2010/11	10,6%	5,3%	11,5%	2,2%	12,6%	8,5%	4,1%	26,8%	4,1%	1,7%	12,7%
	Middle skilled workers		14,6%	6,4%	24,0%	5,0%	15,8%	5,4%	3,1%	9,0%	4,6%	1,6%	10,4%
	Low skilled workers		13,7%	6,8%	30,1%	5,5%	12,3%	4,1%	4,1%	3,4%	6,8%	0,7%	12,3%
	High skilled workers	2011/12	10,2%	5,9%	13,4%	2,3%	11,3%	8,6%	4,3%	24,9%	3,4%	1,9%	13,8%
	Middle skilled workers		15,5%	5,7%	24,9%	3,6%	13,8%	4,7%	4,2%	9,5%	4,5%	1,8%	11,8%
	Low skilled workers		16,3%	5,2%	32,6%	11,9%	12,6%	1,5%	3,7%	3,7%	3,0%	1,5%	8,1%
	High skilled workers	2012/13	10,5%	5,3%	10,6%	3,1%	11,4%	9,3%	3,3%	26,0%	4,3%	2,3%	14,0%
	Middle skilled workers		17,0%	5,5%	20,9%	4,2%	14,2%	5,0%	3,4%	10,4%	5,1%	2,3%	11,9%
	Low skilled workers		23,6%	6,3%	21,5%	5,6%	9,0%	4,2%	4,9%	4,2%	4,9%	0,7%	15,3%
	High skilled workers	2013/14	9,2%	5,0%	11,5%	2,9%	11,2%	8,8%	3,9%	27,8%	4,2%	2,6%	12,9%
	Middle skilled workers		17,5%	4,8%	25,2%	5,4%	11,3%	5,2%	2,9%	10,7%	3,7%	1,4%	11,9%
	Low skilled workers		20,3%	4,2%	21,0%	4,2%	10,5%	3,5%	2,1%	8,4%	5,6%	1,4%	18,9%
	High skilled workers	2014/15	10,4%	5,0%	10,6%	3,4%	11,9%	8,2%	3,3%	28,0%	4,3%	1,4%	13,3%
	Middle skilled workers		16,5%	6,3%	23,4%	4,6%	14,8%	5,6%	2,9%	9,2%	3,5%	1,8%	11,3%
	Low skilled workers		17,5%	6,3%	25,2%	7,7%	9,8%	2,8%	2,8%	7,0%	2,8%	0,7%	17,5%
Nationality	Swiss	2008/09	11,4%	5,7%	16,7%	1,9%	11,3%	6,6%	3,9%	20,6%	4,2%	4,2%	13,4%
	Italian		19,4%	7,0%	18,3%	4,0%	7,7%	6,2%	2,6%	7,3%	2,9%	2,6%	22,0%
	Other		15,5%	6,5%	18,6%	3,6%	10,3%	4,7%	2,2%	7,6%	3,6%	5,2%	22,2%
	Swiss	2009/10	12,2%	5,2%	18,5%	3,3%	13,1%	6,2%	3,3%	19,1%	5,6%	2,1%	11,2%
	Italian		17,3%	5,4%	20,5%	5,4%	6,1%	4,7%	2,9%	10,4%	3,2%	0,7%	23,4%
	Other		17,1%	6,8%	25,6%	3,8%	10,0%	2,4%	2,1%	7,6%	4,1%	0,9%	19,7%
	Swiss	2010/11	12,1%	5,6%	17,1%	3,6%	14,6%	7,5%	3,7%	19,4%	4,4%	2,0%	10,1%
	Italian		16,4%	4,3%	25,6%	4,6%	10,3%	3,9%	2,8%	10,7%	3,2%	0,7%	17,4%
	Other		14,6%	9,6%	22,8%	4,2%	11,0%	3,9%	2,5%	7,6%	4,5%	0,8%	18,5%
	Swiss	2011/12	11,9%	5,4%	19,2%	3,3%	13,2%	6,7%	4,2%	18,3%	4,0%	1,7%	12,1%
	Italian		12,3%	7,0%	25,5%	3,0%	11,6%	5,0%	3,6%	10,6%	5,3%	1,3%	14,9%
	Other		21,5%	8,1%	20,5%	4,3%	8,3%	4,3%	4,0%	8,6%	1,8%	2,8%	15,9%
	Swiss	2012/13	13,1%	5,1%	15,5%	3,6%	12,5%	7,5%	3,7%	19,8%	5,0%	2,4%	11,7%
	Italian		18,7%	5,7%	20,3%	4,1%	12,3%	4,7%	2,8%	11,4%	2,8%	0,6%	16,5%
	Other		17,8%	6,6%	17,3%	4,7%	12,9%	5,5%	3,9%	6,8%	3,9%	2,1%	18,4%
	Swiss	2013/14	12,4%	4,8%	18,3%	3,5%	11,5%	7,3%	3,7%	20,9%	4,5%	2,2%	11,0%
	Italian		15,8%	5,9%	18,5%	5,3%	9,4%	6,5%	2,9%	14,4%	2,6%	0,9%	17,9%
	Other		21,0%	5,1%	19,4%	7,8%	8,9%	4,0%	2,4%	8,9%	2,4%	1,1%	18,9%
	Swiss	2014/15	12,9%	5,8%	16,5%	3,7%	13,3%	7,1%	3,3%	20,2%	4,1%	1,8%	11,4%
	Italian		14,8%	4,2%	19,3%	7,4%	10,4%	6,8%	2,1%	13,6%	3,3%	0,6%	17,5%
	Other		18,2%	6,9%	19,8%	4,7%	12,4%	3,3%	2,8%	9,4%	1,9%	1,1%	19,6%

3.3 Eight Years After the End of Compulsory Education

Eight years after the beginning of the last year of the lower secondary school, half of the youngsters of each cohort followed for the longest time frame hold a vocational qualification (a federal VET diploma in 25% - 30% of the cases and a vocational baccalaureate in almost one fourth of the cases). Around 30% own a high school or a Canton school of commerce baccalaureate (Figure 3). If over 40% of youngsters belonging to the most advantaged social group obtain a high school or a Canton school of commerce baccalaureate, this percentage is halved for the intermediate social group and is further reduced for the most disadvantaged social stratum. If we compare the Swiss youngsters with the foreigners and girls with boys, we can reach the same conclusions. On the contrary, well federal VET diplomas and certificates are more common among middle-lower strata and among foreign students (around 40% of them own this degree). As for the federal vocational baccalaureate, it seems a little more equally distributed among the three social strata and national groups. As for gender, a percentage between 22% and 25% of girls hold a vocational baccalaureate against 20% of boys.

Figure 3

School or training attended, or qualification achieved eight years after the last year of compulsory education (GAGI).

		Compulsory education last year	VET dual system	VET full time	Federal VET diploma or certificate - dual system	Federal VET diploma or certificate - full time	Federal vocational baccalaureate	Still at the high school	Still at the Canton school of commerce	High school baccalaureate	Canton school of commerce baccalaureate	Other	Unknown destination
Total		2008/09	2,5%	0,2%	24,7%	2,9%	20,9%	0,0%	0,2%	23,3%	7,2%	4,6%	13,4%
		2009/10	2,4%	0,3%	27,8%	3,7%	21,4%	0,1%	0,0%	22,2%	8,2%	2,3%	11,7%
		2010/11	2,6%	0,6%	27,5%	5,7%	20,4%	0,0%	0,0%	22,8%	6,6%	2,5%	11,2%
		2011/12	1,5%	0,3%	31,0%	0,0%	23,8%	0,0%	0,0%	22,1%	7,6%	2,1%	11,5%
Gender	Females	2008/09	2,4%	0,2%	18,6%	3,6%	22,4%	0,1%	0,0%	26,9%	8,2%	5,5%	12,0%
	Males		2,7%	0,3%	30,7%	2,1%	19,3%	0,1%	0,0%	19,8%	6,3%	3,7%	14,9%
	Females	2009/10	2,1%	0,3%	20,3%	4,5%	24,0%	0,1%	0,0%	25,3%	9,8%	3,5%	10,1%
	Males		2,7%	0,3%	34,5%	2,9%	19,0%	0,0%	0,0%	19,5%	6,7%	1,2%	13,2%
	Females	2010/11	1,5%	0,5%	21,9%	6,9%	21,8%	0,0%	0,0%	26,2%	7,2%	3,5%	10,4%
	Males		3,8%	0,7%	33,2%	4,5%	19,0%	0,0%	0,0%	19,3%	6,0%	1,4%	12,0%
	Females	2011/12	1,1%	0,0%	20,2%	4,6%	25,0%	0,1%	0,0%	25,3%	10,0%	3,4%	10,2%
	Males		1,9%	0,6%	34,6%	2,5%	22,5%	0,0%	0,1%	18,9%	5,2%	0,8%	12,8%
Socio-economic origin	High skilled workers	2008/09	2,4%	0,2%	12,9%	3,4%	18,5%	0,0%	0,0%	38,4%	6,2%	5,4%	12,7%
	Middle skilled workers		3,3%	0,4%	27,4%	4,4%	21,5%	0,0%	0,0%	20,6%	6,1%	5,7%	10,5%
	Low skilled workers		7,4%	0,0%	35,2%	0,0%	14,8%	0,0%	0,0%	9,3%	11,1%	7,4%	14,8%
	High skilled workers	2009/10	2,1%	0,2%	16,4%	2,5%	21,8%	0,1%	0,1%	34,4%	9,8%	2,4%	10,4%
	Middle skilled workers		2,0%	0,3%	37,3%	4,0%	23,0%	0,0%	0,0%	13,3%	6,6%	2,4%	11,0%
	Low skilled workers		4,1%	0,7%	38,6%	6,9%	18,6%	0,0%	0,0%	6,2%	6,2%	0,0%	18,6%
	High skilled workers	2010/11	2,3%	0,6%	17,5%	4,2%	19,7%	0,1%	0,0%	34,3%	6,6%	2,6%	12,1%
	Middle skilled workers		2,7%	0,7%	35,7%	7,0%	22,1%	0,0%	0,0%	13,4%	7,0%	2,4%	9,1%
	Low skilled workers		3,4%	0,0%	40,4%	7,5%	17,8%	0,0%	0,7%	6,8%	9,6%	0,7%	13,0%
	High skilled workers	2011/12	0,7%	0,3%	18,7%	2,0%	22,5%	0,0%	0,1%	33,1%	7,6%	2,4%	12,5%
	Middle skilled workers		1,8%	0,2%	34,4%	4,0%	25,2%	0,1%	0,0%	14,0%	8,4%	2,0%	9,9%
	Low skilled workers		2,2%	0,7%	38,5%	11,1%	26,7%	0,0%	0,0%	5,2%	4,4%	1,5%	9,6%
Nationality	Swiss	2008/09	2,2%	0,1%	22,9%	2,6%	21,4%	0,0%	0,1%	27,0%	8,0%	4,6%	10,9%
	Italian		2,9%	0,7%	33,0%	5,5%	16,8%	0,0%	0,0%	13,6%	5,5%	3,3%	18,7%
	Other		3,4%	0,4%	28,9%	3,4%	20,9%	0,0%	0,4%	11,9%	5,4%	4,5%	20,9%
	Swiss	2009/10	2,2%	0,2%	25,8%	3,2%	22,6%	0,1%	0,0%	25,1%	8,8%	2,6%	9,4%
	Italian		3,6%	1,1%	30,2%	5,8%	15,8%	0,0%	0,0%	15,1%	6,1%	1,8%	20,5%
	Other		2,9%	0,0%	39,4%	5,3%	17,6%	0,0%	0,3%	10,0%	5,9%	1,2%	17,4%
	Swiss	2010/11	2,3%	0,5%	24,8%	5,3%	21,8%	0,0%	0,0%	25,8%	7,0%	2,7%	9,7%
	Italian		2,1%	0,7%	39,9%	5,7%	14,9%	0,4%	0,0%	14,2%	5,0%	1,4%	15,7%
	Other		4,8%	1,1%	35,1%	8,1%	15,7%	0,0%	0,3%	10,7%	5,6%	1,7%	16,9%
	Swiss	2011/12	1,2%	0,2%	25,5%	3,3%	24,7%	0,0%	0,0%	24,8%	8,1%	2,1%	10,2%
	Italian		3,3%	0,0%	32,5%	3,0%	22,2%	0,0%	0,0%	15,6%	8,6%	1,7%	13,2%
	Other		2,0%	1,0%	35,1%	5,8%	20,2%	0,0%	0,0%	12,1%	4,5%	2,8%	16,4%

3.4 The Role of the VET

If we compare the school immediately begun after the end of the lower secondary school with the qualification achieved within 2020 by the youngsters of the above-mentioned cohorts, we can observe that in each cohort, between 74% and 79% of those who had enrolled in a high school obtain a high school baccalaureate. Moreover, less than 5% migrate to the Canton School of Commerce and complete it and the remaining ones obtain a vocational qualification, which, in most cases, is a vocational baccalaureate (Figure 4). If in the cohorts further back in time about 10% of those who after the lower secondary school had enrolled in a high school have migrated into the VET and ended up obtaining a vocational baccalaureate, in the most recent cohorts this percentage is lower. This is probably because those who have not achieved any high school baccalaureate within the regular period are still in education. Among those who after the compulsory education had enrolled in the Canton School of Commerce, in some cohorts the percentage of young people who own a vocational baccalaureate is close to 20% and the share of those who obtain a federal VET diploma is around 5%. It is therefore very evident that the VET, in addition to provide a post-compulsory qualification to over 60% of youngsters belonging to the middle – lower social class group and to a similar percentage of foreign students (Figure 3), plays a very important role in containing the school dropout of those who are unable to complete a baccalaureate school. To the latter it gives the opportunity to obtain a qualification.

As for those who after the lower secondary school had begun a vocational training program, over 80% manage to achieve within 2020 at least one qualification, which in full-time vocational training is more frequently a federal vocational baccalaureate and in the case of dual training is more often a federal VET diploma (Figure 4).

What is interesting to remark is that in each of the four cohorts the percentage of those holding a vocational baccalaureate is higher among girls, students of the more advantaged households and of Swiss nationality (Figure 5). Despite the important equalization role played by the VET in upper secondary education, even in this kind of less elitist education, a sort of stratification is observed. The privileged social groups show, in facts, a higher propensity to achieve those degrees that give access to tertiary education, while the more disadvantaged ones more frequently achieve a Federal VET diploma or a Federal VET certificate. These differences could depend on what Goldthorpe calls strategies “from below” pursed from less advantaged class origins and strategies “from above” for more advantaged class origins (Goldthorpe, 2007). Strategy from below imply that individuals of working-class background, faced with the choice of stopping at a Federal VET diploma and obtaining a vocational baccalaureate that allows to enroll in a university, lead, unless the young person is particularly brilliant, to opt for the former. In facts, this is the option that seems safer and that gives in any case the opportunity to those coming from the lower strata to make a small leap of mobility upwards. Young people from the most disadvantaged classes achieve more frequently the vocational baccalaureate, in case of failure to complete the high school as in this case they think that it is safer to leave. The strategy from above, in contrast, push youngsters of upper class to remain in the high school path (5.4% of unknown destinations could concern both transfers outside Ticino and enrollments in private high schools, which are not included in the database). Should they enroll in a vocational program, they would opt for the vocational baccalaureate, as in this case it represents the safest way to the intergenerational maintenance of the class position (Erikson & Jonsson, 1996; Breen & Goldthorpe, 1997; Glauser & Becker, 2016).

Figure 4

School or training attended or qualification achieved within 2020 according to the school or training begun at the end of the lower secondary school (GAGI).

Compulsory education last year	School/training originally attended after compulsory education	Federal VET diploma	Federal VET certificate	Vocational baccalaureate	High school baccalaureate	Canton school of commerce baccalaureate	Specialised school baccalaureate or certificate	Unknown destination
2008/09	High school	1,6%	0,0%	11,1%	74,2%	4,4%	2,6%	6,0%
	Canton school of commerce	5,7%	0,0%	16,7%	0,0%	71,4%	1,6%	4,5%
	VET dual system	66,7%	4,8%	18,3%	0,0%	0,0%	0,0%	10,2%
	VET full time	22,1%	0,6%	70,6%	0,0%	0,3%	0,9%	5,5%
2009/10	High school	1,8%	0,0%	10,5%	77,4%	3,3%	1,5%	5,4%
	Canton school of commerce	4,5%	0,0%	12,8%	0,0%	79,7%	0,4%	2,6%
	VET dual system	64,8%	6,3%	19,4%	0,0%	0,2%	0,0%	9,2%
	VET full time	30,3%	1,7%	59,8%	0,7%	0,3%	0,7%	6,5%
2010/11	High school	1,6%	0,0%	9,1%	78,5%	2,9%	1,5%	6,4%
	Canton school of commerce	5,2%	0,0%	18,1%	0,0%	71,6%	0,4%	4,8%
	VET dual system	61,2%	7,4%	23,8%	0,0%	0,0%	0,1%	7,4%
	VET full time	29,9%	0,6%	62,4%	0,3%	0,5%	0,0%	6,3%
2011/12	High school	1,8%	0,0%	9,8%	74,8%	4,8%	1,6%	7,2%
	Canton school of commerce	3,6%	0,0%	19,8%	0,0%	73,0%	0,8%	2,8%
	VET dual system	62,0%	7,3%	22,4%	0,1%	0,1%	0,0%	8,1%
	VET full time	27,1%	2,2%	61,6%	0,2%	0,3%	0,2%	8,5%
2012/13	High school	1,6%	0,1%	6,5%	79,4%	3,8%	1,5%	7,0%
	Canton school of commerce	5,0%	0,0%	17,3%	0,7%	73,0%	0,7%	3,2%
	VET dual system	57,4%	8,3%	22,7%	0,0%	0,0%	0,0%	11,6%
	VET full time	34,0%	1,7%	54,5%	0,2%	0,6%	0,5%	8,6%
2013/14	High school	2,1%	0,1%	5,5%	77,2%	3,6%	1,6%	9,9%
	Canton school of commerce	4,2%	0,8%	15,1%	0,4%	73,6%	0,4%	5,4%
	VET dual system	59,3%	6,1%	22,7%	0,0%	0,3%	0,2%	11,4%
	VET full time	30,0%	2,4%	55,5%	0,2%	0,3%	0,2%	11,5%
	Pre-apprenticeship integration progr.	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	Pre-apprenticeship orientation progr.	42,7%	19,1%	2,2%	0,0%	0,0%	0,0%	36,0%
	Motivation semester	31,6%	15,8%	0,0%	0,0%	0,0%	0,0%	52,6%
2014/15	High school	0,7%	0,0%	3,6%	76,8%	2,3%	0,4%	16,1%
	Canton school of commerce	5,1%	0,4%	10,2%	0,9%	69,4%	1,3%	12,8%
	VET dual system	59,6%	5,7%	19,9%	0,0%	0,1%	0,1%	14,5%
	VET full time	26,3%	2,6%	51,2%	0,1%	0,1%	0,7%	18,9%
	Pre-apprenticeship orientation progr.	32,4%	19,4%	1,2%	0,0%	0,0%	0,0%	47,1%
	Motivation semester	33,3%	0,0%	0,0%	0,0%	0,0%	0,0%	66,7%

Figure 5

Percentages of vocational baccalaureates achieved within 2020 by youngsters of four different cohorts who, after the lower secondary school, had enrolled in the VET according to gender, socio-economic origin and nationality (GAGI).

VET originally attended after compulsory education	Compulsory education last year	Females	Males	High skilled workers	Middle skilled workers	Low skilled workers	Swiss	Italian	Other
VET dual system	2008/09	20,7%	17,3%	21,0%	16,5%	5,9%	20,4%	15,9%	12,4%
	2009/10	24,0%	17,4%	25,5%	18,4%	15,3%	22,1%	10,7%	10,6%
	2010/11	26,4%	22,8%	33,4%	22,2%	13,5%	27,9%	15,7%	10,6%
	2011/12	25,9%	20,9%	26,4%	22,0%	13,3%	25,4%	17,3%	11,0%
VET full time	2008/09	72,6%	68,6%	74,5%	65,6%	62,5%	71,9%	48,3%	70,7%
	2009/10	63,5%	56,2%	67,7%	58,5%	38,5%	64,7%	44,4%	47,6%
	2010/11	64,9%	58,8%	67,4%	60,3%	60,6%	66,0%	50,0%	51,5%
	2011/12	62,6%	60,7%	65,4%	60,8%	55,8%	65,6%	61,4%	46,7%

4 Conclusions

The analysis confirms that in Ticino, as in the rest of Switzerland, vocational training gives many young people the opportunity to obtain a post-compulsory degree. Some of these youngsters enroll in the VET after the lower secondary school; others after having attended a transitional solution and a third group after having started and interrupted the baccalaureate school track. For the latter, the VET constitutes a sort of life raft that prevents them from entering the labor market without any post-compulsory education and from exposing themselves to greater risks of unemployment, precariousness and social exclusion in adulthood.

Although the reputation enjoyed by vocational training is probably better than in countries such as Britain, where the VET has a long history of stigmatization, stereotyped and devalued as education more suitable for children of the working classes (Reay, 2017), even in Ticino children with lower educational background follow more frequently vocational tracks. Children with higher parental background, on the contrary, more often pursue academic education.

Universities of Applied Sciences offer more opportunities for children from lower social backgrounds who have followed the vocational track to reach higher education through a vocational baccalaureate, but in facts even among those who have attended the VET a certain inequality is observed. The vocational baccalaureate is in facts more frequently achieved by youngsters from privileged households and with Swiss nationality. Youngsters from more disadvantaged background, on the contrary, show a higher propensity to achieve a federal VET diploma or certificate, which does not allow them to continue their studies. In an increasingly knowledge-driven global economy, where tertiary education is more important than ever before, that could result in a risk of inequality in the future. Moreover, not all young people are able to achieve a vocational degree: eight years after the last year of lower secondary school around 12% of youngsters in each cohort neither are enrolled in any education or training nor have obtained any post-compulsory qualification in Ticino. If some of them could simply have left Ticino, some could be real NEET. The latter, who, despite the transitional solutions aimed at supporting them, were not able to enroll in the VET or to complete it, are certainly the group at higher risk of exclusion.

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Biographical notes

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