VETNET
European Research Network
Vocational Education and Training

Christof Nägele, Natasha Kersh and Barbara E. Stalder (Editors)
Introduction to the papers: Marg Malloch

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

Yerevan, 2022

23 - 25 August 2022 (in-person)
01 - 10 September 2022 ECER Plus (online)

VETNET
European Research Network
Vocational Education and Training

ISBN: 9798844516740
Imprint: Independently published

zenodo.org/community/vetnet/
www.vetnetsite.org

Nägele, C., Kersh, N., & Stalder, B. E. (Eds.) (2022). *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET).*
https://doi.org/10.5281/zenodo.7002250

Editorial

We are happy and proud to present the 5th edition of the VETNET ECER Proceedings. We'd like to thank all authors for their contributions.

This year is again a special ECER conference, which is, in fact, two conferences: The papers in the Proceedings are either presented in-person in Yerevan, Armenia, or at the ECER or online during ECER plus.

Marg Malloch has contributed a concise and condensed overview of the papers that are united in this Proceedings, see below.

We wish all a great time reading the papers and hope that they contribute to exchange, vivid discussions and mutual learning.

Dr Christof Nägele VETNET chair/link convenor of VETNET
University of Applied Sciences and Arts Northwestern Switzerland, School of Education

Dr Natasha Kersh, VETNET board member
IOE, UCL's Faculty of Education and Society

Professor Dr Barbara E. Stalder, VETNET chair/link convenor
Bern University of Teacher Education

Developments of VET Research Mirrored in the Papers of VETNET at the ECER

This year's conference theme *Education in a Changing World: The impact of global realities on the prospects and experiences of educational research* encapsulates our experiences of the past two years – the first two years of the Covid19 pandemic. Physical movement and communication were restricted, with periods of isolation due to lockdowns, having the virus or having been a contact. Globally, health, governments, economies, employment, transport and manufacturing were jolted out of complacency.

As is so frequently noted, our worlds as we knew them changed suddenly and in education a rapid change to a much increased usage of online learning. We are now slowly emerging to a hybrid blend of online and face-to-face activities. Conferences are slowly reviving, and as ECER this year, also employing a hybrid mode of presentation, with the in-person conference in Yerevan, Armenia, and the online conference ECER plus.

The Vocational Education and Training Network has moved beyond the everyday exigencies of the pandemic to present a robust programme on current and future issues and challenges to Vocational Education and Training (VET). A pleasing programme of qualitative, quantitative and mixed methods research is presented. The impact of the past two years is evident in the research methods employed, for example, document analysis and interviews conducted virtually.

The 20 papers and one symposium presented in these Conference Proceedings ably demonstrate the range of research priorities for the Network, which encompasses:

- Comparison of VET cultures and Governance of VET systems
- Qualification frameworks, competence assessment
- Teachers' and trainers' professional development
- Careers, transitions and guidance & counselling
- Work-based learning, partnership of learning venues
- Social issues in VET and social impact of VET provisions
- Pedagogic support by digital media

In the vocational education and training sector ingenuity was required as to how to cater for workplace learning and demonstration of skills in a work setting. VET teachers, trainers and learners had to adjust quickly, developing simulations and imaginative at home activities as well as rescheduling work-based activities to engage learners and to meet the requirements of their courses, with varying degrees of success. Learners have missed the face-to-face interactions with peers and teachers and opportunities for networking and career development.

Key themes emerging from the VETNET proceedings are encouraging; to learn from this challenging time and to move forward positively. There is a bringing together of theory and practice, encompassing VET related policies, comparisons of VET systems and cultures, practice based learning, learning designs, new media and curricular innovations.

An important distinction is the positioning of the learner as central in vocational education and training. Flexibility and confidence, relevance and a supportive learning community are advocated. Transformative learning, hybrid learning, collaborative learning, lifelong learning and peer learning are all identified as desirable for VET in schools, higher education and the workplace. Learning from errors and irritations also contributes to the vocational learning journey.

In a time of increased utilisation of technology, digital technologies provide opportunities for creative, imaginative approaches such as virtual environments for students, teachers and workplaces.

Research into educators working together on their professional development to address challenges provides ideas and models for others to utilise. Collaborative research between vocational school leaders and a university and SMEs and a university provides a model for successfully addressing education in a changing world. Cross-country and comparative research provide insights into VET systems and also address the challenges of a changing world.

The authors and editors are to be congratulated on these proceedings, which provide insights into European developments that have relevance internationally.

We hope that you will be inspired to join the VETNET.

Professor Dr Marg Malloch
VETNET Board Member
Victoria University Melbourne

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

Table of contents

VETNET
European Research Network
Vocational Education and Training

Altay, Ö. (2022). Transformation for rural development: An analysis of perspective transformation of participants of a VET course in agriculture. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 1–9). https://doi.org/10.5281/zenodo.6972232

Transformation for Rural Development: An analysis of Perspective Transformation of Participants of a VET Course in Agriculture

Altay, Özge
ozge.altay@baucyprus.edu.tr, Bahçeşehir Cyprus University

Abstract

Context: Sustainable rural development depends on how swiftly new knowledge, and practices are accepted, adopted, and implemented and formal, non-formal and/or informal vocational training opportunities designed specifically for agriculture sector can cater for much needed knowledge transfer. This study is situated in such a context; through a qualitative methodology, it aims to explore to what extent the implementation of a modular pilot vocational education and training (VET) programme is effective in terms of fostering a "perspective transformation" towards adoption of better, novel, and innovative practices in agriculture (Mezirow, 1991, 2000).
Approach: In order to determine whether the participant farmers experienced a perspective transformation, the Learning Activities Survey and Follow-up Interview Form developed by King (1997) were employed as data collection tools. The study group consisted of practising farmers (n=16) who have successfully attended and completed at least two modules of the programme.
Findings: As a result of the data analysis, the PT Index Scores reveal that the majority of the participants (n=12) have experienced a perspective transformation as a result of the training they have received. The majority of participants (n=10) who have experienced a perspective transformation have noted that it was induced because of the unconventional approach of the delivery of courses. A total of 11 participants revealed that the field visits were effective for their experience of transformation while one participant informed that the transformation was induced during classroom discussions with peer farmers.
Conclusion: This study aims to identify and discuss the efficiency of a modular pilot VET programme in agriculture that is designed and targeted to meet the identified needs of farming community in northern part of Cyprus for adoption of better practices. The results of this study can be useful for a broad range of stakeholders that are active in agricultural sector; education and training institutions that deliver agricultural training, agricultural policymakers aiming for sustainable rural development practices, educational practitioners and/or consultants active in the sector, vocational education, and training authorities as well as curriculum developers.

Keywords: VET in agriculture, transformative learning theory, perspective transformation, lifelong learning, rural development

1 Introduction

There is no shortage of challenges that dominate the agriculture sector today, and incessant flow and implementation of knowledge and innovation are necessary to cope with these challenges if successful rural development is targeted. Rural development is a multifaceted process and comprises variables such as sustainable production, natural resource management, policy-

making and institutional decision-making, climate change, infrastructure, finance, and education and training, each of which confronts distinct challenges on its own (Maalouf, 1988; Maguire, 2000). This calls for new skill sets even for experienced and trained farmers, and ordain efficient use of resources, sustainable production methods through best practices, action against climate change and integration of innovation and new technologies. At the core of rural development, agriculture is a knowledge and research-intensive area. It is critical that the farmers, as key stakeholders for rural development, receive, accept, and implement innovation and knowledge at the same pace these are produced.

However, the flow of knowledge in agricultural sciences is top-down, hence positioning information and new knowledge at an abstract status. Traditional and conventional approaches to the transfer of agricultural knowledge often fail to meet agricultural practitioners' real needs on the field (Lioutas, 2019). Also, new, research-based knowledge is not always readily available for the farming community which relies heavily on empirical practical experience. 2017 European Parliament briefing by Augère-Granier indicates that only 8.5 % of the present generation of European farmers are qualified with a degree in agriculture whereas as much as 70 % rely solely on practical experience which does not qualify as verifiable vocational training (2017).

In such a context, whether already practising members of the farming community or the aspiring younger generation, vocational education and training (VET) and lifelong continuous professional development are crucial for farmers. Here, lifelong learning emerges as a prospect to help farmers of various ages and educational backgrounds gain new knowledge, skills, and competences that are necessary to capitalise from if balanced dynamics for rural development is targeted. Sustainable rural development depends on how swiftly these practices are adopted and implemented. Therefore, as much as making the new knowledge and skills ready for the farming community, internalisation and adoption of these are critical. It is important to track, enquire and follow up on how and to what extent this new knowledge and information is internalised and utilised by the recipient farming community.

2 Theoretical Framework

One approach to take on to enquire whether introduction of new knowledge and skills have resulted in construction of new ways of thinking and doing is to employ the lens of transformative learning theory (Anderson et al, 2018; Galt et al., 2013; Parr & Trexler, 2011). An attempt to assess agricultural training from such lens may provide answers in multiple aspects. First it may serve to understand if a proposed vocational and technical curriculum could challenge, and shift farmers' set of habitual views, schemas, and structures of belief in their own conventional and traditional practices. Secondly, since transformative learning theory builds on experiences in formal, non-formal and/or informal educational settings as sources for perspective transformation, such assessment may present evidence whether the proposed curricula provide effective experiential instances to induce perspective change.

Transformative learning theory has foundations associated with a wide variety of philosophical and psychological theories and approaches; Kuhn's (1962) concept of philosophical paradigm, psychoanalytic theory (Dirkx, 1998; Kitchenham, 2008; Mezirow, 1978a), constructivist approach, Freire's (1970) concept of conscientization and Habermas's (1971, 1984) domains of learning and types of knowledge (Arı, 2015; Calleja, 2014; Dirkx, 1998; Kitchenham, 2008). For Mezirow (2000, 1991, 1997), transformative learning theory focuses on people's meaning-making processes. Therefore, transformative learning is a process that enables individuals to become more inclusive, open, emotionally sensitive, and reflective so that they can form beliefs and ideas that can guide their actions in a more real and reasonable way. In one sense, the theory is about how individuals form and act on their own objectives, values, feelings, and meanings, rather than assumptions they acquire from others without the filter of critical

consideration, so that they can have more say in their lives as socially responsible, open-minded decision-makers (Mezirow, 2000).

In a similar line, Cranton (2016) states that her definition of the foundations of transformative learning is based on this first definition of Mezirow; transformative learning is a process in which assumptions, beliefs, values, and perspectives that have not been critically evaluated before are questioned, thereby making those assumptions, beliefs, values, and perspectives more open, permeable, and better justified. In its simplest form, Mezirow (2003) defines transformative learning as the process of individual's understanding and knowing himself or herself. This process should lead to changes in the way the individual sees himself/herself, the world, and his/her own experiences, and ultimately differentiate his/her general perspective.

According to transformative learning theory, experiences play a central role in adult learning. When the individual brings the new knowledge, he/she has acquired through experiences to the awareness of his consciousness, he enters a reflection process about how this new knowledge is compatible with existing belief, value structures and ways of being/doing. If the new information is compatible with the past beliefs and value structures, the individual continues his/her life without any change in these patterns and does not make any transformative changes. However, suppose this new information that comes to the consciousness of the individual through experience does not fit into the older patterns and schemas acquired in the past. In that case, a process of harmonisation and balancing begins between the new conflicting information and the existing beliefs and values, initiated by questioning the beliefs, values, and assumptions about what this incompatible piece is. From time to time, the new knowledge gained in this balancing process prevails, and a new perspective begins to take root in the individual (King, 2009; Mezirow, 1997). Mezirow (1995) describes these “changing events in our lives can make us feel that old meaning perspectives have become dysfunctional” and “that no matter how much harder we try, things do not seem to fit old ways of seeing any longer” (p. 44). The whole cycle of this process is defined as perspective transformation and can be considered as the transformation of meaning structures acquired by individuals throughout their lives (Mezirow, 1991, 1997, 2003).

Transformative learning theory describes adult learning as the intentional acquisition of an individual's beliefs, values, and assumptions through a critical reflection process as a result of an experience in formal or non-formal educational environments and/or informally in life. In this context, Mezirow (1991, 2000) defines perspective transformation as a ten-stage process that includes cognitive dimensions such as exploration, evaluation, self-examination and planning as part of the learning experience (Senyshyn, 2018). Therefore, perspective transformation is the structural transformation of the individual's perception of himself/herself and his/her relationships with the world (Mezirow, 1978b). Mezirow's perspective transformation has been defined in his previous works as steps, phases or stages leading to a transformation that begins with a disorienting dilemma and ends in a state of regained equilibrium (Mezirow, 1991, 1994).

However, Cranton (2002) also states that in most of the later research on transformative learning theory, although many of these steps of the process have remained in one way or another, they are no longer seen as linear steps to be followed definitively. In this study, perspective transformation is handled as a process consisting of ten transformation phases as revealed by Mezirow (1991, 2000) as follows:

1. Disorienting dilemma / 2. Self-examination / 3. Critical assessment / 4. Recognition of shared experiences/ 5. Exploring options for new behaviour / 6. Planning a course of action / 7. Acquisition of knowledge / 8. Trying new roles / 9. Building confidence / 10. Reintegration

Although these phases outline a linear direction for perspective transformation, an individual might still experience perspective transformation and still assess himself/herself to have gone

through only the first few stages. This is why Cranton (2002) states that transformative learning is not a linear process. However, it can have a circular structure.

As discussed above, assessing recipient farmers' experiences from the lens of transformative learning theory may serve to understand whether the implemented educational intervention challenged and shifted the farmers' old and dysfunctional patterns of thought, belief, and practices or not. Therefore, this study attempts to explore to what extent the pilot implementation of a vocational and technical curriculum that is designed and developed by an EU Technical Assistance Project tasked with the Implementation of Farm Advisory Services (FAS) in northern part of Cyprus is effective in terms of fostering a "perspective transformation" towards adoption of better, novel, and innovative practices in agriculture (Mezirow, 1991, 2000). In this context, this study aims to analyse the effect of a pilot modular VET programme in agriculture on participant farmers' perspective transformation towards adoption of better practices in agriculture and seeks to answer the following research questions:

I. Was the pilot modular VET programme in agriculture effective to induce perspective transformation of farmers towards adoption of better practices in agriculture?
II. How do farmers describe their experience of perspective transformation through the implementation of a modular VET programme in agriculture?
III. In which phases, as defined by Mezirow (1991, 2000) this perspective transformation has occurred?
IV. Which element of the pilot VET programme has facilitated this perspective transformation?

3 Methodology

This study employs a qualitative methodology to explore the experiences and views of participant farmers to the pilot modular VET programme in agriculture. In order to determine whether the participant farmers experienced a perspective transformation towards the adoption of better practices in agriculture as a result of the implemented VET curriculum, the Learning Activities Survey (LAS) and Follow-up Interview Form (King, 1997) were employed as data collection tools. The survey was also used to determine at which dimensions the farmers have experienced the perspective transformation as defined by Mezirow (1991, 2000) and to identify the activities that contributed to this transformation. The data analysis is conducted as per guidelines by King (2009) and the Perspective Transformation (PT) Index score obtained by the participants determine whether the farmers have experienced the perspective transformation or not. The qualitative analysis of the Follow-up Interview Forms provides a deeper understanding of the experience of farmers. The translation and adaptation of both instruments which are developed by King (1997) were completed by the researcher as per previous approval by King.

3.1 Study Group

The study group consists of a total of 16 practising farmers who have attended and successfully completed at least two modules of the VET programme in agriculture. A total of eight participants are female while the remaining eight are male. The farmers could opt for any of the eight thematic modules based on their area of production and/or interest as long as they complete the obligatory, cross-cutting module on Introduction to Farm Management. All the farmers in the study group have completed the cross-cutting Introduction to Farm Management module. Following the completion of this obligatory module, a total of five participants completed Advanced Beekeeping, seven have completed Sheep and Goat Herd Management and four have completed Dairy Cattle Herd Management modules.

3.2 Pilot VET Programme in Agriculture

The modular pilot VET programme in agriculture is designed, developed, and implemented by the EU Technical Assistance Project, tasked with the Implementation of Farm Advisory Services (FAS) in northern part of Cyprus. The design, development and delivery of the training is conducted under the task of provision of advice and providing technical assistance to farmers which are two of the many tasks of the project. The proposed VET curriculum was based on the needs analysis that was also conducted by the experts engaged by FAS project. The needs analysis conducted by the project revealed that effective education and vocational training opportunities were not available for farmers. The farmers were offered limited, scattered, and short-term ad-hoc courses organised by either NGOs or other institutions which mostly fail to generate a longer-lasting effect on adoption of better agricultural practices. In such a context, design, development and implementation of a standardised vocational education and training course for both crop and livestock production with a strong component in farm management practices was deemed critical for rural development in northern part of Cyprus.

The modular curriculum was designed to be compatible with the European Qualifications Framework (EQF) and consisted of eight thematic modules based on the results and priority areas outlined following the needs analysis. The delivery methods of the modules included both theoretical and practical sessions with an emphasis on the practical aspect of agricultural practices for both crop and livestock production. The duration, hours of theoretical and practical sessions of each module varied based on the content. The thematic modules were as follows:

1. Introduction to Farm Management (28 hours, basic, obligatory)
2. Citrus Growing (32 hours, advanced, elective)
3. Olive Growing (32 hours, advanced, elective)
4. Advanced Beekeeping (28 hours, advanced, elective)
5. Dairy Cattle Herd Management (32 hours, advanced, elective)
6. Sheep and Goat Herd Management (36 hours, advanced, elective)
5. Organic Agriculture (26 hours, advanced, elective)
6. Advanced Organic Agriculture (32 hours, advanced, elective)

Each thematic unit was organised in a varying number of Learning Units (LUs) which lasted for four hours and corresponded to one session so that the participation of farmers was ensured. The LUs were structured to deliver a corresponding set of Learning Outcomes (LOs), which were pre-defined in terms of knowledge, skills, and competences which the farmers would be able to apply in his/her own professional context. The objectives for best agricultural practices in the EU such as natural resources management, efficient use of resources, soil management, better animal welfare, hygienic practices to attain food safety at farm level, conscious use of pesticides and other chemicals in the farm, occupational health, and safety and others comprised an intrinsic part of all the thematic modules to direct participant farmers to implementation of standard that were close to the EU.

In order to ensure complete participation of the farmers, the maximum allowed number of participants to each module was limited to 15 trainees. All the content was developed by the experts engaged by FAS project in accordance with the identified LUs and LOs. The language of instruction and training materials were Turkish, and all the sessions were delivered by experts engaged by FAS project. The modules were delivered in accordance with the seasonality of the theme to ensure that the practical demonstrations and activities could be carried out in the right period (e.g. exercise of olive pruning and harvesting should be done in November; honey harvesting in spring/summer etc.). The scheduling of the thematic modules was organised respecting farmers' daily and seasonal workload; in such a timeframe when farmers were able to successfully attend the courses (e.g. livestock breeders were not engaged in lessons in

the morning or late afternoon because they would be busy milking animals, etc.). The participants could choose to attend one or more modules depending on their area of production and/or interest. Upon full attendance and successful completion of the courses the participants received a certificate of achievement signed by relevant Turkish Cypriot bodies responsible for agriculture and education.

3.3 Data Collection Tool, Data Collection Process and Data Analysis

The data collection tools employed to identify whether the modular pilot VET programme in agriculture was effective to induce perspective transformation of the participant farmers were Learning Activities Survey (LAS) and Follow-up Interview Form developed by King (1997). The LAS was developed in 1997 by Cathleen P. King who was one of the leading researchers of transformative learning theory. King (1997) states that the two main purpose of LAS are (i) to determine whether there is a perspective transformation in relation to the educational experience and, if so, (ii) to determine which learning activities conducted contributed to this transformation. King (1997) defines perspective transformation as central to learning in the context of andragogy. She developed LAS based on the need for a better understanding of perspective transformation, which is both an integral part of adult learning and essential for the realisation of transformative learning, considering the lack of tools to enable empirical evaluation of perspective transformation in the literature. Transformational learning theory (Mezirow, 1978a, 1978b) forms the theoretical basis of LAS, and there are two major reasons to employ LAS and Follow-Up Interview Form as the data collection tools in this study. First of all, the curriculum objectives developed are related to the changes that farmers will experience in the acquisition of knowledge and skills for better practices. These changes, which are expected to be experienced in form of competence, habitual ways of thinking and doing are related to the practices carried out during the educational activities and the experiences of the participants regarding these practices.

LAS provides an opportunity to understand what these activities are, what kind of classroom experience the farmers have had, and what their reflections include. In addition to this, the survey also reveals if the farmers experienced a perspective transformation and if they did, it also reveals at what phase this had happened. LAS also provides information on whether the factors that initiated this transformation are related to classroom experience or other dynamics effective in life. Thus, the researcher can clearly identify whether the source of the participant's perspective transformation is directly related to educational activities and practices. LAS consists of 14 questions in which quantitative and qualitative data were collected, and the Follow-up Interview Form consists of eight questions in which only qualitative data were collected. As a data collection tool, the optional, closed-ended, and open-ended questions in the entire survey are intended to determine whether the participants have experienced a transformation in perspective. The validity and reliability of the instrument were conducted by King (1997).

The data collection process was completed over a six-week period following the certification of the farmers based on voluntary participation. Necessary approvals have been obtained from authorities of FAS project to feature the participant group as sample. The farmers were first asked to fill LAS. The scoring criterion for LAS is a composite score, which is defined by King (1997) as the Perspective Transformation Index/PT Index and consists of the answers to questions 1, 2, 3 and 5 in the first part of the survey. The PT Index is presented as the criterion score. If the participants experienced a transformation related to the training they received, the PT-Index is stated as PT-Index=3, if the transformation they had experienced which was not directly related with the training they received, PT-Index is stated as PT-Index=2, and if they had experienced perspective transformation at all PT-Index is stated as PT-Index=1.

Upon first analysis of the data, the participants who revealed a perspective transformation had been contacted again to conduct follow-up interviews in order to obtain in-depth

understanding of their experience. These interviews were recorded and then transcribed for coding. The coding process was completed by the researcher. There are different approaches to ensure the reliability of coding, and intercoder reliability can be calculated in various ways (Cohen, 1960; Krippendorff, 1980; Miles & Huberman, 1994; Scott, 1955). In this study, in order to ensure coding reliability, the similarities and differences of the codes obtained from the data set were compared numerically by using a single approach in the analysis of qualitative data. This technique, which is based on numerical comparison of codes determined by different coders and understanding whether similar codes are used or not, is defined as intercoder reliability by Miles and Huberman (1994). According to this, "intercoder reliability can be calculated by dividing the number of agreed codes by the total number of agreed and non-agreed codes" (Arastaman et al., 2018) Yıldırım and Şimşek (2016) state that a reliability percentage of at least 70 % should be achieved in such studies. Miles and Huberman (1994) suggest that an initial rate of 70 % is acceptable, but it should be close to 90 % depending on the size of the dataset. However, Miles and Huberman (1994) stated that an agreement of 80 % on 95 % of the codes among different coders is sufficient for intercoder reliability. For this purpose, the interview transcripts, which were taken randomly from data set to form 80 % of the data set, were coded by another researcher other than the researcher, and the reliability was calculated by dividing the number of agreed codes by the sum of the number of agreed and disagreed codes and multiplying by 100 ([Consensus/(Disagreement+Consensus)]*100). Accordingly, the reliability rate of 83 % was reached and it was accepted that the reliability of the coding was ensured due to the intercoder reliability being over 70 % (Miles & Huberman, 1994; Yıldırım & Şimşek, 2016).

3.4 Researcher's position

The researcher was not engaged in any of the processes of development, design, and delivery of the training programme. This had ensured complete neutrality in terms of the results obtained. The content and the views presented in this study are those of the researcher alone. They do not in any way represent the official opinion of the European Union.

4 Findings

As a result of the data analysis, the majority of the participants (n=12) scored with a PT-Index=3. This finding reveals that a total of 12 participant farmers were challenged by the training provided and experienced a shift in their existing belief, view and practice schemas and structures. This finding is significant in terms of the capacity and potential of the content, delivery methods and overall structure of the pilot VET programme to change conventional, habitual ways of doing and initiate internalisation of new knowledge and skills towards better and more sustainable practices in agriculture. The embedded objectives to attain best agricultural practices similar to the ones in the EU such as natural resources management, efficient use of resources, soil management, better animal welfare, hygienic practices to attain food safety at farm level, conscious use of pesticides and other chemicals in the farm, occupational health, and safety and others had an impact on the participant farmers to have a perspective transformation and caused them to change their ways of thinking and doing.

Among those participants who have experienced a perspective transformation a total of 10 have noted that it was induced because of the unconventional approach of the delivery of courses. During follow-up interviews they further detailed this as the distribution of theoretical and practical sessions throughout the courses. The practical sessions which were conducted as field and farm visits were noted as the most effective means to initiate the change in participant farmers perspectives. One of the farmers who have experienced perspective transformation revealed that this was induced during discussions with peer farmers during one of the classroom sessions. Among other statement the farmers indicated that they were "impressed by the farm

visits", "learned new ways of managing the farm", "realised the importance of bookkeeping" and "gained new knowledge".

5 Conclusion

This study aims to explore and discuss the effectiveness of a modular pilot VET programme in agriculture that is developed to meet specific needs of farmers in northern part of Cyprus. The implementation of the systematised pilot VET programme included unconventional methods such as practical field and farm visits, discussion sessions and demonstrations. The results obtained from this study is informative for a diverse group of actors that are involved in rural development work and studies. These can be listed as training institutions involved in delivery of agricultural training, policymakers, educational practitioners, farm advisors, farmers, and other agricultural practitioners. The findings of the study reveal that farmers can shift and change their previous perceptions, beliefs, ways of thinking and doing through effective educational experiences.

References

Anderson, C. R., Maughan, C., Pimbert, M. P. (2018). Transformative agroecology learning in Europe: building consciousness, skills and collective capacity for food sovereignty. *Agriculture and Human Values*, *Symposium/Special Issue*. https://doi.org/10.1007/s10460-018-9894-0

Arastaman, G., Öztürk Fidan, İ., & Fidan, T. (2018). Nitel araştırmada geçerlik ve güvenirlik: Kuramsal bir inceleme. *YYÜ Eğitim Fakültesi Dergisi*, *15*(1), 37–75.

Arı, A. (2015). *Alternatif öğrenme öğretme yaklaşım ve yöntemleri*. Eğitim Yayınevi

Augère-Granier, M. L. (2017). *Agricultural education and lifelong training in the EU*. Retrieved from https://www.europarl.europa.eu/RegData/etudes/BRIE/2017/608788/EPRS_BRI(2017)608788_EN.pdf

Calleja, C. (2014). Jack Mezirow's conceptualisation of adult transformative learning: A review. *Journal of Adult and Continuing Education, 20*(1), 117–136.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement, 20*, 37–46

Cranton, P. (2016). *Understanding and promoting transformative learning: A guide to theory and practice*. Stylus Publishing.

Cranton, P. (2002). Teaching for transformation. *New Directions for Adult and Continuing Education, 93*, 63–71.

Dirkx, J. M. (1998). Transformative learning theory in the practice of adult education. PAACE Journal of Lifelong Learning, 7, 1–14.

Freire, P. (1970). *Pedagogy of the oppressed*. Herter and Herter.

Galt, R.E., Parr, D., Van Soelen Kim, J. Beckett, J. Lickter, M. Ballard, H. (2013). Transformative food systems education in a land-grant college of agriculture: the importance of learner-centered inquiries. *Agriculture and Human Values, 30*, 129-142.

Habermas, J. (1971). *Knowledge of human interests*. Beacon.

Habermas, J. (1984). *The theory of communicative action: Vol. 1 Reason and the rationalization of society*. Beacon.

King, K. P. (1997). *Examining activities that promote perspective transformation among adult learners in higher education* [Doktora]. Widener University.

King, K. P. (2009). *The handbook of the evolving research of transformative learning based on the learning activities survey* (10th Anniversary Edition). Information Age Publishing.

Kitchenham, A. (2008). The evolution of John Mezirow's transformative learning theory. *Journal of Transformative Education, 6*(104), 10–123.

Krippendorff, K. (1980). *Content analysis: An introduction to its methodology* (2nd ed.). Sage.

Kuhn, T. (1962). *The structure of scientific revolutions*. University of Chicago Press.

Lioutas, E.D., C. Charatsari, M. Černič Istenič, G. La Rocca, and M. De Rosa. (2019). The challenges of setting up the evaluation of extension systems by using a systems approach: The case of Greece, Italy and Slovenia. *The Journal of Agricultural Education and Extension, 25*(2), 139–160.

Maalouf, W. D. (1988). Views on strategies for higher agricultural education in support of agricultural and rural development. *Agriculture and Human Values*, Fall, 40-49.

Maguire, C. (2000). From agriculture to rural development: Critical choices for agriculture education. SD Dimensions. Sustainable Development Department (SD). Food and Agriculture Organization of the United Nations

(FAO). Paper presented to the 5th European Conference on Higher Agriculture Education, Plymouth, United Kingdom,
Mezirow, J. (1978a). *Education for perspective transformation: Women's re-entry programs in community colleges*. Teacher's College, Columbia University.
Mezirow, J. (1978b). Perspective transformation. Adult Education, *28*, 100–110.
Mezirow, J. (1991). *Transformative dimensions of adult learning*. Jossey-Bass.
Mezirow, J. (1994). Understanding transformation theory. *Adult Education Quarterly, 44*(4), 222–232.
Mezirow, J. 1995. Transformation theory of adult learning. In M.R. Welton (ed.), *Defense of the lifeworld: Critical perspectives on adult learning* (39–70). New York: State University of New York Press.
Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education, 74*, 5–12.
Mezirow, J. (2000). Learning to think like an adult: Core concepts of transformation theory. In *Learning as transformation: Critical perspectives on a theory in progress* (pp. 3–33). Jossey-Bass.
Mezirow, J. (2003). Transformative learning as discourse. *Journal of Transformative Education, 1*, 58–63. https://doi.org/10.1177/1541344603252172
Miles, B. M., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage.
Parr, D. Trexler, C. J. (2011). Students' experiential learning and use of student farms in sustainable agriculture educations. *Journal of Natural Resources & Life Sciences Education, 40*, 172-180.
Scott, W. A. (1955). Reliability of content analysis: The case of nominal scale coding. *Public Opinion Quarterly, 19*, 321–325.
Senyshyn, R. M. (2018). Teaching for transformation: Converting the intercultural experience of preservice teachers into intercultural learning. *Intercultural Education, 29*(2), 163–184. https://doi.org/10.1080/14675986.2018.1429791
Yıldırım, Ali, & Şimşek, H. (2016). *Sosyal bilimlerde nitel araştırma yöntemleri* (10th ed.). Seçkin Yayıncılık.

Biographical notes

Dr **Özge Altay** is a part-time lecturer at the Department of English Language Teaching at Bahçeşehir Cyprus University in northern part of Cyprus. Her academic interests include psychology of learning, curriculum design, vocational education and training, and andragogy.

VETNET
European Research Network
Vocational Education and Training

Benke, M., Bonoli, L., Gonon, P., Grollmann, P., Marhuenda-Fluixá, F., Markowitsch, J., & Vorpe, J. (2022). The future of vocational education and training in Europe. Scenarios for 2035: A symposium. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 10–24). https://doi.org/10.5281/zenodo.6975254

The Future of Vocational Education and Training in Europe. Scenarios for 2035: A Symposium[1]

Benke, Magdolna[2]
magdolna.benke@gmail.com, University of Debrecen, CHERD, Hungary

Bonoli, Lorenzo
lorenzo.bonoli@hefp.swiss, Swiss Federal University of VET, Renens, Switzerland

Gonon, Philipp
gonon@ife.uzh.ch, University of Zürich, Switzerland

Grollmann, Philipp
grollmann@bibb.de, Federal Institute for Vocational Education and Training, Bonn (Germany)

Marhuenda-Fluixá, Fernando
fernando.marhuenda@uv.es, University of Valencia, Spain

Markowitsch, Jörg
joerg.markowitsch@3s.co.at, 3s Unternehmensberatung, Vienna, Austria

Vorpe, Jackie
jackie.vorpe@hefp.swiss, Swiss Federal University of VET, Renens, Switzerland

Abstract

Context: The main research question of the symposium is how the latest findings from scenario research impact theoretical research on vocational education and training, VET policies, and the evolution of VET systems in various countries.
Approach: The symposium includes four presentations followed by a discussion. One of the important expected outcomes of the symposium is that the new scenarios hold the potential to catalyse supporting future innovation and strategies in vocational education and training.
Findings/Conclusion: We propose that the regular application of the scenario approach could be a useful complement to various other prospective approaches used to guide European employment and vocational training policies.

Keywords: vocational education and training, scenarios, educational policy, economic aims, transformation

[1] The contributions are based on articles published in the thematic issue of 'The future of VET' of the Hungarian Educational Research Journal in 2022, edited by Jörg Markowitsch, Jens Bjornavold and Magdolna Benke.

[2] Corresponding author

1 Introduction[3]

The symposium will draw on two sources. On the one hand, Cedefop's research 'The changing nature and role of VET in Europe (2015-18)', and, on the other hand, further research that has provided the background for the studies on the HERJ thematic issue on 'The future of VET' published in 2022, edited by Jörg Markowitsch, Jens Bjornavold and Magdolna Benke. Based on the findings of Cedefop's research project 'The changing nature and role of VET in Europe' (2015-18), our paper outlines the development and transformation of VET in Europe over the past two decades.

By examining change from an epistemological-pedagogical, institutional and socio-economic perspective, the paper will illustrate the stability and path dependency of national VET systems and how this circumstance maintains the overall diversity of VET in Europe. In addition, the paper will also outline how gradual changes and significant social and economic shocks are combined to change the orientation of VET. Mapping and analysing the past will help us to outline possible scenarios for the future of VET in Europe. Three main scenarios - pluralist, distinctive, and specialized vocational education and training - help to illustrate the different directions vocational education and training could take in the next two decades and the challenges and opportunities that each direction presents. The symposium will refer to theoretical works that are fundamental behind scenario research and to some 'extraneous' theoretical work that has been stimulated by scenario research.

The study of vocational education and training in the two participating countries (Switzerland and Hungary) presents an insight into various topics and challenges. It shows different approaches, research targets, and the organisation of dual training in Europe.

The scenario theme also provides an opportunity to draw attention to future issues that can only be approached by logical deduction.

It is hoped that the symposium and its associated publications will also be of great help in launching a series of meaningful debates on the questions left open by the research, both within the professional community of the symposium participants and within the professional community of the countries represented in the thematic volume of HERJ, and also among the readers of HERJ.

6 Conflicting Roles of Vocational Education: Civic, Industrial and Market Tensions before Connectivism and VET Scenarios.[4]

Fernando Marhuenda-Fluixá, University of Valencia, Spain

6.1 Introduction

The economics of conventions is a theoretical approach which has been developed by French sociologists (Boltanski & Chiapello, 2002; Boltanski & Thévenot, 2006) and that has been applied in the field of education (Derouet, 1989; Derouet et al., 2015; Verdier, 2016) and vocational education and training (Bernad & Molpeceres 2010; Berner, 2017; Marhuenda, 2017; Marhuenda & Molpeceres, 2020; Martínez & Molpeceres, 2010; Zehnder & Gonon, 2017).

VET policies and practices are permanently subject to reform, promoted by national governments but also by international institutions, the European institutions playing a relevant role in fostering possible ways to improve the effectiveness of VET. All actors involved are

[3] The Introduction is partly based on the following article: Markowitsch, J., & Bjornavold, J. (2022). Scenarios for Vocational Education and Training in Europe in the 21st century. *Hungarian Educational Research Journal,* https://doi.org/10.1556/063.2021.00116

[4] This contribution is based on an article published in the Hungarian Educational Research Journal in 2022.

conscious of their relative position of power and claim their legitimation to point the direction that reforms may take. Different actors hold different rationales, and they have to confront each other in order to establish their discourse and to better negotiate with each other.

Insofar conventions are shared by those who use them but also recognised by those with whom they have to negotiate; they may prove useful for analysing the current proposal of different scenarios described by Cedefop (2020). Such a proposal can be subject to interpretation from the perspective of the economics of convention, allowing us to identify the mindsets used by different actors negotiating these, critique and compromise being the main forces behind such negotiations.

6.2 The Economics of Conventions

My first assumption is that the connectivist order, also known as the projective city, is the context in which Europe finds itself nowadays. If this is right, it sets the framework for all other conventions to adapt. This does not imply that the projective city is the only framework, but it proves particularly useful to understand today's VET systems, labour and economic relations.

A second assumption is that three of the conventions proposed by this French tradition have already proved useful in analysing VET developments in different European countries. These are the civic, industrial and market conventions that have enjoyed different weight and different power positions in several European countries throughout the history of their VET systems. The main aims pursued by these systems embed the notion of worth that vocational education has enjoyed as the result of the conflict over the power of the different actors involved.

By analysing the scenarios, I aim to see whether they represent a variety of justifications, and which are the ones that apply better than the rest. This is relevant insofar as the picture of the scenarios indicates that no country remains stable and that all of them are on the move. Furthermore, this move is in different directions, which is probably the result of the negotiations among the different countries involved.

6.3 Scenarios Seen from the Perspective of the Sociology of Conventions

Economic, social and demographic changes are valid explanations behind the reforms that different European countries want to take. Employer demands are always out of doubt as crucial dimensions to be addressed by any VET system, but sustainability has also become an intangible asset that no country wants to avoid. Mobility of workers, including migration, is another dimension that adds pressure on the reforms upon VET systems.

Among the axis used by Cedefop to allocate country patterns, some seem to be favouring the projective city, like pluralism, diversity of learning approaches, ambiguity and patchwork. In fact, the axis portrayed by Cedefop (2000, 69) to allocate country patterns consist of an invitation to assume the projective city as a ruling justification.

However, it seems that the connectivist convention is more likely to find agreements with the market than with the civic convention. Ambiguity is also better accepted by market approaches than by civic ones, which tend to favour equality above difference. Civic regulations are often associated with stability, and mobility is a more demanded value by connectivism, but also one welcomed by market conventions.

Connectivism, as an overwhelming convention, is ready to reach agreements with all other conventions, though it suits best the market one. The power of the market was already indicated by Derouet as an indication of the diminishing power of the civic convention that is still the one most appropriate for compulsory education. The implications this may have not only in terms of VET systems but also in larger terms of political engagement of the European population, increasing populism and nationalism is relevant. The European Union's claim to be the most

cohesive society and the most representative of human rights is however a sign of hope for civic conventions to find its way also through VET reforms.

6.4 Conclusions

The projective city may be able to overcome different historical traditions and their relations to transition and welfare regimes, and it may be an appropriate legitimation for the replacement of welfare by workfare. The European Deal is behind the VET scenarios proposed by Cedefop, and the cases of Switzerland and Hungary presented in this symposium illustrate different ways in which actors in those countries are addressing tensions and finding new balances.

References

Bernad, J.C., Martínez, I., Molpeceres, M.A., & Marhuenda, F. (2015). La transformación de las políticas educativas desde la gobernamentalidad neoliberal: el caso español como ejemplo. In N. Dal Ri & T. Brabo (Eds.), *Políticas Educacionais, Gestao Democrática e Movimientos Sociais: Argentina, Brasil, Espanha e Portugal* (pp. 149-172). Sao Paulo: Cultura Acadêmica.

Bernad, J.C., & Molpeceres, M.A. (2010). Discursos emergentes sobre la educación en los márgenes del Sistema educativo. *Revista de Educación*, *341*, 149-169.

Berner, E. (2017). Citizenship and participation: Apprenticeship as a political issue in the Swiss VET debate of the 1970s/80s. In F. Marhuenda. (Ed.), *Vocational education beyond skill formation: VET between civic, industrial and market tensions* (pp. 65-83). Bern: Peter Lang.

Boltanski, L., & Chiapello, E. (2002). *El nuevo espíritu del capitalismo*. Madrid: Akal.

Boltanski, L., & Thévenot, L. (2006). *On justification: economies of worth*. Princeton, NJ: Princeton University Press.

Cedefop (2020). *VET in Europe 1995-2035*. Louxemburg: Publications Office of the European Union.

Derouet, J.F. (1989). L'établissement scolaire comme entreprise composite. Programme pour une sociologie des établissements scolaries. In L. Boltanski & L. Thévenot. (Eds). *Justesse et justice dans le travail*. Paris: PUF.

Derouet, J.F., Mangez, E., & Benadusi, L. (2015). Introduction to the EERJ dossier. European Educational Research Journal, 14 (3-4), 195-205.

Marhuenda, F. (Ed.) (2017). *Vocational education beyond skill formation: VET between civic, industrial and market tensions*. Bern: Peter Lang.

Marhuenda, F., & Molpeceres, M.A. (2020). Training for work in the margins of the projective city. In T. Rachwal, R. Hepp & D. Kergel. (Eds.), *Precarious places: social, cultural and economic aspects of uncertainty and anxiety in everyday life* (pp. 51-71). Wiesbaden: Springer.

Martínez, I., & Molpeceres, M.A. (2010). Lógicas de justificación en el sector asociativo. *Revista Española del Tercer Sector*, 14, 17-40.

Verdier, E. (2016). The social conventions of guidance as a major component of Lifelong learning systems. A French-Danish-British comparison. In E. Berner & P. Gonon. (Eds.), *History of vocational education and training in Europe: cases, concepts and challenges* (pp. 29-44). Bern: Peter Lang.

Zehnder, L., & Gonon, P. (2017). Civic and market convention as driving forces of the development of Swiss VET. In F. Marhuenda. (Ed.), *Vocational education beyond skill formation: VET between civic, industrial and market tensions* (pp. 271-291). Bern: Peter Lang.

7 Methodological Choices in Developing Scenarios in Vocational Education and Training – Reflections on three European Scenario Projects[5]

Philipp Grollmann, Federal Institute for Vocational Education and Training, Bonn. Germany
Jörg Markowitsch, 3s Unternehmensberatung, Vienna, Austria

7.1 Introduction

Scientific attempts to support policy-making with a view to the future can quickly bring science into competition with science fiction. A compromise between science and science fiction in order to support decision-making in this respect is the so-called scenario method.

7.2 Analysing and Comparing Scenarios in VET

As a matter of fact, only three international scenario projects on VET have been carried out in the past 20 years. All of them were conducted by Cedefop, the European Centre for the Development of Vocational Training (see also Cedefop, 2020, pp. 192-197). We refer to them by the publication date of the studies as "Scenarios 2003", "Scenarios 2010" and "Scenarios 2020" (Cedefop 2003, 2010, 2020). In a contribution that maps 50 years of experience with scenarios, van Notten et al. (2003) classify scenarios according to three questions: a) what is the goal of the respective project, b) what is its content and c) how is the process designed? In Table 1 we summarize key differences between the three scenario approaches according to these criteria.

Table 1
Mapping the three Cedefop Scenarios studies according to criteria from the scenario literature

	2003	2010	2020
Goals	Strategy formation, for VET in Europe and country level (p. 7)	Analytical tool for stakeholders, considering different aspects of the development of qualifications (p. 220)	Development of potential future paths, plausible and consistent pictures, supporting the European dialogue (p. 189, p. 197)
Timescale	Short-term (10 years)	Short-term (10 years)	Longer term (15-20 years)
Exploratory or decision support	Strong focus on decision support than exploration	Exploration and decision support	Exploration and decision support
Process design	Formal and intuitive elements Partly participatory on the national level	Mainly intuitive, mainly desk research	Mainly intuitive, desk research and participatory elements on the European level
Database	Sequence of quantitative and qualitative data analysis	Combination of quantitative and qualitative data and analysis	Combination of quantitative and qualitative data and analysis
Methods/instruments	European level trend survey Multiple national approaches including interviews and workshops	Integrated analysis of several studies of Cedefop on qualifications	28 country analysis of European trends and drivers in VET Case studies on selected countries; Europe level expert survey on trends in VET; European level scenario workshop

(continued on next page)

[5] This contribution is based on an article published in the Hungarian Educational Research Journal in 2022.

Content	4 contextual scenarios – country level scenarios	4 qualification system scenarios	3 basic and 6 detailed VET scenarios
Description, story	Snapshot	Snapshot	Chain, storytelling
Perspective/vantage point	Mainly prospective	Mainly prospective	Combining retrospective and prospective
Scenario dimensions	Socio-economic development/systemic divergence or convergence STEEP Model	Dynamics of the qualification system/supply-led or demand-driven	Relative position of VET within the education system/characterisation of VET

Note. Source: Authors

In Table 2 we show the results of our discussion around the following themes:

- What is the relationship between the scenarios, their context and what are the drivers of change?
- What role do future archetypes – a topic that is emphasized in the recent methodological scenario process - play in the regard to scenarios of VET
- We then bring the two discussions together and introduce the difference between transactional and contextual scenarios.

Table 2
Summary of the analysis

	2003	**2010**	**2020**
Type of scenario approach	Institution-based / Contextual	Issue-based	Institution-based/transactional
Scenario process	Formal, strongly structured	Mix of intuitive and formal approaches	Mix of intuitive and formal approaches
Result	Complex set of scenarios, 4 European meta scenarios and strategies	European qualification system scenarios	3 overarching European VET Scenarios and 6 detailed scenarios
Relation to archetypes	high	low	low
Perspective/vantage point	Mainly prospective	Mainly prospective	Combining retrospective and prospective
Description, story	multiple comprehensive snapshots on different levels	Snapshot	Developmental chain that can be related to external developments different ways
Use of the scenario	Testbed for strategies	-	Stand-alone stories that can be used as reference in strategic communication

Note. Source: Authors

7.3 Conclusions

A regular discussion in research, policy and practice taking into account the state of the art of discussion on scenarios of VET and general future scenarios would be worthwhile. This should also cover the continuous verification, review and reflection of past scenarios and foregone future studies on VET, including skills forecasts. It would fit very well with recent postulations of the Expert Group on Foresight Modelling (2015).

From our experiences, we can draw the following lessons for the further establishment of such a process: The discussion about recurring basic patterns of argumentation in future scenarios as well as the significance of generally existing ideas about the future present themselves as an interesting basis for the reflection of scenarios. However, they are too general for the VET

scenarios discussed here. Hence, the notion of scenario archetypes does not directly apply to the domain of VET.

Scenarios about VET can be classified as "institution-based" scenarios. With the claim to constructing international/European scenarios, the diversity of the different systems must also be taken into account. These two facts, the institutional focus and the diversity of conceptions on VET, are the reasons why the idea of archetypes or purely contextual scenarios seems to be limited to the field of VET. On the other hand, archetypes could be an excellent basis for placing the different VET scenarios in their broader societal context.

In light of existing research, we would argue for the role that the relative independent VET systems and practices can play in market and technological developments. In future studies of VET, results of skills and labour forecasts (that are usually looking at the “demand side”) need to be balanced with research on changing skills governance, feedback mechanisms and changing VET policies that do justice to the structuring effect of the training system, something which has at least a long-term impact on the demand on the labour market.

References

Boschetti, F., Price, J., & Walker, I. (2016). Myths of the future and scenario archetypes. *Technological Forecasting and Social Change*, *111*, 76–85. https://doi.org/10.1016/j.techfore.2016.06.009

Bradfield, R., Derbyshire, J., & Wright, G. (2016). The critical role of history in scenario thinking: Augmenting causal analysis within the intuitive logics scenario development methodology. *Futures*, *77*, 56–66. https://doi.org/10.1016/j.futures.2016.02.002

Cardoso, J. F., & Emes, M. R. (2014). The use and value of scenario planning. *Modern Management Science & Engineering, 2*(1), 19-42.

Cedefop. (2010). *Changing qualifications. A review of qualifications policies and practices*. Reference series: 84. Luxembourg: Publications Office of the European Union.

Cedefop. (2017). The changing nature and role of vocational education and training in Europe. Volume 1: Conceptions of vocational education and training: an analytical framework. Cedefop research paper: No 63. Luxembourg: Publications Office of the European Union.

Cedefop. (2018). The changing nature and role of vocational education and training in Europe. Volume 3: The responsiveness of European VET systems to external change (1995-2015). Cedefop research paper: No 67. Luxembourg: Publications Office of the European Union.

Cedefop. (2019). The changing nature and role of vocational education and training in Europe. Volume 7: VET from a lifelong learning perspective: continuing VET concepts, providers and participants in Europe (1995-2015). Cedefop research paper: No 74. Luxembourg: Publications Office of the European Union.

Cedefop. (2020). Vocational education and training in Europe, 1995-2035. Scenarios for European vocational education and training in the 21st century. Luxembourg: Publications Office of the European Union.

Cedefop, van Wieringen, F., Sellin, B., & Schmidt, G. (2003). *Future education: learning the future: scenarios and strategies in Europe*. Cedefop reference series 42 (No. 42). Luxembourg: Publications Office of the European Union.

Expert Group on Foresight Modelling. (2015). Concurrent design foresight. Report to the European Commission of the expert group on foresight modelling. Luxembourg: Publications Office of the European Union.

Fahey, L., & Randall, R. M. (Eds.). (1998). *Learning from the future: Competitive foresight scenario*. John Wiley & Sons.

Fergnani, A., & Song, Z. (2020). The six scenario archetypes framework: A systematic investigation of science fiction films set in the future. *Futures, 124*, 102645.

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change, 114*, 254–280.

Greve, B. (2017). *Technology and the future of work: The impact on labour markets and welfare states*. Edward Elgar Publishing.

Grollmann, P., Kruse, W., & Rauner, F. (2005). *Europäisierung beruflicher Bildung*. Bildung und Arbeitswelt. Lit-Verlag.

Grollmann, P., Kruse, W., Rauner, F., Klein, B., & Kühnlein, G. (2003). S*zenarien und Strategien für die berufliche Aus- und Weiterbildung in Europa. Ein Projekt von Cedefop/ ETF*; deutscher Bericht [Scenarios and strategies for VET in Europe. A project by Cedefop/ ETF; German report]. Landesinstitut Sozialforschungsstelle Dortmund (sfs).

Hirsch-Kreinsen, H. (2016). Zum Verständnis von Arbeit und Technik bei Industrie 4.0. *Aus Politik und Zeitgeschichte*, *66*(18/19 0479-611), 10–17.

Hunt, D. V., Lombardi, D. R., Atkinson, S., Barber, A. R., Barnes, M., Boyko, C. T., Brown, J., Bryson, J., Butler, D., & Caputo, S. (2012). Scenario archetypes: Converging rather than diverging themes. *Sustainability, 4*(4), 740–772.

Kuwan, H., & Waschbüsch, E. (1998). *Delphi-Befragung 1996/1998. Potentiale und Dimensionen der Wissensgesellschaft. Abschlußbericht zum Bildungs-Delphi.* [Delphi Survey 1996/1998. Potentials and Dimensions of the Knowledge Society. Final report on the Edcation-Delphi]. Bonn: Bundesministerium fur Bildung und Forschung

Leney, T., Coles, M., Grollmann, P., & Vilu, R. (2004). Scenarios Toolkit. Cedefop Panorama. Off. for Official Publ. of the Europ. Communities.

Mietzner, D., & Reger, G. (2004). Scenario Approaches - History, Differences, Advantages and Disadvantages. Contribution to *EU-US seminar: New technology foresight, forecasting & assessment methods-seville, 13-14 May 2004.*

Pfeiffer, S. (2018). The 'Future of Employment' on the shop floor: Why production jobs are less susceptible to computerization than assumed. *International Journal for Research in Vocational Education and Training, 5*(3), 208–225.

Schoemaker, P. J. H. (1991). When and how to use scenario planning: A heuristic approach with illustration. J*ournal of Forecasting, 10*, 549–564.

Schoemaker, P. J. H. (2020). How historical analysis can enrich scenario planning, *Futures & Foresight Science, 2*(3-4), e35. https://doi.org/10.1002/ffo2.35

Spaniol, M. J., & Rowland, N. J. (2018). The scenario planning paradox. *Futures, 95*, 33–43. https://doi.org/10.1016/j.futures.2017.09.006

van der Heijden, K. (1996). *Scenarios. The art of strategic conversation*. John Wiley and Sons.

van der Heijden, K. (1997). *Scenarios, Strategies and Strategy Proces*s. Nijenrode University Press.

van Notten, P. W. F., Rotmans, J., van Asselt, M. B. A., & Rothman, D. S. (2003). An updated scenario typology. *Futures, 35*(5), 423–443. https://doi.org/10.1016/S0016-3287(02)00090-3

World Economic Forum (2018). *Eight futures of work: Scenarios and their Implications*. White Paper, 1.

8 Past and future evolution of VET Systems as a combination of diverging aims. The Case of Swiss VET System.[6]

Jackie Vorpe, Swiss federal university of VET, Renens, Switzerland
Lorenzo Bonoli, Swiss federal university of VET, Renens, Switzerland
Philipp Gonon, University of Zürich, Switzerland

Abstract

Context: The goal of this contribution is to propose a theoretical model to analyze the evolution of VET systems based on the notion of aim, hinting at a nearby future: in particular on the economic, social and educational aims that are commonly attributed to VET and whose content and interaction vary according to the countries and historical moments considered.
Approach: We adopt a discourse-analysis approach in order to bring out the aims attributed to VET from the public debates around this field. We focus our analysis on the development of the Swiss VET system from 1880 to 2030.
Findings: Three major aims characterize the evolution of the Swiss system: economic, social and educational purposes. The importance of these three aims varies according to the time. While the economic purpose remains important throughout the period studied, the social purpose varies according to the societal challenges that Switzerland has faced, while the educational purpose has seen its importance increase in recent decades.
Conclusion: The notion of aim lends itself well to describing the evolution of vocational training systems. The purposes attributed to VET change according to the country and the historical period, revealing specific weighting between the different purposes. The analysis of the

[6] This contribution is based on an article published in the Hungarian Educational Research Journal in 2022.

evolution of aims is mainly based on a historical perspective, but it can also formulate future projections on the basis of current discourses on the future development of the field.

Keywords: vocational education and training, economic aims, social aims, educational aims, Swiss VET system

8.1 Introduction

Any future forecast is built on a reading of trends that characterise the present and that we assume will continue into the future. However, the identification of trends is inevitably an exercise in historical reconstruction insofar as changes become trends as soon as they present a continuity over several years. Thus: no future forecast without historical analysis.

This also applies to forecasts in complex areas such as vocational education and training. Formulating a forecast on future trends means reading the changes of the last decades in detail, detecting regularities and noting the possibilities of their reoccurrence.

Our approach would like to combine a look into the past with a look into the future, based on changes that are relevant to the aims of vocational education and training systems.

8.2 The aims of VET

Vocational and educational training (VET) systems serve multiple aims, which find their roots in socio-cultural and economic contexts and evolve according to the times.

Depending on the country or the period, these VET systems have been charged with responding to different and constantly evolving challenges. The responses to these challenges have determined concrete choices at the level of their public policies, their structures and their organisation. A close look at the different aims assumed by VET systems offers an interesting perspective for a better understanding of their development and their specificities.

The notion of purpose has already been studied by many authors without however presenting a theoretical model for the analysis of VET systems (cf. Billett 2011, Euler 2013, Cedefop 2017, 2020). By adopting an exploratory approach, we refer to the notion of aim in order to build a theoretical framework that facilitates international comparisons between VET systems as well as the description of their evolution from the past to the future.

The notion of aim that we are putting at the centre of our reflection identifies "comparable functions" in different systems and, at the same time “, comparable issues” over a long period. Formulated differently, the notion of aim allows us to designate what Dubar et al. (2003) call "common problems"; problems, stakes, questions “with which all members and institutions would be confronted and which would have given rise, historically [and in the future], to different answers according to the diverse and contingent configuration of the actors involved (p. 61; cf. also Gally 2011).

In order to develop this theoretical framework, we will reduce the multiplicity of the aims assumed by the different systems to three general orders of aims: (1) economic policy aims, i.e. providing qualified labour for businesses and thus supporting economic growth; (2) social policy aims, i.e. helping individuals to integrate into the labour market and society and contribute to the reduction of social inequalities; (3) education policy aims, i.e. completing compulsory school education and opening up the possibility of pursuing learning and training at higher levels.

However, these three aims overlap in VET and furthermore raise problems of incompatibility of expectations, which in practice often are resolved by compromises. These compromises have evolved in historically different ways depending on the socio-economic conditions of the different countries.

8.3 The case of the evolution of the Swiss VET system

Using an analysis of the specific case of the Swiss VET system, our research makes it possible to reconstruct the evolution of the balance between these three aims and their internal evolution, from the past (1880 onwards) to the future (up to 2030).

The identification of the different aims will be based on a discourse analysis approach[7] of different sources of the history and the current debate of VET in Switzerland. This approach focuses on the arguments and positions as they emerge from the discourses pronounced at a given moment on a specific theme. More precisely, we will first focus on the explicit formulations of aims as they may emerge in the arguments and positions of the various actors active in the public debates on VET (politicians, experts in the field, civil servants, journalists, etc.). These arguments and positions shape the public debate, influence VET policies and, at least in part, find a concrete realisation in measures and structures adopted in the institutional processes of each country. At the same time, these measures and structures can also be considered in the historical analysis as indicators or traces, that allow us to track back to arguments and positions developed in the public debate.

This analysis will enable us to show that the Swiss VET system was drafted in the 19th century to achieve economic aims but that they also gradually integrated social and educational aims that have become increasingly important in the last decades of the 20th century.

Finally, on the basis of the launched debate of the social partners, business associations and education policy on the "Vision 2030" of the Swiss VET, it will also be possible to forecast the future evolution of balancing and navigating between these three aims, probably keeping the economic dimension at the heart of the Swiss VET, but nevertheless increasing the importance to the educational aims, meanwhile reducing the role of the social aims.

8.4 Conclusion

The notion of aim lends itself well to describing the development of vocational training systems. The purposes attributed to VET change according to the country and the historical period, revealing specific compositions between the different aims. The analysis of the evolution of aims is mainly based on a historical perspective. Still, it can also formulate future projections on the basis of current discourses on the future development of the field.

References

Billett, S. (2011). *Vocational education. Purposes, traditions and prospects*. Springer. https://doi.org/10.1007/978-94-007-1954-5.

Cedefop (2017). The changing nature and role of vocational education and training in Europe volume 1: Conceptions of vocational education and training: An analytical framework. Cedefop research paper. Publications Office of the European Union.

Cedefop (2020). Vocational education and training in Europe, 1995–2035. Scenarios for European vocational education and training in the 21st century. Publications Office of the European Union.

Dubar, C., et alii (2003). Pour une analyse comparée des configurations: Réflexions sur le cas de la formation continue. In M. Lallement, & J. Spurk (Eds.), *Stratégie de la comparaison internationale* (pp. 57–69). CNRS.

Euler, D. (2013). *Das duale System in Deutschland – Vorbild für einen Transfer ins Ausland?* Bertelsmann Stiftung.

Gally, N. (2011). Ecrire le contraste au-delà des typologies: L'apport de l'histoire croisée à la comparaison internationale. *Revue internationale de politique comparée*, *19*, 19–38.

Keller, R. (2011). *Diskursforschung. Eine Einführung für SozialwissenschaftlerInnen*. VS Verlag.

Landwehr, A. (2009). *Historische Diskursanalyse*. Campus.

[7] Discourse analysis in the sense of Landwehr 2009, Keller 2011.

9 The Evolution of Vocational Education and Training in Hungary 1989-2035[8]

Magdolna Benke, University of Debrecen, CHERD, Hungary

9.1 Introduction

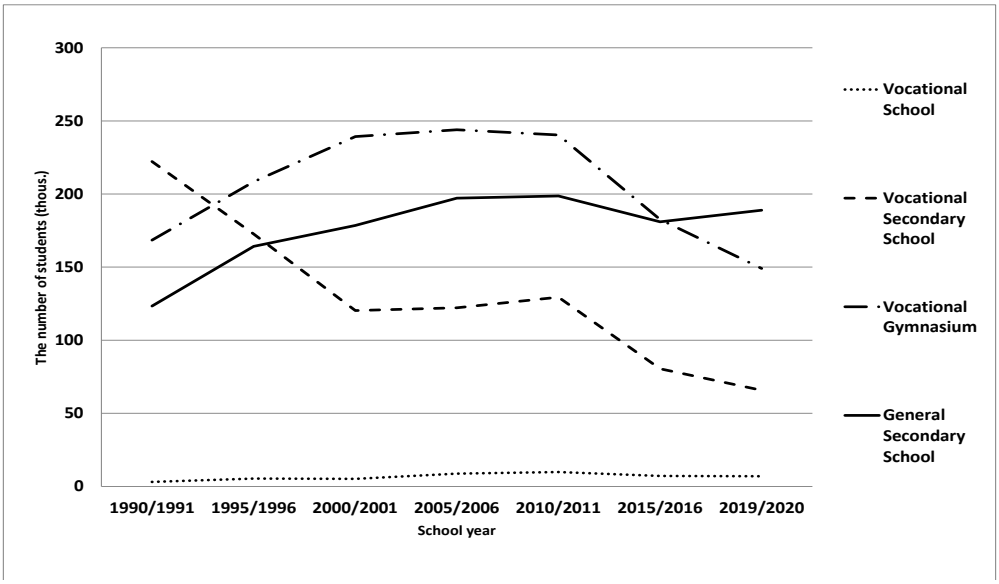
The social and economic changes initiated at the turn of the 1990s had a great impact on the education systems of the former socialist countries. Based on a critical analysis of national literature, my contribution presents the increasing challenges faced by VET in Hungary by discussing the following issues: historical traditions, declining prestige, governance, the involvement of social partners, and the introduction of dual training. Furthermore, I discuss the relevance of recently published European VET scenarios (Cedefop, 2020) for Hungary.

9.2 Evaluation of government measures to solve challenges faced by VET

In Hungary, VET has rich *traditions* dating from the last century. The structure of the economy led to an industrial world in which apprenticeship training was customary. The sudden shift of the regime towards a market economy posed a huge challenge for VET and made it necessary to redefine its role in the new socio-economic conditions.

The *prestige of VET* in the light of enrolment data has long been a critical point of Hungarian VET. Within the framework of the market economy, it has deteriorated even more than before. The government introduced measures that seek to make VET more attractive to young people through various 'facilitation measures' such as reducing general education and the 'simplified' content and delivery conditions for VET (Horn 2014, Kunert 2016, Mártonfi 2019). Obviously, the government's above facilitation attempts to raise the prestige of VET have failed, as enrolment figures for the last three decades show (compare Figures 1 and 2).

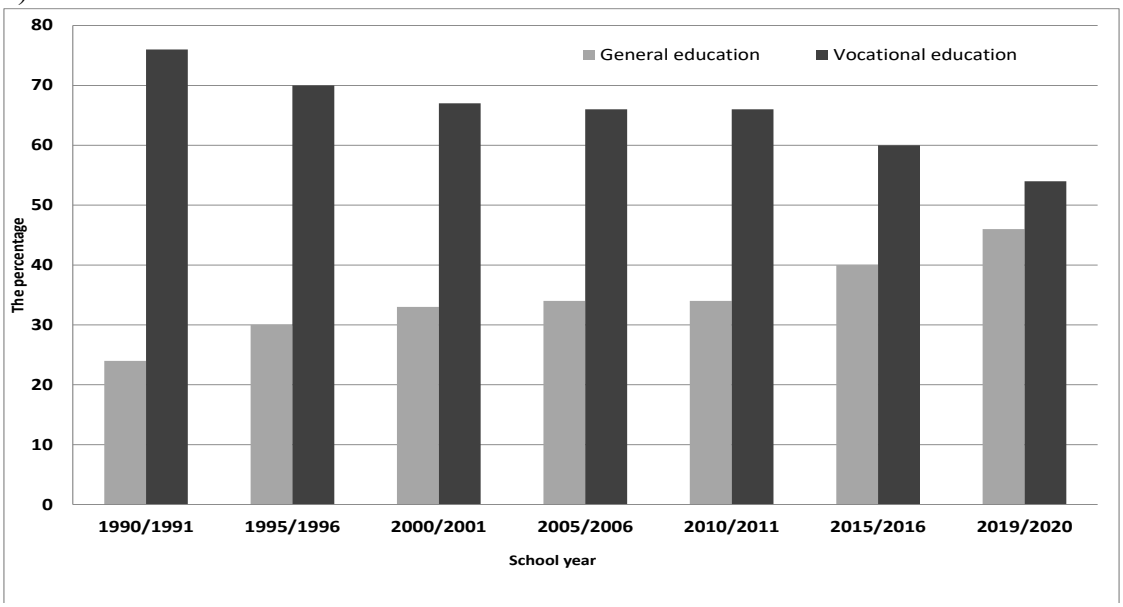
Figure 1
Number of students in post-elementary full-time education by type of school in Hungary (1990-2020)



Note. Source: Author based on data from the Central Statistical Office of Hungary

[8] This contribution is based on an article (Benke, M., & Rachwał, T. (2022). The evolution of vocational education and training in Hungary and Poland 1989-2035. *Hungarian Educational Research Journal*, https://doi.org/10.1556/063.2022.00061) focusing on Hungary.

Figure 2
Percentage of students in vocational and general post-elementary schools in Hungary (1990-2020)



Note. Source: Author based on data from the Central Statistical Office of Hungary

Researchers have emphasised the danger of improving occupation-specific skills at the expense of general skills. In parallel, as Mártonfi (2019) pointed out, the 'lower branch' of secondary VET suffers from a permanent loss of popularity and is increasingly lagging behind in the competition.

VET *governance* at different levels constantly raises important questions, where the topic focuses on centralization and decentralisation. After 2010, centralisation and national-level policies, downsizing of the role of VET professionals, and restricting professional publicity have had a suppressing effect on the formation of VET policy, with professionalism pushed increasingly into the background (Györgyi, 2019).

While the purpose of secondary VET is changing in Europe (Cedefop, 2020; Vorpe, Bonoli and Gonon in this paper), economic goals are dominating VET to this day in Hungary. The implementation of tasks arising from ad hoc market requirements seems to appear as a given priority, even employers are only able to define their medium- and long-term training needs within very narrow limits. In the meantime, the educational and social goals of VET have almost completely disappeared.

The *social partners* do not seem to appear in substance in the policy-making process. In general, reconciliation of social interests with the enforcement of the principle of partnership is very underdeveloped in Hungary (Benke, 2019) which, by implication, also affects social groups with weak advocacy such as apprentices.

Since 2010 the aim of the government has been to make VET even more responsive to the needs of the economy and to further strengthen and increase *dual VET*. For this, the German dual model served as a reference. But policymakers did not take into account the characteristics and operating conditions of the economies, nor did they pay attention to the criticisms regarding the German dual training. Moreover, the 'copy' was not precise: Hungarian students participating in VET spend about two or three years less on general education subjects than their German counterparts (Fazekas et al 2020: 64-65).

According to data (Eurostat, 2021), under the latest VET law (2019), all Hungarian students who enrolled in upper secondary VET, enrolled in dual training as well, similarly to

Germany. However, this statistic is rather about a statutory possibility. In theory, all VET students are candidates for dual training, but some of them – for certain reasons – cannot access it.

There is a risk that nowadays dual training better serves the coordination of economic needs and training only in the case of large companies who mainly train pupils for themselves. Researchers worry that companies are only interested in retaining students who make (higher) profits (Mártonfi, 2019).

9.3 Conclusions

Instead of democratization and pluralization, flexibility and empowerment, in Hungary the government's response to declining interest in VET is to be rigid, concentrate power, and overregulate. We have to emphasize that simplification, considering VET mostly from a short-term labour market perspective, forgetting its complexity as a system with several external factors, has weakened its prestige and compromised its quality, especially in the lower 'branch' of VET. Highly centralized governance and the lack of broader, social functions for VET do not require or allow for meaningful negotiations between VET actors. The maneuver, which is an essential condition for meaningful negotiations, is provided only in moderation in Hungary.

The emerging problems and challenges regarding VET are unlikely to be resolved within VET itself and, instead, will require a comprehensive approach, the revitalization of youth policy, and a stronger enforcement of social policy to ensure the interests of students.

As regards Hungary, in the current circumstances and in the near future, only conditions for two scenarios seem to be in place: 'Distinct VET', because of the strong dual character of training, and 'VET for special purposes', because of the large group of young people with special needs. In my opinion there is little chance that decision-makers will move towards the 'Pluralist model', also because there is a lack of professional and social pressure to move in this direction.

9.4 References

Benke, M., & Rachwał, T. (2022). The evolution of vocational education and training in Hungary and Poland 1989-2035. *Hungarian Educational Research Journal,* https://doi.org/10.1556/063.2022.00061

Benke, M. (2019). Vocational education and training, the contested partner in innovation projects: Questions and remarks. In B. E. Stalder & C. Nägele (Eds.), *Trends in Vocational Education and Training Research, Vol. II. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 77-84). https://doi.org/10.5281/zenodo.3457503

Cedefop (2020). Vocational education and training in Europe, 1995-2035: Scenarios for European vocational education and training in the 21st century. Publications Office of the European Union. Cedefop reference series; No 114. http://data.europa.eu/doi/10.2801/794471

Eurostat Data Browser (2021). Pupils enrolled in upper secondary education by programme orientation, sex, type of institution and intensity of participation. https://ec.europa.eu/eurostat/databrowser/view/educ_uoe_enrs04/default/table?lang=en

Fazekas, K., Csillag, M., Hermann, Z., & Scharle, Á. (Eds.) (2020). *The Hungarian Labour market 2019*. Institute of Economics, Centre for Economic and Regional Studies. https://econpapers.repec.org/bookchap/haslmbook/2019.htm

Györgyi, Z. (2019). Változások a hazai szakképzésben [Changes in domestic vocational education and training] 2004 - 2019. *Educatio, 28*(1), 105–120. https://doi.org/10.1556/2063.28.2019.1.8.

Horn, D. (2014). A szakiskolai tanoncképzés rövidtávú munkaerőpiaci hatásai. *Közgazdasági Szemle*, [Short-term labour market effects of apprenticeship training] *61*(9), 975–999.

Kunert, A. (2016). Eurofound, Hungary: Vocational training system gets major overhaul. https://www.eurofound.europa.eu/publications/article/2016/hungary-vocational-training-system-gets-major-overhaul

Mártonfi, Gy. (2019). Tanügyirányítás és struktúraváltás a hazai szakképzésben 2010 után. [School management and structural change in Hungarian VET after 2010]. *Educatio, 28* (2), 241-254. https://doi.org/10.1556/2063.28.2019.2.3

2019. évi LXXX. törvény a szakképzésről. [Act LXXX of 2019 on Vocational Education and Training.] https://net.jogtar.hu/jogszabaly?docid=a1900080.tv

10 Conclusion

By studying the conclusions of the contributions in this paper, we can discover important similarities between the very different approaches. Thinking about future tasks, it is obvious that the tasks have been mentioned (addressing tensions (Marhuenda-Fluixá); the analysis of the evolution of aims of VET (Vorpe, Bonoli & Gonon), which are the result of negotiations and conventions; wishing for regular discussion in research, policy, and practice (Grollmann & Markowitsch); pointing out that the manoeuvre of VET actors is provided only in moderate level (Benke), is all about the necessity of partnership and communication between actors.

It has been discovered that both in Switzerland (Vorpe, Bonoli & Gonon in this paper) and the Netherlands (Broek, 2022), one of the key elements in the development of VET is cooperation and striving for agreement, and consensus, based on broad interests are considered important values. However, democratic leeway for manoeuvre, which is an essential condition for meaningful negotiations between VET actors (Marhuenda-Fluixá), is provided only in moderation in Hungary, where highly centralised governance and the lack of broader social functions for VET do not require or allow for meaningful negotiations between VET actors (Benke).

Scenario research raises a number of questions for the future (Benke & Rachwal, 2022), like, can 'Pluralist VET' open up new perspectives for secondary VET in connection with the development of local societies and economies? We consider the potential of the new scenarios as a catalyst for innovations and strategies in VET (Markowitsch & Bjornavold, 2022), where greater consideration of non-economic and non-market aspects may create new avenues and purposes for VET concerning social innovation. We also propose that the regular application of the scenario approach could be a useful complement to various other prospective approaches used to guide European employment and vocational training policies (Grollmann & Markowitsch).

Finally, if we accept that the ultimate driving force which perpetuates the problems and the failures outlined around VET is an overly utilitarian economic approach that reinforces a zero-sum game, is insensitive to social inequalities, and does not take into account the values associated with disadvantage (Benke, 2021), it is an interesting question for the future, if and how the 'capability approach' (Sen, 1999) by putting the needs of people first could cooperate with 'Pluralist VET'.

References

Benke, M., & Rachwał, T. (2022). The evolution of vocational education and training in Hungary and Poland 1989-2035. *Hungarian Educational Research Journal,* https://doi.org/10.1556/063.2022.00061

Benke, M. (2021). Participatory planning as community building? In J. Boros, T. Kozma & E. Márkus (Eds.), *Community Building and Social Innovation* (pp. 69-87). Debrecen University Press. CHERD. https://www.academia.edu/52407909/Community_Building_and_Social_Innovation_2021_07_02_kiado

Broek, S. (2022). Radical institutional changes while maintaining strong links between VET and the labour market: The Dutch VET experience. *Hungarian Educational Research Journal*. https://doi.org/10.1556/063.2021.00048

Markowitsch, J., & Bjornavold, J. (2022). Scenarios for vocational education and training in Europe in the 21st century. *Hungarian Educational Research Journal,* https://doi.org/10.1556/063.2021.00116

Sen, A. (1999). *Development as freedom.* Oxford University Press; (2003). *A fejlődés mint szabadság*. Európa Könyvkiadó.

Biographical notes

Dr **Magdolna Benke** is a researcher of CHERD at the University of Debrecen, Hungary, and a lecturer on vocational education research at the doctoral school of education. She has managed several nation-wide research projects in various fields of VET and adult learning.

Dr **Lorenzo Bonoli** is a professor at the Swiss federal university for VET, where he conducts research and teaches on the history and development of the Swiss education system as well as on international issues in this field.

Dr **Philipp Gonon** is a professor em. at the University of Zürich, where he researches and teaches vocational pedagogy, history and theory of (vocational) education, quality assurance, program evaluation, as well as issues on international comparison in education.

Dr **Philipp Grollmann** is deputy head of the division "International VET Comparison, Research and Monitoring" at the Federal Institute for Vocational Education and Training (BIBB) in Germany. He looks back at 25 years of experience in European VET research.

Dr **Fernando Marhuenda-Fluixá** is a professor at the University of Valencia, where he conducts research on vocational education and training, its pedagogy and policies, as well as the practices implemented by non-for-profit organisations providing VET for social inclusion. He teaches didactics and organisation of VET and social education, as well as social economy.

Dr **Jörg Markowitsch** studied mathematics and philosophy in Vienna. He is co-founder and managing partner of 3s, a Vienna-based Research and Consulting firm that researches and teaches on vocational and adult education and advises policy makers at national and EU level.

Jackie Vorpe works at SFUVET in the International Relations department and the Master of Science in VET. She is currently writing a PhD thesis at the University of Zürich on the evolution of VET in Switzerland.

VETNET
European Research Network
Vocational Education and Training

Bobe, A., & Karber, A. (2022). The relationship between theory and practice in vocational education: De-sign elements from the perspective of teachers. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 25–33).
https://doi.org/10.5281/zenodo.6975316

The Relationship Between Theory and Practice in Vocational Education: De-Sign Elements from the Perspective of Teachers

Bobe, Anna
anna.bobe@leuphana.de, Leuphana University Lüneburg

Karber, Anke
anke.karber@leuphana.de, Leuphana University Lüneburg

Abstract

Context: This article is dedicated to the relationship between theory and practice in social pedagogical vocational training courses and discusses this against the background of the discourse on professionalisation. The article is based on a research project that investigates the question of the design of the theory-practice relationship in vocational education and training. The first interim results of an interview study with teachers in Germany are presented and discussed. In this context, an insight into the understanding of a theory-practice link from a curricular point of view as well as from the perspective of teachers in vocational education is given, which should provide a starting point for international discussion. For a comprehensive understanding of the German system of socio-pedagogical vocational training courses and the corresponding design of theory-practice links, it will also be presented in comparison to international systems.
Methods: The interview study can be classified as qualitative social research and was evaluated with the help of qualitative content analysis according to Kuckartz.
Findings: Many opportunities to shape the relationship between theory and practice became clear.
Conclusion: Teachers argue their approaches to the design of theory-practice linkages via modes that on the one hand enable differentiation and at the same time open up connectivity for the international theory-practice discourse.

Keywords: vocational education social pedagogy, theory-practice relation, learning processes, international view

1 Introduction

"(…) social work education in Germany is an important part of the whole profession with all its current problems and challenges" (Laging et al., 2021, p. 102). So first of all it is important to understand that the profession includes not only social pedagogical practice but also social work education. And both are affected by current social, political, economic and global changes (Laging et al., 2021, p. 108). And at the same time, social work is still struggling for its own identity, both in Germany but also in other European countries. Against this current background, the following article addresses a problem that has existed for a long time: the relationship between theory and practice in social work education in Germany.

The project is dedicated to the relation between theory and practice, which is a recurring point of discussion in social pedagogical vocational training courses and is still to be understood as an unfinished debate. Above all, the abbreviated juxtaposition not only separates actors and

activities into two supposedly definable areas but also action and reflection seemingly unambiguously. Linked to this is the question of how a design of theory and practice in vocational education and training can succeed. Little is known about the appropriation processes of learners in this context and is, therefore, a desideratum in research on social work education. The article is therefore based on the first results of the interview study with teachers on the design of theory and practice in social work education. This basic research is intended to open up future research potential, also in an international perspective on social pedagogical training and vocational education in particular.

2 The 'German System' of Social Pedagogical Education in International Comparison

Not only within Germany is there still a high demand for social pedagogical specialists (Autorengruppe Fachkräftebarometer, 2019, p. 148), but also internationally (Matthies, 2011, p. 95). A common overview of international qualification pathways is hardly feasible due to their diversity (Matthies, 2011, p. 97). Therefore, in the following, an insight into selected international qualifications is given. Subsequently, the German system will be explained in a more differentiated way. With regard to international qualification paths, the first decisive factor is orientation. A low level of qualification is often sufficient for purely vocational training. Overall, qualification requirements in social work education range from a master's degree in Finland, for example, to the necessary qualification in Portugal, which stipulates that daycare workers should be able to read and write (Egge, 2009, p. 46, quoted after Matthies, 2011, p. 96). Also, within Slovenia, a degree is considered a prerequisite for working in daycare centres. Social pedagogues, there also work in schools as counsellors and in centres for social work. For the study program in social pedagogy, there is the possibility of studying full or part-time. Compared to full-time studies, part-time studies combine the practical parts at a very early stage. It is interesting to note that full-time students attach great importance to the practical and theoretical parts of their studies, whereas part-time students focus more on theoretical knowledge (Kobolt, 2005). Entry into the social pedagogical field in comparison in the United Kingdom is possible without at least an undergraduate degree. Often, a vocational qualification is considered sufficient, which must be viewed critically in terms of professionalism (Bondi et al., 2011). Furthermore, the understanding of social pedagogy is reduced to inpatient childcare and occasionally also to work with individuals or groups in other phases of life (Petrie, 2013).

The international view of social pedagogical training formats within early education showed that it is also worthwhile to look outside of vocational education with a view to a growing theory-practice link. However, since vocational education is the central training format within early education in Germany, it will be presented below with its associated special features.

Within Germany, there is a low proportion of academically trained personnel in early education (Autorengruppe Fachkräftebarometer, 2021, p. 110). In the school year 2016/ 2017, however, an attempt to modularize training started in the federal state of Lower Saxony (Niedersächsisches Kultusministerium, 2016a; Niedersächsisches Kultusministerium, 2016b). Modularization is a curricular organizational and structural principle that is based on the European system for credit transfer in higher education and enables horizontal as well as vertical permeability that underlies the concept of lifelong learning (KMK, 2011, p. 8). As has already become clear in the international comparison, the social pedagogical training landscape in Germany can also be described as "diverse". The students are similarly heterogeneous.

For the further presentations, the focus will be on the social pedagogical for vocational training courses for social assistants or children's nurses, and the vocational training course for state-certified kindergarten teachers, as the internationally known training. Kindergarten teachers have a special position because they are considered the largest occupational group within the field (Autorengruppe Fachkräftebarometer, 2021, p. 110). The training programs differ in

their assigned socio-educational fields of action. Social assistants qualify for the occupational fields of crèches, daycare centres, after-school care centres and elementary schools. In addition, kindergarten teachers take on educational and childcare tasks in all-day school programs, educational assistance and facilities for open child and youth work (KMK, 2011, p. 5f.; Sekretariat der Kultusministerkonferenz, 2020, p. 2f.). Furthermore, they are classified at different levels. In this context, the German Qualifications Framework for Lifelong Learning (DQR) should be mentioned, which records all qualifications of the German education system across all educational sectors and takes into account the requirements of the European Qualifications Framework (EQF) with regard to the specifics of the German education system (AK DQR, 2011, p. 3). Accordingly, the vocational training courses for a social assistant is classified at DQR level four and the vocational training course for a state-certified kindergarten teacher at DQR level six (Bund-Länder-Koordinierungsstelle für den DQR, 2021, p. 3). Both types of schools belong to the full-time school system (Gudjons & Traub, 2020, p. 318). Like the more familiar dual system, this also consists of two learning locations. The full-time school-based system has the learning site 'school' and the learning site 'practice' with its different socio-pedagogical fields of action. Compared to the dual school-based vocational system, the responsibility for both the theoretical and the practical part of the training lies with the institution school or the teachers (Schäfer & Tessmer, 2021, p. 153), which is why one can also speak of a dual function on their part in this context. With regard to the legal requirements, the full-time school system does not have a "two-instance jurisdiction" (Schanz, 2015, p. 36), as in the dual system; instead, there are legal bases that apply nationwide or state-specifically, which differ in their binding nature.

With regard to the theory-practice link in both systems, the practical part of the training in the full-time school system comprises one-third (KMK, 2011, p. 7; Sekretariat der Kultusministerkonferenz, 2020, p. 15). In contrast, the proportion is much higher in the dual system. At this point, a different organization with regard to theory-practice relationships thus becomes apparent, which brings the question of how to design the theory-practice linkage(s) into focus. This will further elaborate the fourth chapter. At this point, however, the following should be pointed out: There continues to be a shortage of social pedagogical specialists in Germany. Due to the continuing high demand for skilled workers, in recent years additional training systems have been developed, in addition to the classic full-time school-based variant (usually two years of training in a vocational course of social assistant and another two years of the vocational training course for state-certified kindergarten teacher), which does not include remuneration (Autorengruppe Fachkräftebarometer, 2019, p. 148). This led to a "pluralization of training formats and a broadening of access options" (Autorengruppe Fachkräftebarometer, 2021, p. 110). With regard to training at vocational course of social assistant, in addition to the full-time school-based format, there is also practice-integrated training, which provides for remuneration (Autorengruppe Fachkräftebarometer, 2021, p. 112). Within the vocational training course for state-certified kindergarten teachers, in addition to the practice-integrated variant, there are also the options of part-time training (with an extended training period) as well as in a so-called activity-based or part-time form. The prerequisite for the part-time form is usually a paid employment within a socio-educational institution, which provides for half of the usual working hours. The practice-integrated variant, on the other hand, does not require an employment contract. Due to the higher proportion of practice within the alternative forms of training to the full-time school system (Autorengruppe Fachkräftebarometer, 2021, p. 116), a modified form of theory-practice linkage will be necessary in the future, as well as associated teaching-learning forms.

A further look at the research landscape makes it clear that too little attention is paid to teacher training for vocational education and training. There are desiderata with regard to qualification and curriculum research, profession-theoretical as well as subject-didactic research and furthermore with regard to methodological and teaching research (Friese, 2010, p. 311;

Friese, 2018, p. 39). For reasons, Friese named the specific training and occupational structures, because it is predominantly trained within the framework of the full-time school system. In this context, Friese speaks of a so-called "semi-professionalism" (Friese, 2010, p. 314), which she sees as being due to the lack of standardization with regard to regulatory and curricular requirements.

3 Theory and Practice in Social Work Education

The relation of theory and practice is a "basic concern of all pedagogical training" (Dittrich, 1987, p. 92). This does not only refer to social pedagogical study programmes and training, but also to other pedagogical training such as teacher training. A similar discussion can be presented from the latter area: "The terms theory and practice thus do not describe a precise or generally valid construct, but as a pair of opposites they refer to a relation which, on the face of it, can be related to a variety of relations" (Rothland, 2020, p. 133).

Therefore, the article is dedicated to the different relations in the context of vocational education in social pedagogy. It is therefore necessary to clarify. Why is this relation still so unclear and why are the relations so diverse? First of all, this is due to the low concretisation of the concepts (theory/practice) on the one hand and the didactic design of the learning arrangements in vocational education and training on the other.

First of all, the understanding of theory and practice. The term theory, in relation to practice, only rarely refers to a specific scientific theory. Rather, it is about a kind of knowledge. Theoretical knowledge, in the sense of the abstraction of specifics, can thus be understood as professional knowledge. In contrast, practice is embedded in the individual case, the concrete situation and institution-related frameworks (Dewe & Otto, 2012, p. 206).

“Moreover, the hereby reformulated theory of professions is based on the assumption that academic knowledge as a supposedly objective, ‘true’, and ‘correct’ form of knowledge can by no means be used directly in practice. Instead, professionalism manifests itself in the ability to relate academic knowledge to routine or practical knowledge: professional social work effects a situation-specific transformation of academic theoretical statements into information relevant for professional practice” (Dewe et al., 2019, p. 385).

Professional action can thus be understood as the linking - or relation - of this professional knowledge and the practical professional skills (Dewe & Otto, 2012, p. 213) or the relation of "different action and knowledge structures" (Dewe & Otto, 2012, p. 213). The individual professionalisation of social education professionals thus aims at the acquisition of "professional knowledge" (Dewe, 2009, p. 59).

In the context of the professionalisation discourse, the relation is a highly relevant question. Theory and practice must therefore be related to each other situationally in the sense of reflexive professionalism.

After this first, brief discussion of terms, the focus now turns to the question of how this relationship between theory and practice can be shaped and learned in vocational education and training. Or, in other words, how can the diversity of conditions be shaped? Didactically, there are different concepts of theory and practice in vocational education.

There are the dominant concepts from the field of vocational education and training, such as “Lernfeldorientierung” (learning field orientation) (e.g. Tenberg, 2006, p. 27ff.), “Handlungsorientierung” (tasked-based approach) (e.g. Küls, 2017, p. 116f.) and learning location cooperation (e.g. Pätzold, 2016, p. 634f.). But even in the genuine field of social education and social didactics, there are a wide variety of formats such as theory-practice linkage and double mediation practice (e.g. Karsten, 2003, p. 354f.), inquiry-based and reflective learning (Karber, 2021, p. 171ff.) and biographical learning (e.g. Thiessen & Schweizer, 2000, p. 197ff.). In particular, the concept of learning location cooperation is leading the way in German vocational education and training. At the same time, from a didactic point of view, this leads to a simple

juxtaposition: vocational school here, socio-educational practice there. There is often a lack of a learner-centred educational perspective here and often remains at a level of formal cooperation. (Pätzold 2016, p. 634f.). The concept of the learning field or action orientation is again related to teaching. This means the orientation of learning situations to vocational case studies. It remains to be clarified which understanding of forms of knowledge in which relation is meaningful to work through here, as long as the learning field orientation assumes seemingly clear and delimitable theoretical and practical structures.

However, it becomes clear that there are not enough didactic-theoretical discussions as well as empirical discussions on these concepts. Some initial empirical approaches to forms of practice reference can be mentioned. According to the study by Stadler and Uihlein (2021), different forms of practice reference (simulated practice; reported practice; observable practice and didactically prepared practice) are often combined in the evaluated teaching units (Stadler & Uihlein, 2021, p. 83). In the context of inquiry-based learning in social pedagogical training, on the other hand, a didactic concept was investigated that aims at a reflection-oriented design (Christ et al., 2021). In particular, the concept according to Gruschka (1986) is convincing here in the form of its didactic differentiation (also Sauerwein, 2020). Here, the individually experienced observations and actions in practice are considered the starting point for teaching and are subjected to a structured analysis in a structured framework so that this approach can be counted among the casuistic formats (Sauerwein, 2020, p. 366). Despite the investigation of individual didactic concepts, there is a lack of knowledge and basic research on the fundamental differentiation of the relationship between theory and practice and how this can be acquired.

4 Teachers' views on the theory and practice of social work education - research methods and interim results

The pilot study already presented focused on the development of teachers' practices and perspectives on the design of theory-practice relationships in the context of appropriation and learning processes on the part of students in social pedagogical vocational training courses. These were approached by means of a qualitative and meaning-understanding research approach. First of all, a literature study was carried out in which the appropriation of the term, relation as well as theory and practice were in the foreground. A document analysis was carried out for both federal and state-specific curricula in Lower Saxony. The procedure described above laid the foundations for the subsequent survey phase by means of guided interviews conducted with teachers of vocational education in social pedagogy in Lower Saxony. In February 2022, the intensive evaluation of the first interviews began. This was carried out by structuring the content with the help of qualitative content analysis according to Udo Kuckartz (2018).

In the following, relevant results of the document analysis with regard to the design of theory-practice relationships in social pedagogical vocational training courses (4.1) as well as first interim results of the pilot study and thus the views of teachers on these relationships (4.2) are presented.

4.1 Theory-practice linkage from a curricular perspective

In the nationwide curricular specifications of social pedagogical training, the "pedagogical interaction with individuals and groups" KMK, 2011, p. 6) is described as part of the "everyday work" (KMK, 2011, p. 6) of the prospective social pedagogical specialists, which is emphasized as a special feature. This must also be reflected in the "teaching practice" (KMK, 2011, p. 6), which is why a close "theory-practice linkage" (KMK, 2011, p. 7) is pointed out. In particular, the linkage should be "didactic" (Sekretariat der Kultusministerkonferenz, 2020, p. 13), which is possible in different variants. In the form of linking teaching content with socio-educational practice, for example, job shadowing can be mentioned at this point. The state-specific guidelines in Lower Saxony further state that learning at the two learning locations "theory" and

"practice" should also be linked through written assignments (e.g. job shadowing) that take into account the respective requirement level of the vocational training (Niedersächsisches Kultusministerium, 2017, p. 7). In this way, the competencies acquired at school are to be applied and deepened in the practical field (Niedersächsisches Kultusministerium, 2016a, p. 4; Niedersächsisches Kultusministerium, 2016b, p. 5). This is justified by the fact that it is only through application in socio-educational fields of action that students learn how previously theoretically acquired competencies can be implemented in practice. At the same time, students become aware of the relevance of their specialized knowledge through practical work (Niedersächsisches Kultusministerium, 2017, p. 3f.).

Overall, the learning location 'practice' is given special significance with regard to the professionalization of future social pedagogical specialists (KMK, 2011, p. 7; Sekretariat der Kultusministerkonferenz, 2020, p. 15). The curricular specifications in Lower Saxony elaborate on the following: In connection with the levels of the German Qualification Framework to be achieved and the related professional action competencies to be developed (Niedersächsisches Kultusministerium, 2017, p. 3), the ability to act independently in "complex pedagogical situations" (Niedersächsisches Kultusministerium, 2017. p. 3.) is relevant and should be supported accordingly. Therefore, the focus at the learning location 'practice' is placed on "practical learning through pedagogical action and its professional reflection" (Niedersächsisches Kultusministerium, 2017. p. 3.). Here the learning place 'practice' would differ "in essential points" (Niedersächsisches Kultusministerium, 2017. p. 3.) from the learning place 'school'.

4.2 Theory-practice linkage from a teacher's perspective

In the third chapter it was already pointed out that the understandings of 'theory' and 'practice' can be described as largely undifferentiated even within the scientific discussion. The teachers interviewed in the pilot study understood theories, among other things, as developing out of practice, which they described, for example, as knowledge from practical experience. This knowledge, in turn, can be found in literature or is recorded in this form (L1, l. 72 - 76). Likewise, theories are also to be understood as a basis or research and practice is the "doing" (L2, 126f.; 131f.) in this context. This was justified by the fact that without theoretical foundations, practice could not take place (L1, l. 131 - 136). Thus, a predominantly functional understanding of theory was evident (Neumann & Sandermann, 2018, p. 11). Furthermore, one teacher differentiated into different levels of theory. Thus, she named everyday theories, scientific theories, and furthermore a meta-level of theories (L3, l. 124 - 131). Further, the theory(s) were predominantly located in the school as well as the practice in the socio-educational fields of practice (L1, l. 91 - 95; L2, l. 128 - 143; L3, l. 153 - 158; L8, l. 138 - 145), although theory and practice were described, among other things, as a "ping-pong" game (L3, l. 152) and thus a clear need for linkage. This could also be found in the document analysis. In this context, teachers see the teaching of theoretical basics as their task in class. Students, on the other hand, are supposed to put what they have learned in theory into practice. Teachers thus ascribe to themselves a task of mediation and students, on the other hand, the activity of appropriation (Gruschka, 2002; Pollmanns, 2019). But how do teachers shape the theory-practice relationship and, at the same time, the associated learning and appropriation process? In this context, teachers named modes (ways of acting) to describe and at the same time to structure the circumstances. In this context, teachers have as a goal perspective that theory(s) learned in school should be applied in practice or in the socio-pedagogical fields of action, as it has already been mentioned within the curricular guidelines. Teachers understand the prior linking of theory and practice in school as a prerequisite for this. In order to achieve this goal, they apply practice in school. This can be done, for example, by including practical situations that students experience in the socio-educational fields of action. At the same time, it is possible to convey theories in this way. Great importance is attached to the understanding of theories on the part of the

students, which is developed or should be developed in the course of the training. On the one hand, a transfer from theory to practice or from practice to theory and, on the other hand, the reporting of personal experiences, in which initial references to theories are already made, are considered to be preliminary stages (L1, l. 269 - 275).

Regarding the mode of applying, it was noticeable that contrary to the understanding that theory cannot be applied in practice (Dewe & Otto, 2010), it was mentioned by all teachers as well as in the curricular guidelines, but 'only' one interviewed person differentiated it further (in the following L3). Thus, this person refers to the application as a pedagogical action, which is understood as a superordinate goal. For this, however, students must "think through these complex everyday pedagogical situations, assess them and (3) deal with them" (L3, l. 293f.). As far as this is possible, there is a professional pedagogical action as well as reflexive acting (L3, l. 294ff.).

5 Conclusion and outlook

The first results of a German pilot study were presented as an insight into concrete approaches to structuring theory-practice relationships in socio-educational vocational training courses from a teacher's perspective. In this context, the question of how the relations of theory and practice can be learned in the context of a (vocationally oriented) learning process was explored. The following became clear: Teachers understand the linking of theory and practice as a necessity with regard to the appropriation and learning processes on the part of students. In their understanding of the concepts of theory and practice, it becomes clear that they make a hierarchy or assign different functions. For example, theory functions as a basis for being able to act in practice. Practice seems to take on a more 'active' part here. With regard to the design of the theory-practice relationship, the teachers described modes that were also hierarchized differently. There are superordinate modes that take over the function of a target perspective and helping modes that act as support. In this context, it also became clear that teachers as a whole understand the theory-practice relationships more diversely than the curricular specifications, which became clear in the number of modes mentioned, among other things. However, the diversity should not be viewed critically in this context, as it opens up different possibilities for stimulating students' learning processes and also takes into account the diversity that also exists there. In addition, the modes and the associated wording of the teachers open up a basis for international discussions about basic learning processes. The connectivity of the modes must be brought into focus and discussed in the future. This has to be done for vocational education as well as for social work education.

References

Arbeitskreis Deutscher Qualifikationsrahmen (AK DQR) (2011). *Deutscher Qualifikationsrahmen für lebenslanges Lernen*. Stand: 22. März 2011. https://www.dqr.de/media/

Autorengruppe Fachkräftebarometer (2019). *Fachkräftebarometer Frühe Bildung 2021. Weiterbildungsinitiative Frühpädagogische Fachkräfte*. München. https://www.fachkraeftebarometer.de/fileadmin/Redaktion/Publikation_FKB2019/Fachkraeftebarometer_Fruehe_Bildung_2019_web.pdf

Autorengruppe Fachkräftebarometer (2021). *Fachkräftebarometer Frühe Bildung 2019. Weiterbildungsinitiative Frühpädagogische Fachkräfte*. München. https://www.fachkraeftebarometer.de/fileadmin/Redaktion/Publikation_FKB2017/Publikation_FKB2021/WiFF_FKB_2021_web.pdf

Bondi, L., Carr, D., Clark, C., & Clegg, C. (2011). *Towards professional wisdom, practical deliberation in the people professions*. Routledge.

Bund-Länder-Koordinierungsstelle für den Deutschen Qualifikationsrahmen für lebenslanges Lernen (DQR) (Eds.) (2021). Liste der zugeordneten Qualifikationen. Aktualisierter Stand: 1. August 2021. https://www.dqr.de/dqr/shareddocs/downloads/media/content/2021_dqr_liste_der_zugeordneten_qualifikationen_01082021.pdf?__blob=publicationFile&v=1

Christ, V., Karber, A., Mertens, V., & Wustmann, C. (2021). Berufliche Bildung für Inklusion: Das didaktische Prinzip Forschendes Lernen in der Fachschule für Sozialpädagogik. *berufsbildung - Zeitschrift für Theorie-*

Praxis-Dialog, 74 (184), 26-28.
Dewe, B. (2009): Reflexive Professionalität: Maßgabe für Wissenstransfer und Theorie-Praxis-Relationierung im Studium der Sozialarbeit. In: A. Riegler, S. Hojnik, K. Posch, (Eds.): *Soziale Arbeit zwischen Profession und Wissenschaft. Vermittlungsmöglichkeiten in der Fachhochschulausbildung*. (pp. 47 – 63). VS Verlag für Sozialwissenschaften.
Dewe, B., & Otto, H. (2010). Reflexive Sozialpädagogik. Grundstrukturen eines neuen Typs dienstleistungsorientierten Professionshandelns. In W. Thole (Eds.), *Grundriss Soziale Arbeit. Ein einführendes Handbuch* (pp. 197 – 217). VS Verlag für Sozialwissenschaften.
Dewe, B., & Otto, H. (2012). Reflexive Sozialpädagogik. Grundstrukturen eines neuen Typs dienstleistungsorientierten Professionshandelns. In W. Thole (Ed.), *Grundriss Soziale Arbeit* (pp. 197 – 217). VS Verlag für Sozialwissenschaften.
Dittrich, J. (1987). Zum Theorie-Praxis-Verhältnis in der Erzieherausbildung. [PhD dissertation, Lueneburg University] Darmstadt.
Dewe, B., Otto, H.-U., & Heite, C. (2019). Future perspectives of social work in Europe and European social work – Professionalization in social services. In F. Kessl, W. Lorenz, H.-U. Otto, S. White (Eds.), *European social work – a compendium*. (pp. 379-392). Barbara Budrich Publishers.
Friese, M. (2010). Didaktisch-curriculare Aspekte für Fachrichtungen und Fachrichtungsbereiche personenbezogener Dienstleistungsberufe. In J.-P. Pahl & V. Herkner (Eds.), *Handbuch Berufliche Fachrichtungen* (pp. 311 – 327). Bertelsmann Verlag.
Friese, M. (2018). Berufliche Fachrichtungen und Fachdidaktiken personenbezogener Dienstleistungen. In F. Kaiser, C. Kalisch (Eds.), *Bildung beruflicher Lehrkräfte. Wege in die pädagogische Königsklasse* (pp. 165 – 176). Wbv Publikation.
Gängler, H., & Wustmann, C. (2004). Die Sozialpädagogik und ihre Didaktik. In B. Fegebank, H. Schanz (Eds.), *Arbeit – Beruf – Bildung in Berufsfeldern mit personenorientierten Dienstleistungen* (pp. 95 – 115). Schneider Verlag Hohengehren.
Gruschka, A. (1986). Wie Schüler Erzieher werden: Studie zur Kompetenzentwicklung und fachlicher Identitätsbildung in einem doppeltqualifizierenden Bildungsgang der Kollegschulversuchs NW. Herausgegeben vom Landesinstitut für Schule und Weiterbildung Nordrhein-Westfalen. Büchse der Pandora.
Gruschka, A. (2002). *Didaktik. Das Kreuz mit der Vermittlung. Elf Einsprüche gegen den didaktischen Betrieb*. Büchse der Pandora.
Gudjons, H., & Traub, S. (2020). *Pädagogisches Grundwissen. Überblick – Kompendium – Studienbuch*. Julius Klinkhardt Verlag.
Hoffmann, H., & Höltershinken, D. (2002). Die Ausbildung der Ausbilder – Zum Studium der Beruflichen Fachrichtung Sozialpädagogik. In H.-W. Otto, T. Rauschenbach & P. Vogel (Eds.), *Erziehungswissenschaft: Lehre und Studium* (pp. 91 – 104). Leske + Budrich Verlag.
Karber, A. (2017). Sozialdidaktik als Berufsfelddidaktik – Didaktik in sozialpädagogischen Bildungsgängen aus der Perspektive der beruflichen Fachrichtung Sozialpädagogik. In M.-E. Karsten, M. Kubandt (Eds.), *Lehramt Sozialpädagogik. Eine Bestandsaufnahme nach 20 Jahren* (pp. 85 – 96). Barbara Budrich Verlag.
Karber, A. (2018). Didaktische Mehrdimensionalität der beruflichen Fachrichtung Sozialpädagogik: Zur Notwendigkeit sozialpädagogischer Didaktikforschung. In M. Friese (Eds.), *Reformprojekt Care Work. Professionalisierung der beruflichen und akademischen Ausbildung* (pp. 237 – 252). WBV Bertelsmann Verlag.
Karber, A. (2021). Praktiken der Reflexion in pädagogischen Qualifizierungen: Forschungs- und Entwicklungsanfragen. *Bildung und Erziehung,* 74 (2), 171 – 183.
Karsten, M.-E. (2003). Sozialdidaktik – Zum Eigensinn didaktischer Reflexion in den Berufsausbildungen für soziale und sozialpädagogische (Frauen-)berufe. In A., Schlüter (Eds.), *Aktuelles und Querliegendes zur Didaktik und Curriculumentwicklung. Festschrift für Werner Habel* (pp. 350 – 374). Janus Presse.
Karsten, M.-E., Meyer, N., & Spanu, S. (2020). Qualifizierung für die Qualifizierung zukünftiger Fachkräfte. Beschreibung und Diskussion empirischer Entwicklungen zur Ausbildung von Lehrkräften an Berufsbildenden Schulen mit der Fachrichtung Sozialpädagogik. *Neue Praxis,* 50*(6)*, 552 – 565.
Kobolt, A. (2005). An Evaluation of Training in Social Pedagogy in Slovenia. *Journal of Child and Youth Care Work*, *20*, 83–92.
Kuckartz, U. (2018). Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung. Beltz Juventa.
Küls, H. (2017). Handlungs- und Lernfeldorientierter Unterricht in der Sozialpädagogik. In. R. Jaszus & H., Küls (Eds.), *Didaktik der Sozialpädagogik. Grundlagen für die Lehr-/Lernprozessgestaltung im Unterricht* (pp. 116 – 151). Verlag Handwerk und Technik.
Kultusministerkonferenz (KMK) (2011). Kompetenzorientiertes Qualifikationsprofil für die Ausbildung von Erzieherinnen und Erziehern an Fachschulen/ Fachakademien. (Beschluss der Kultusministerkonferenz vom 01.12.2011). https://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2011/2011_12_01-ErzieherInnen-QualiProfil.pdf
Laging, M., Schäfer, P., & Lorenz, M. (2021): Social Work and Social Work Education in Germany: Development

and Challenges in a Scientific and Practice-Based Profession and Its Education. In M. Laging, N. Žganec (Eds.), *Social Work Education in Europe. Tradition und Transformations. (p- 89-110).* Springer.

Matthies, A.-L. (2011). Sozial Service Professions Towards Cross – European Standardisation of Qualifications Social Work. *Social Work & Society*, *9(1)*, https://ejournals.bib.uni-wuppertal.de/index.php/sws/article/view/9/78

Neumann, S., & Sandermann, P. (2018). *Grundkurs Theorien der Sozialen Arbeit. Mit Online-Zusatzmaterial*. Ernst Reinhardt.

Niedersächsisches Kultusministerium (2016a). Rahmenrichtlinien für die berufsbezogenen Lernbereiche -Theorie und Praxis- in der Berufsfachschule – sozialpädagogische Assistentin/ Sozialpädagogischer Assistent (Stand: März 2016). Hannover: Niedersächsisches Kultusministerium. https://www.nibis.de/uploads/2bbs-kuels/sopaedass.pdf

Niedersächsisches Kultusministerium (2016b). Rahmenrichtlinien für die berufsbezogenen Lernbereiche -Theorie und Praxis- in der Fachschule Sozialpädagogik (Stand: März 2016). Hannover: Niedersächsisches Kultusministerium. https://www.nibis.de/uploads/2bbs-kuels/fsp.pdf

Niedersächsisches Kultusministerium (2017). Innovationsvorhaben im Bereich der berufsbildenden Schulen. Leitfaden für die praktische Ausbildung. Berufsfachschule – Sozialpädagogische Assistentin/ Sozialpädagogischer Assistent. Fachschule – Sozialpädagogik. (Stand: Juni 2017). https://www.nibis.de/uploads/2bbs-kuels/Leitfaden %20praktische %20Ausbildung.pdf

Pätzold, G. (2016). Lernorte. In J.-P. Pahl (Eds.), *Lexikon Berufsbildung.* (pp. 634 – 636). W. Bertelsmann.

Perez, V., & Johr, S. T. (2018). Social Pedagogy and Social Work in the UK: The Meeting of Two Cultures as Seen from a Continental European Perspective. *RES, Revista de Educacion Social*, *26,* 49-68.

Petrie, P. (2013). Social Pedagogy in the UK: Gaining a firm foothold? *Education Policy Analysis Archives, 21(37)*. https://doi.org/10.14507/epaa.v21n37.2013

Pollmanns, M. (2019). Unterrichten und Aneignen. Eine pädagogische Rekonstruktion von Unterricht. Barbara Budrich Verlag.

Rothland, M. (2020). Theorie-Praxis-Verhältnis in der Lehrerinnen- und Lehrerbildung. In C. Cramer, J. König, M. Rothland & S. Blömeke (Eds.), *Handbuch Lehrerinnen- und Lehrerbildung* (pp. 133 – 140). Klinkhardt/UTB.

Sekretariat der Kultusministerkonferenz (2020). Rahmenlehrplan für die Fachschule für Sozialpädagogik. Beschluss der Kultusministerkonferenz vom 18.06.2020. https://www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2020/2020_06_18-RVFSRLP-Sozpaed.pdf

Sauerwein, M. N. (2020). Konturen einer Weiterentwicklung der Didaktik für Sozialpädagogik. *Soziale Passagen*, *12*, 359 – 377. https://doi.org/10.1007/s12592-020-00359-w

Schäfer, M., & Tessmer, E. (2021): Lehramtsstudium der Beruflichen Fachrichtung Sozialpädagogik Status quo und aktuelle Entwicklungen in Zeiten des Lehrkräftemangels. *Bildung und Erziehung, 74(2),* 152 - 170.

Stadler, K., & Uihlein, C. (2021). Formen des Praxisbezugs im Fachschulunterricht. Ausgewählte Ergebnisse einer ethnografischen Studie der WiFF. In A., König (Eds.), *Wissenschaft für die Praxis. Erträge und Reflexionen zum Handlungsfeld Frühe Bildung* (pp. 79 – 97). Beltz Juventa.

Tenberg, R. (2006). Didaktik lernfeldstrukturierten Unterrichts. Theorie und Praxis beruflichen Lernens und Lehrens. Klinkhardt.

Thiessen, B., & Schweizer, B. (2000). Eigensinn und biographische Reflexivität. Voraussetzungen für die Entwicklung Sozialer Qualifikation. In M., Friese (Eds.), *Modernisierung personenorientierter Dienstleistungen. Innovationen für die berufliche Aus- und Weiterbildung* (p. 197 – 2019). Leske und Budrich.

Thole, W. (2012). Die Soziale Arbeit – Praxis, Theorie, Forschung und Ausbildung. In W. Thole (Eds.), *Grundriss Soziale Arbeit. Ein einführendes Handbuch* (pp. 19 – 70). VS Verlag für Sozialwissenschaften.

Biographical notes

Anna Bobe (M. Ed.) is a research assistant at Leuphana University in Lüneburg and previously worked as a teacher at a vocational school for social pedagogy. Her work and research focuses are: Social pedagogical didactics research and theory-practice transfer.

Dr **Anke Karber** is a professor of social pedagogy with a focus on Vocational Education Research and Didactics at Leuphana University Lüneburg.

VETNET
European Research Network
Vocational Education and Training

Deissinger, T., & Gonon, P. (2022). Continuity and change in dual apprenticeship systems: different historical pathways to 'hybridity' in vet in Germany and Switzerland. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 34–36).
https://doi.org/10.5281/zenodo.6975344

Continuity and Change in Dual Apprenticeship Systems: Different Historical Pathways to 'Hybridity' in VET in Germany and Switzerland

Deissinger, Thomas
thomas.deissinger@uni-konstanz.de, University of Konstanz

Gonon, Philipp
gonon@ife.uzh.ch, University of Zurich, Switzerland

Abstract

Context: Dual apprenticeship systems receive major attention on account of their structural speciality, their traditional working, didactic and learning principles, and, above all, because they seem to solve the problem of integrating young people into the labour market relatively smoothly. In contrast to other VET systems the German and the Swiss VET system pay tribute to both private and public interests, including shared responsibilities. Furthermore, subsidiarity, not central regulation, plays a major role in what political science labels "collective skill formation" (Busemeyer & Trampusch, 2019).
Approach: This paper is based on a historical analysis of the development of the German and Swiss system. Furthermore, topical documents and research literature in both countries are evaluated and synthetized from a comparative perspective.
Findings: Although the German and Swiss VET system are labelled as dual apprenticeship countries differences in the development are important, which will shape the further pathways that aim at hybridity, including labour market access and possible changes in higher education.
Conclusion: Dual apprenticeships are still playing an important role in both countries. Each country-specific solution of adapting dual apprenticeships in a global economy and in the face of expanding higher education had to be elaborated based on collaborative governance and commonly shared issues.

Keywords: apprenticeship, dual system, hybridity

1 The development of the German and Swiss VET system

The importance and high reputation of VET in both countries today is based on institutional development, including legislative regulations. In the aftermath of the Second World War and especially in the 1960s this remarkable amount of stability, structural and conceptual conservatism has been challenged. In Germany and Switzerland in the turmoil of the late 1960s and early 1970s (Greinert, 1994), pushing for educational reforms and the overcoming of established patterns, such as the three-tier secondary school system, the apprenticeship system also was at stake. Furthermore, the boost of baccalaureate schools led to a rising pressure to reform and modernize dual apprenticeships but did not lead to giving up the vocational principle in VET, the subsidiarity principle and consensus building - parameters mostly recurring to the late 19th century (Deissinger & Gonon, 2021).

Germany and Switzerland share the commonality of a VET system which gives apprenticeships, though to a varying degree, a crucial weight and relevance within the post-secondary

education system. Nevertheless, there are nation-specific differences even between Germany and Switzerland, which we will highlight in this paper. We treat Germany and Switzerland as two cases which are not juxtapositional but similar at least in their historical situation impacting vocational education at the beginning of the 20th century. In the course of history, however, due to various often dramatical political and economic developments, VET and dual apprenticeships followed different pathways in the two countries that are still visible today.

The obvious stability of the apprenticeship system seems to be one of the reasons why links between higher and vocational education, including hybridity, i.e. the formal combination of a vocational and a general qualification, are rather weak in Germany (Deissinger et al, 2013). Differently, in Switzerland, the establishment of the professional baccalaureate has led to a hybrid system (Gonon 2013), which does not set the VET sector apart and offers access to tertiary education.

Young people not going to university in Germany and Switzerland traditionally undertake apprenticeships in the dual system (Greinert 1994; Deissinger 2010; Wettstein et al. 2017). The dual system is a major pathway into skilled employment and also a crucial element of workforce development for many companies. As an apprenticeship system, its core aim is to qualify young people for carrying out an "occupation". However today, more and more young people tend to start immediately (in a baccalaureate school) or later (due to new programs leading to a bachelor degree) with an academically oriented learning pathway.

2 Differences regarding the current features and the importance of apprenticeships in both countries

When comparing Germany and Switzerland today, we can discern a number of similar but also different features regarding dual apprenticeships. In both countries, occupations play a decisive role in training young people for the world of work. Both countries still rely on a strong dual system and try to strengthen and stabilise this model also for the future. A pivotal element is the engagement of employers who are needed to guarantee that the systems still remain attractive for young people. Until now, in both countries (though to a larger degree in Switzerland), they are committed to training and do not want to delegate this task to schools or the state (Deissinger and Gonon 2016).

Having stressed the commonalities, we can look at different recent developments in both countries. The pathway to higher education and the importance of courses involving companies within the higher education system regarding the aspect of duality are different. Dualisation within higher education and, at the same time, with it a specific kind of "vocationalisation", have now become familiar features of an increasingly differentiated higher education system in Germany – e.g. with the *Berufsakademien* in the state of Baden-Württemberg (vocational academies which combine academic and practical training) now called "dual universities" (Deissinger 2010).

In Switzerland, the Federal Vocational Baccalaureate, introduced in 1993, has been the most important innovation in the last decades. It enables the transition from the - until then - quite isolated system of VET into the field of academic education and has gained recognition from the majority of stakeholders in educational policy and the public. In particular, it has become accepted by young people and their parents as a course of education which offers continuative options and therefore functions as an alternative to the traditional grammar school-based academic track (Wettstein et al. 2017).

3 Conclusion

In identifying the challenges for dual systems in Germany and Switzerland, we have focused on hybridity. Hybridity can be identified as an element of reframing (in Switzerland) or

transferring the apprenticeship model (in Germany) not just towards the world of work but also to the education system, thus opening further career paths for young people.

References

Busemeyer, M.R., & Trampusch, C. (2019). The politics of vocational training: Theories, typologies, and public policies. In D. Guile & L. Unwin (Eds.), *The Wiley handbook of vocational education and training* (pp. 137-164). Wiley Blackwell.

Deissinger, T. (2010). Dual System. in: P. Peterson, E. Baker & B. McGaw (Eds.), *International Encyclopedia of Education*, (3rd Edition, Vol. 8 pp.448-454), Elsevier.

Deissinger, T., Aff, J., Fuller, A., & Helms Jorgensen, C. (Eds.) (2013). *Hybrid Qualifications: structures and problems in the context of European VET policy,* Peter Lang.

Deissinger, T., & Gonon, P. (2016). Stakeholders in the German and Swiss VET system and their role in innovating apprenticeships against the background of academisation. *Education and Training*, 58 (6), 1-11.

Deissinger, T., & Gonon, P. (2021). The development and cultural foundations of dual apprenticeships – a comparison of Germany and Switzerland, in: *Journal of Vocational Education and Training*, 73 (2), 197-216.

Gonon, Ph. (2013). Federal Vocational Baccalaureate: The Swiss way of „hybridity". In T. Deissinger, J. Aff, A. Fuller & C. Helms Jörgensen (Eds.), *Hybrid Qualifications – Structures and Problems in the Context of European VET Policy* (pp. 181-196). Peter Lang

Gonon, P. (2017). Quality doubts as a driver for vocational education and training (VET) reforms – Switzerland's way to a highly regarded apprenticeship system. In M. Pilz (Ed.): *Vocational education and training in times of economic crisis* (pp. 341-354). Springer

Greinert, W.-D. (1994). *The "German System" of vocational training. History, organization, prospects*. nomos

Wettstein, E., Schmid, E., & Gonon, P. (2017). *Swiss vocational and Professional Education and Training (VPET). Forms, system, stakeholders*. hep

Biographical notes

Dr **Thomas Deissinger** is a professor at the University in Konstanz, Germany. His research includes international comparative perspectives on the VET systems of Australia, England, and Canada in particular, but also looks at other European countries.

Dr **Philipp Gonon** is a professor em. at the University of Zürich, where he researches and teaches vocational pedagogy, history and theory of (vocational) education, quality assurance, program evaluation, as well as issues on international comparison in education.

VETNET
European Research Network
Vocational Education and Training

Fischer, S., & Barabasch, A. (2022). Lecturer's conceptions of student creativity in higher vocational teacher education. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 37–43). https://doi.org/10.5281/zenodo.6975358

Lecturer's Conceptions of Student Creativity in Higher Vocational Teacher Education

Fischer, Silke
silke.fischer@ehb.swiss, Swiss Federal University of Vocational Education and Training

Barabasch, Antje
antje.barabasch@ehb.swiss, Swiss Federal University of Vocational Education and Training

Abstract

Context: This research was conducted in the context of Swiss vocational education and training (VET) teacher training. Lecturers from all institutions in the German-speaking part of Switzerland that train vocational teachers were surveyed.
Approach: The overall objective of this study was to find out how university lecturers conceptualise students' creativity. Overall, 19 university lecturers from five universities of teacher education in German-speaking Switzerland participated in our study. The data were analysed via qualitative content analysis and open coding.
Findings: From the lecturer's perspective, student creativity is categorised into a 5-category model in which lecturers *'see'* student creativity represented by (1) student self-reflection, (2) independent decision-making, (3) curiosity and motivation, (4) producing something and (5) developing original, new solutions. Additionally, a creative achievement according to their opinion in the profession of a lecturer is the creation of a new, innovative teaching/learning arrangement within university teaching.
Conclusion: The findings show that the understanding of student creativity is very complex as a common understanding of student creativity in higher teacher education does not exist. The categories identified in our study could be used not only to 'see' student creativity but also to promote and even evaluate it in higher education.

Keywords: creativity, higher vocational teacher education, data-grounded framework, empirical study

1 Introduction

Today creativity is a critical requirement for success and is even regarded as an *"indispensable prerequisite"* for innovative ability (Schubert, 2009, p.1). Creative minds are important for companies because they contribute to innovative products and processes and make strategic decisions that enable competitive advantage. Along with critical thinking, cooperation and communication, creativity is considered one of the most important skills of the 21st-century (Lai et al., 2018) and, therefore central to higher vocational teacher education. Creativity is understood as a transversal skill *"which everyone can develop"* (Cachia et al., 2010, p. 9), and thus the creative potential of all students should be promoted interdisciplinarily by all university lecturers equally.

Although scientific interest in creativity has risen greatly in recent years, it is still difficult to define the complex phenomenon of creativity. Various studies about creativity in higher

education illustrate that basic agreements about a common definition of creativity are lacking and that even contradictory understandings are available (cf. Amabile, Hadley, & Kramer, 2002; Beghetto & Kaufman, 2007). In psychology, there is a standard definition of creativity that consists of two criteria: *'Creativity requires (a) novelty or originality and (b) utility or usefulness'* (Simonton 2012, 97). Furthermore, creativity must always be seen in the context of an area or domain, and creative work must be recognised by others as creative (Glăveanu & Lahlou, 2012). However, in higher education, it proves difficult to capture students' creativity according to the standard definition, as students are not entrepreneurs and therefore do not produce new and useful products for a market (Cropley & Cropley, 2010). The European report on *"Creative Learning and Innovative Teaching"* (Cachia et al., 2010) also shows that many lecturers are unclear about how creativity should be integrated didactically into lectures, especially in terms of learning and assessment. Overall, it is, therefore difficult for lecturers to recognise a creative performance of students or even to assess it.

This paper aims to contribute to the understanding of the conceptualisation of student creativity. For this purpose, the overall objective of this study was to find out how university lecturers conceptualise students' creativity.

2 Challenges of Creativity in Higher Education

Despite the recognition of the benefits of creativity for the individual and for society, the promotion of creativity is anything but a priority in (higher) education. Various studies show that the creativity of students tends to decline in the formal educational system (Csikszentmihalyi, 2007; Pfeiffer & Wechsler, 2013). Csikszentmihalyi (2007) describes the knowledge transfer in the formal educational system as follows: *"Schools teach how to answer, not to question"* (p. xix). The formal education system discourages students from taking intellectual risks, which in turn are essential for creative performance (Kettler et al., 2018). This is due in part to the fact that most of today's teaching still takes place in repetitive frontal instruction settings that predominantly promote convergent thinking processes in which students pursue only one, the best solution, at a time. In order to think out-of-the-box and to perform creatively, however, divergent thinking processes in which several and, if possible, different solutions are generated are particularly important. Conventional instruction favours students who are strong analytical thinkers but disadvantages students who have creative abilities (Sternberg, 2006). In addition, the purely functional orientation of the educational system, which educates students primarily to *"teach to the test",* is also criticised in this context (Klieme et al., 2007, p. 229; Robinson, 2011). Common assessments and testing procedures lack the dimensionality needed to identify students' creative abilities (Sternberg, 2006). The creative contributions and abilities of students are even often perceived as disruptive, and distracting from learning objectives. Teachers seem to be afraid of losing control in the classroom due to the creative contributions of students. Chan and Chan (1999) even demonstrated in their study that teachers often associate students' non-conforming, disruptive behaviour with creativity. Creativity is therefore frequently even sanctioned in the context of classroom management. For this reason, creative contributions are often repressed in educational settings, including higher education (Gibson, 2010; Hosseini, 2011; Robinson, 2011).

Creativity is also not found in formal settings as well as in didactics of the formal educational system. To date, almost no educational institutions teach for creativity or train teachers to teach for creativity (Kaplan, 2019). Creativity is also not often found in college course curricula and is rarely stated as an explicit learning objective in courses (Jackson, 2006). According to Jackson (2006), this is because lecturers know too little about creative approaches in higher education and are also not familiar with the relevant literature on creativity promotion because it is not addressed in teacher education. Jahnke and Liebscher's (2020) study of the use of mobile devices to promote creativity in higher education shows that lecturers do not explicitly use

creativity as a didactical design element in their teaching either. However, learning with mobile devices encourages student creativity or the emergence of creativity-friendly learning environments. In this context, three types of implicitly integrated creativity that promote meaningful learning with mobile technologies were identified (cf. Jahnke & Liebscher, 2020). This implies that creativity should also be perceived by lecturers as a digital didactical design element, but this has not yet been done in teaching practice. Beyond that, in terms of 21st-century skills, higher education institutions place more importance on critical thinking, while the importance of creativity in teaching and learning processes is significantly underestimated (Jackson et al., 2007).

Another challenge of creativity in the higher education context is the perception of students' creative achievements. According to the standard definition (see 1 Introduction), however, the evaluation of the creative performance of students proves to be difficult, as they usually do not produce new and useful products for a market; they are not entrepreneurs or inventors (Jahnke et al., 2015). In a more general sense, the creative outputs produced by students are not tangible products, and the creative actions vary according to the subject. Consequently, it is difficult for lecturers to recognise the creative performance of students in the first place and to evaluate it adequately afterwards. To that date, there is no common understanding of creativity in higher education; however, some initial research has been conducted to define creativity in higher education. Jahnke et al. (2015) developed a '6-Facet-Model' that categorises student creativity through (1) student self-reflection, (2) independent decisions, (3) curiosity and motivation, (4) producing something, (5) multiperspectives and (6) when students develop original new ideas. To this point, creativity has not been studied in vocational teacher education.

These examples show that creativity has received little attention in (higher) education so far. There are many reasons for this. On the one hand, learning and testing in the educational system are geared toward achieving learning objectives as efficiently as possible and, consequently, convergent thinking processes. Creative achievements and contributions on the part of students are thus usually perceived as disruptive by lecturers. On the other hand, creativity has rarely been formally integrated into curricula, course descriptions, and learning objectives. Moreover, it is difficult to capture what creativity in higher education specifically means and whether concepts differ, if at all, across disciplines

3 Methods

For this study, an explorative approach was applied where university lecturers were requested to describe how they perceive and conceptualise student creativity. This approach has been used before by Jahnke, Haertel and Wildt (2015), who examined student creativity in a higher education context in Germany. For this purpose, the interview guideline used by Jahnke, Haertel and Wildt (2015) was adapted to the situation in the Swiss university/college context of vocational teacher training. The interviews were conducted from June to mid-October 2021 with university lecturers from all Swiss universities that train VET teachers, e.g. Swiss Federal University for Vocational Education and Training (SFUVET), Zurich University of Teacher Education, University of Zurich and the pedagogical Universities of Luzerne and St. Gallen. The participating institutions selected the respective interview partners.

The interview guideline was partly structured. The lecturers were asked to describe in detail the course in which they teach the most, for example, learning objectives, learning activities, content, assessments etc. They were also asked, *"What characterises a creative course for you?", "What do you consider a creative performance/effort of your students?", "How can you 'see' if/when a student is creative?"* The interviews were done via MS Teams and transcribed. Afterwards, they were analysed with MAXQDA by means of qualitative content analysis (Mayring & Frenzl, 2019) as well as open coding (Brymann, 2008). First, each interview was analysed in detail in order to understand the participants' perceptions of creativity and to match

the material with the identified categories of Jahnke, Haertel and Wildt (2015) (structured content analysis). Subsequently, all interviews were compared, analysed and summarized on a higher level. Finally, a theoretical model was derived from the interview data.

4 Findings

4.1 Demographics

A total of 19 interviews (N=19) were conducted with lecturers from five universities of teacher education in German-speaking Switzerland. The average interview duration was around 58 minutes. 10 participants (53 %) were female, and 9 participants (47 %) were male. At the time of the interview, the participants were on average 48 years old, the youngest participant was 36 years old, and the oldest participant was 60 years old. The teaching experience of the participants at the university level averaged 11 years. 14 subjects had an average teaching experience of 11 years at a vocational school, whereas 5 subjects had no teaching experience at a vocational school at all. 6 subjects held a leadership position, e.g. program director, at the time of the interview.

4.2 Conceptualisations of Creativity in Higher Teacher Education

Creativity in the Job as a Lecturer. The findings for the following questions are presented below: 'What does creativity mean to you in your job as a lecturer? Under which conditions are you (particularly) creative?/In which situations are you (particularly) creative? What stimulates your creativity?' From the interviewee's perspective, creativity in their job as a lecturer means creating something new. The new can also result from the combination of what is already known. A creative achievement in the profession of a lecturer is thus the creation of a new, innovative teaching/learning arrangement within university teaching, e.g. by embedding innovative methods and challenging discussions as well as creating a good learning atmosphere and open, self-regulated learning arrangements etc. The interviewees found a certain openness (with regard to the result and the approach to the solution), freedom, team exchange and time pressure, but not excessive, to be conducive to creativity. Accordingly, answers like the following were given: 'Free spaces with few defined specifications that can be filled individually, taking into account the current situation', 'if the external framework allows me a relatively large amount of self-organization and self-direction and I am also allowed to decide for myself how I shape it' and 'when a little pressure forces you to be creative or find solutions that aren't quite conventional, then that's certainly beneficial'.

Student Creativity. The findings show the interviewees' responses to the following questions 'How can you 'see' if/when a student is creative? How do you know that your students are creative?' The following answers were frequently given: 'Understand own learning itself', 'representing the own further development', 'analysing the own learning output'. These answers have in common that the own learning process is reflected on a meta-level. However, self-reflected learning also includes reflection in relation to one's own learning product so that a meaningful new arrangement can be created. This also includes the transformation of reflection processes into knowledge. Both aspects – self-reflection on a meta-level and the production of a meaningful composition (or learning product) – are represented in this cluster, which we, therefore, named self-reflective learning.

Another cluster that could be identified from the interviewees' response behaviour relates to self-organised or independent learning. This involves expanding knowledge independently and dealing with new aspects of a topic on one's own in- and outside the courses. It also implicates thinking further about the topic beyond the existing literature. Respectively, answers such as 'creative is just when an own contribution comes', ' going beyond the arguments of the literature' and 'in the sense of transfer performance, where a person has made very exciting

connections' were assigned to this cluster. The interviewed lecturers also linked the students' interest and engagement in a topic with creativity. Therefore, the third category was named showing curiosity and motivation. The following statements were summarised under this heading ' it takes enthusiasm to be creative', 'interest, engagement and participation in class', 'students who think actively, question things, get involved in discussions', 'when you link the theory with your own ideas or experiences' as wells as 'question things critically'.

A fourth cluster combined responses that were output-oriented and included examples and descriptions of learning products. Some of these responses were very specific. Typical responses assigned to this cluster were 'creating a role play in computer science class for the installation of a router' and 'designing own learning works'.

The last cluster we identified focuses on the achievement of original and completely new arrangements. In contrast to the category of self-reflective learning, this assignment is not only about meaningful arrangements but above all, about original and new arrangements. The following responses were assigned to this category: 'Using what you have learned in an original way in your lessons', ' search for new, unusual ways, possibilities', ' out of the box thinking', 'develop an efficient solution that is not foreseeable from the outset'. Since the courses are mostly about creating a learning product and, thus, finding their own solutions, in the name of this category, we have used the word solution (reaching for original, new solutions).

In summary, a total of five categories of lecturers' conceptualisations of creativity in higher teacher education were derived based on the data collected. These are summarised in Table 1.

Table 1

The '5-Category-Model' – how lecturers in our survey conceptualise student creativity in higher teacher education

	Category	Examples given by lecturers
1.	Self-reflective learning	• Understanding own learning itself/ reflection on own learning growth • Representing the own further development • Analyzing the own learning output (learning product) • Combining several concepts into a meaningful arrangement
2.	Independent learning	• Dealing with new aspects • Own acquisition of knowledge • Independently conducted products/assignments • Finding arguments that go beyond the literature (rationales, arguments, connections)
3.	Showing curiosity and motivation	• Enthusiasm for the topic/subject/discipline • Exchange ideas about new things that have been tried out • Lively discussions • Critical examination of the objects and topics and questions we deal with (critical thinking)
4.	Producing something	• Creating a learning video about all the modules they had in the course of study • Filming a teaching sequence that they have planned independently • Creating a role play in computer science class for the installation of a router • Writing a good, perhaps unexpected, critique, e.g. of a subject being taught
.	Reaching for original, new solutions	• Adapting newly acquired knowledge to their context and derive new possibilities for action for themselves • Extraordinary ideas in well-known issues • Creation of a transfer performance for your own teaching, with new, exciting links • Out of the box thinking

Note. Source: Own representation based on Jahnke et al. (2015, p. 6)

5 Discussion

The findings show that the understanding of student creativity is very complex. Our study underlines that there is no common understanding of student creativity in higher teacher education in the university context. We have therefore developed a '5-Category-Model' in accordance with the '6-Facet-Model' of Jahnke et al. (2015) by which the lecturers 'see' the creativity of the students of higher teacher education. From the lecturer's perspective, in our study, student creativity is expressed through (1) self-reflective learning, (2) independent learning, (3) showing curiosity and motivation, (4) producing something and (5) developing original, new solutions. Unlike the '6-Facet-Model' of Jahnke et al. (2015), our model does not include the category 'multiple perspectives'. This could be due to the fact that creative learning products in higher teacher education, like the design of a student-centred lesson, often incorporate learners' perspectives anyway and are therefore not perceived as multi-perspective by prospective teachers. However, this assumption would need to be verified in further studies.

In turn, the categories identified in our study could be used not only to 'see' student creativity but also to promote and even evaluate it in higher education. Through the identified categories, divergent thinking processes that lead to creative thinking and action can be promoted in higher education teaching. However, these would then have to be consciously used by lecturers to promote creativity. For example, students can be encouraged through self-reflection processes to improve their own learning product and, if necessary, to make it more creative and innovative through the use of new digital tools. Showing curiosity and motivation of students could be used, for example, to share new ideas and perspectives as well as to question existing ones. Learning products could be open-ended to some degree and could be created by using innovative methods and tools. In addition, the deliberate search for new and innovative solutions could be rewarded. Appropriate evaluation criteria would then also have to be developed to assess the creative performance achieved. These could be oriented, among other things, to the degree of innovation and the usefulness of the developed learning products for one's own learning or for one's own teaching.

Our study is limited in its representativeness due to the small size of the sample. The findings are therefore not universally valid and apply only to our survey context. In principle, it would be interesting to repeat this study with a larger sample size or to extend it to other professional groups. In this way, a generally valid definition of student creativity in higher education could possibly be generated, or student creativity could be discussed against different professional backgrounds. Furthermore, it would be interesting to validate the '5-Category-Model' we developed in school-based practice and determine if perceptions of student creativity differ between university faculty and teachers in vocational education and training.

Further, our study should help encourage discussion about the teaching of creativity and other transversal skills in higher teacher education. Against this background, the question arises whether the instruction of transversal skills for prospective teachers should be a task of higher teacher education in the future.

References

Amabile, T., Hadley, C., & Kramer, S. (2002). Creativity under the gun. *Harvard Business Review, 80*(8), 52-61.

Beghetto, R.A., & Kaufman, J.C. (2007). Toward a broader conception of creativity: A case for "mini-c" creativity. *Psychology of Aesthetics, Creativity, and the Arts, 1*, 73-79. https://doi.org/10.1037/1931-3896.1.2.73

Bryman, A. (2008). *Social research methods* (3rd ed.). New York, NY: Oxford University Press.

Cachia, R., A. Ferrari, K. M. Ala-Mutka, & Punie, Y. (2010). *Creative Learning and Innovative Teaching: Final Report on the Study on Creativity and Innovation in Education in EU Member States*. Luxembourg: Publication Office of the European Union. https://data.europa.eu/doi/10.2791/52913

Chan, D.W., & Chan, L. (1999). Implicit Theories of Creativity: Teachers' perception of students characteristics in Hong Kong. *Creativity Research Journal, 12*(3), 185-195. https://doi.org/10.1207/s15326934crj1203_3

Cropley, D., & Cropley, A. (2010). Recognizing and fostering creativity in technological design education.

International Journal Technology Design Education, 20(3), 345-358. http://dx.doi.org/10.1007/s10798-009-9089-5

Csikszentmihalyi, M. (2007). Developing creativity. In N. Jackson, M. Oliver, M. Shaw, & J. Wisdom (Eds.), *Developing creativity in higher education* (pp. xviii-xx). Routledge. https://doi.org/10.4324/9780203016503

Gibson, R. (2010). The 'art' of creative teaching. Implications for higher education. *Teaching in Higher Education, 15*(5)*,* 607-613. https://doi.org/10.1080/13562517.2010.493349

Glăveanu, V.P., & Lahlou, S. (2012). Through the creator's eyes: Using the subjective camera to study craft creativity. *Creativity Research Journal* 24 (2–3), 152-162. https://doi.org/10.1080/ 10400419.2012.677293

Hosseini, A. (2011). University student's evaluation of creative education in universities and their impact on their learning. *Procedia - Social and Behavioural Sciences, 15,* 1806-1812. https://doi.org/10.1016/j.sbspro.2011.04.007

Jackson, N., Oliver, M., Shaw, M., & Wisdom, J. (Eds.). (2007). *Developing creativity in higher education*. Routledge.

Jackson, N. (2006). Creativity in higher education: Creating tipping points for cultural change. *SCEPTrE Scholarly Paper, 3*(1), 1-25.

Jahnke, I., & Liebscher, J. (2020). Three types of integrated course designs for using mobile technologies to support creativity in higher education. *Computers & Education, 146*(2), 1-17. https://doi.org/10.1016/j.compedu.2019.103782

Jahnke I., Haertel, T., & Wildt, J. (2015). Teachers' conceptions of student creativity in higher education. *Innovations in Education and Teaching International, 52*(1)*, 87-95.* https://doi.org/10.1080/14703297.2015.1088396

Kaplan, D. (2019) Creativity in Education: Teaching for Creativity Development. *Psychology*, *10,* 140-147. https://doi.org/10.4236/psych.2019.102012

Kettler, T., Lamb, K.N., Willerson, A., & Mullet, D.R. (2018). Teachers' Perceptions of Creativity in the Classroom. *Creativity Research Journal, 30*(2), 164-171. https://doi.org/10.1080/10400419.2018.1446503

Klieme, E. et al. (2007). *Expertise zur Entwicklung nationaler Bildungsstandards. Eine Expertise [Expertise on the development of national educational standards. An expertise].* BMBF.

Lai, E. R., Yarbro, J., DiCerbo, K., & De Geest, E. (2018). *Skills for Today. What We Know about Teaching and Assessing Creativity*. Pearson.

Mayring P., & Fenzl T. (2019) Qualitative Inhaltsanalyse. [Qualitative content analysis.] In

Baur N., Blasius J. (Eds.), Handbuch Methoden der empirischen Sozialforschung (pp. 633-648). Springer VS. https://doi.org/10.1007/978-3-658-21308-4_42

Pfeiffer, S. I., & Wechsler, S. M. (2013). Youth leadership: A proposal for identifying and developing creativity and giftedness. *Estudos de Psicologia* (Campinas)*, 30*(2)*,* 219-229. https://doi.org/10.1590/S0103-166X2013000200008

Robinson, K. (2011). *Out of our Minds. Learning to be Creative.* West Sussex, UK: Capstone.

Schubert, T. (2009). Kreativität und Innovationen: Schlüsselkompetenzen in der Wissensgesellschaft. [Creativity and innovations: Key competencies in the knowledge Society.] *BWP, 6,* 10-13.

Sternberg, R. J. (2006). The nature of creativity. *Creativity Research Journal, 18*(1), 87-98. https://doi.org/10.1207/s15326934crj1801_10

Biographical notes

Dr **Silke Fischer** is a senior researcher in the research area «Teaching and Learning within the VPET system» and in the research field «Learning Cultures and Didactics» at the Swiss Federal University for Vocational Education and Training (SFUVET). Her research focuses on creativity in VET and game-based learning and instruction.

Dr **Antje Barabasch** is a professor and head of the research axe «Teaching and Learning in Vocational Education and Training» and the research field «Learning Cultures and Didactics» at the Swiss Federal University for Vocational Education and Training (SFUVET). Her research is concerned with learning cultures at Swiss enterprises, creativity in VET, art-based research, comparative education and the integration of refugees into the labour market.

VETNET
European Research Network
Vocational Education and Training

Goppold, M., Frenz, M. (2022). Staying or leaving academia? Career development of VET doctoral researchers in times of uncertainty. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 44–54). https://doi.org/10.5281/zenodo.6975374

User Feedback of Apprentices on an Augmented Reality System for Learning from Errors in TVET

Goppold, Marvin
m.goppold@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University

Frenz, Martin
m.frenz@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University

Nitsch, Verena
v.nitsch@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University

Abstract

Context: The paper introduces an augmented reality learning system that detects human vocational actions in company-based dual TVET. Based on digital twins in a simulation environment, a head-mounted display visualises simulated consequences of detected action errors while the system prevents consequences in reality. The learning system enables situated learning in TVET. A prototype resulting from the development process shows potential as a suitable learning medium for vocational schools. Because vocational schools do not have situational vocational characteristics, the research question asks which technical adaptions apprentices suggest improving the prototype for vocational schools. Do their suggestions constitute situated learning characteristics?
Approach: 28 apprentices for Mechanics in plastics and rubber processing evaluated the prototype of the Augmented Reality learning system in a user study. The study used a learning task on an injection-moulding machine that assesses the quality and proceeds a filling study. The apprentices rated the system usability based on the ISONORM usability scale and responded to open feedback questions regarding possible improvements of the prototype.
Findings: The results indicate many objective situational characteristics and constraints that allow improvements of environmental and occupational characteristics at VET schools. Due to missing social interaction in the focused vocational learning tasks, the social and subjective dimensions have not been part of the study. A reflection and evaluation phase after completing the learning tasks needs to address this issue didactically for optimal competence acquisition.
Conclusion: The discussion paves the way for useful adaptions in order to incorporate an improved prototype in vocational schools. Teachers then can implement learning approaches based on vocational actions on a machine mock-up using an Augmented Reality learning system in the classroom. Future research should address the design of a suitable reflection phase to facilitate learning from performed actions.

Keywords: usability, learning media, digital twin, work-based

1 Introduction

Digitalisation plays an important role in the transformation processes of technical vocational education and training (TVET) all over Europe. European stakeholders stated numerous recommendations such as digital competence frameworks (Carretero et al., 2017; Redecker & Punie, 2017). According to that, TVET has to distinguish two phenomena of digital change. The first concerns vocational work processes due to the introduction of digital processes or tools (e.g. Goller et al., 2021). The second concerns the design of digitised learning and teaching processes (Dobricki et al., 2020) and is the focus of this contribution.

First, a theory chapter summarises the current state of the art of Augmented Reality learning media in TVET before presenting a current learning system development as subject of the study. A brief section introduces the technical point of view before formulating a research question combining both perspectives relying on experienced apprentices as experts in situational learning. Next, the methodology for the empirical investigation is outlined. Following the description of the results, they are discussed from several perspectives. Finally, a conclusion summarises the findings and gives suggestions for further research.

5.1 State of the Art: Augmented Reality Learning Media in TVET

In TVET, teaching and learning often utilise the opportunities of situated or work-based learning approaches (e.g. Lave & Wenger, 2011). Many current approaches in learning media development model learning situations in augmented (AR) or virtual reality (VR) (e.g. Aarkrog, 2021) and reduce situational attributes in a negative way from a perspective of situated learning due to increasing complexity (Teräs & Moreno Herrera, 2019). Thus, innovations should integrate digital learning technologies such as AR/VR in real learning situations to provide opportunities through their use (cf. Stender et al., 2021). When it comes to AR, engineering is an early adopter (Han et al., 2022) translating basic research into practice which offers great chances for TVET linked to engineering disciplines.

Simulation technology offers powerful options to implement TVET environments virtually for mobile or stationary learning process support (Bacca et al., 2015; Pürzel et al., 2013). Technical implementations of AR solutions in TVET to support learning, e.g. with a haptic tool simulator, are, for instance, found in carpentry (Jose et al., 2016) and plumbing (Jose et al., 2014) or, in the event technology industry in workplace training for rigging (Sommerauer, 2021). Another example from carpentry designs AR for three-dimensional drawings (Lee, 2020). Smith et al. (2021) simulate a fault diagnosis task of a three-phase power supply to enable guiding with AR comparable to the inspection and maintenance of an air compressor in a virtual cave simulating an engine plant room (Cheung & Sai Lok, 2016). Related to TVET, there is another system assisting in the motherboard assembly of computer hardware (Sirakaya & Kilic Cakmak, 2018) or supporting start-up operations of laboratory equipment (Alptekin & Temmen, 2018; Lester & Hofmann, 2020). One general learning media trend in AR is functional models within AR environments for TVET (Lavrentieva et al., 2019), e.g. a lathe (Güler & Yücedağ, 2018).

Welding is one domain where AR is a well-developed training solution (cf. Chan et al., 2022) that is currently becoming state of the art in many training centres worldwide (Lavrentieva, Arkhypov, Kuchma, & Uchitel, 2019). Usability and technology acceptance studies show positive results in this AR use case (Agrawal & Pillai, 2020; Okimoto et al., 2015; Papakostas et al., 2022). Yet there are still some objective situation characteristics of welding out of scope. However, fostering physiological and motor skills does not necessarily lead to experiences of typical welding situation characteristics that apprentices usually have to cope with. These include heat resulting from melting material, ultraviolet rays and counterforce of the electric arc, as well as current-carrying welding parts.

Referring to Zinn (2015), AR technology matches with the theory of situated learning. Situated learning states that learners co-participate in vocational tasks and learn by solving occupational problems (Billett, 1994; Lave & Wenger, 2011; Spöttl, 2008). In contrast to other didactics, it neglects content in order to investigate situational characteristics or constraints of learning and motivation effects, especially of higher-order transfer capabilities (Billett, 1994; Lave & Wenger, 2011). Therefore, learning processes attempt to support the interpretation of occupational situations for well-reflected vocational actions. Vocational action analyses imply no social interaction during work actions under consideration (Goppold et al., 2021a; Goppold et al., 2021b), which characterises multiple machine work as a standard work organisation in injection moulding. As a result, the main objectives in the first place are objective situational characteristics and constraints of vocational tasks and actions.

From a theoretical understanding, the technical system proposed in the following section provides a base for reflection to support a transfer by abstracting from situated experience toward universally applicable knowledge (cf. Tawfik et al., 2015).

5.2 Description of the Investigated Augmented Reality Learning System.

The researched Augmented Reality (AR) system detects and tracks actions in technical vocational work processes of apprentices with the help of digital twins that digitally map the structure and behaviour of the real learning environment (cf. Atanasyan et al., 2020). Furthermore, the system enables the simulation of vocational actions virtually in order to identify errors and prospective consequences (Schluse et al., 2018). A head-mounted display visualises hazardous error consequences to support learning processes (Cattaneo & Boldrini, 2017) while stopping potential negative incidents from occurring in the real world. Enhancing situated learning with a new dimension is the key benefit compared to traditional learning media, which contradicts the assistance paradigm of economic rationalisation (e.g. Wang et al., 2016). A systemic approach to a work system connects the interdisciplinary interfaces in the development process (Goppold et al., 2021c). Data logging on a cloud platform and the simulation allow virtually replaying actions to evaluate and reflect them in the light of various guiding ideas such as ecology (Rauner, 2013).

The didactical concept based on AR fosters competence acquisition in the work-based learning processes of company-based TVET (Goppold et al., 2021b). Furthermore, the same system could be a use case for vocational schools. It refers to vocational actions derived from activity theory and related occupational competence as normative guiding ideas in German VET curricula (e.g. Gessler & Howe, 2015).

Due to the technical complexity of two learning scenarios in injection moulding and CNC turning of company-based VET, the development team built multiple prototypes. The final prototype for the in-company application (see Figure 1) allows mimicking vocational learning tasks on an injection moulding machine mock-up that might have a second life as learning media in vocational schools.

Apprentices in the German dual VET system have expertise regarding work practice and situational constraints of work activity. This offers potential when involving them in learning media development. In addition to their feedback on the system entities such as AR glasses, apprentices counsel the development process regarding abilities to simulate practical work characteristics in school. The arising research question focuses on the optional continuing improvement of the final prototype as standalone learning media.

5.3 Usability

Usability is a multidimensional construct that describes the ability of a product to fulfil its purpose while used to perform a task effectively and efficiently under a certain condition (cf.

International Organization for Standardization, 2020). The products have to offer human-system interaction, and the construct gives valuable feedback to the product designers.

There is a formative and summative application of usability in the design processes of products and interaction with helpful recommendations on technical solutions of requirements in the product development. Mainly, studies deal with the design of human-computer interfaces and incorporate users in the early stages of development processes. Since the introduced AR learning system has a dual interface with AR glasses and the interface of the injection-moulding machine mock-up, usability evaluations by experienced apprentices will help to further develop the current prototype into an improved product for company-based TVET as well as a possible standalone school-based learning media. Usability questionnaires (Assila et al., 2016) provide a suitable standardised instrument to assess this construct in the study described in the following.

5.4 Research Question

Based on the considerations outlined above, the following leading research questions were formulated: Combining the TVET and technical perspective, which technical adaptions do apprentices of German dual TVET suggest in order to improve the AR learning media prototype for a stand-alone integration in school-based learning processes? Are these suggestions features of situated learning?

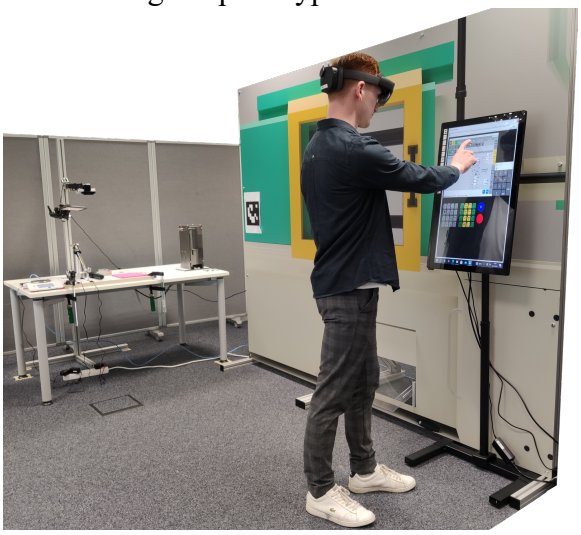
6 Methodology

To investigate the stipulated research questions, a user study was conducted. Apprentices from the dual VET system in Germany were the target group. Apprentices participating in the study had to perform an open learning task on quality assessment of a workpiece situated at an injection-moulding machine in order to evaluate quality concerning standards and customer demands. Furthermore, they had to reproduce the exact same workpiece using the prototype mock-up of a real injection-moulding machine.

Figure 1 shows a typical situation of the study in which apprentices needed to interact with the machine interface to optimise the production process of the injection-moulding machine. While working on these vocational tasks, participants wore a Microsoft HoloLens 2 as a head-mounted display that visualised details of the machine (e.g. a virtual representation of the machine tool) and situational feedback (e.g. results of an initiated automated measurement). Moreover, they used smart tools such as a scale to measure masses that provide the simulation with information on their technical vocational actions. The simulation visualised erroneous action consequences in AR without harmful and dangerous situations in reality.

The study utilised usability measures for the optimisation of the technical learning system. Due to a new usability standard (International Organization for Standardization, 2020), usability measurement instruments that match and satisfy the changed definitions of usability do not exist. Therefore, the short version of the ISONORM usability questionnaire (Prümper, 1997) was used, which comprises seven different scales with five items each on relevant topics for good usability referring to the previous standard definition (International Organization for Standardization, 2006).

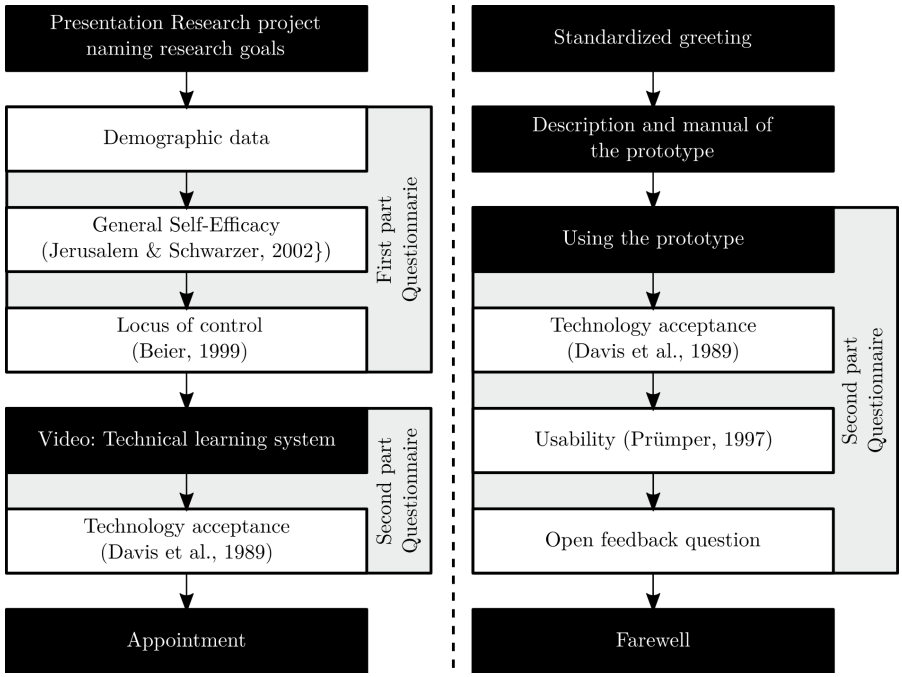
Figure 1
Apprentice using the prototype of a technical learning system in the study



On top of the quantitative usability measures, the study obtained qualitative feedback in the form of recommendations for improvements in the questionnaire relying on apprentice experience in company-based learning processes with real machinery, as introduced at the end of section 1.2. An open question format was chosen to obtain additional information about their perceptions of the system. The procedure of the entire experiment is depicted in Figure 2.

The participants completed the online survey using an iPad with an attached keyboard after they finished the learning task. The task design, in combination with the linked surveys, resulted in a maximum test time of 90 minutes.

Figure 2
Procedure outline of the study. The part on the right addresses the research question described in the article.



7 Results

Participants in this study were 29 apprentices for Mechanics in plastics and rubber processing in their last year of apprenticeship, mostly from the injection-moulding sector. During the study, there was one drop-out while processing of the learning and work task, presumably due to motion sickness. However, there was no clearly attributable evidence of HMD use. This represents approximately 3 % of all German apprentices for Mechanics in plastics and rubber processing specialised in moulding in their last year and more than 10 % in the state of North Rhine-Westphalia (Bundesinstitut für Berufsbildung, 2022).

The sample included 25 men and three women participants. The average age is 22 years (SD 3.6). General education levels are six times on ISCED 344 and 22 times on ISCED 244. Additional reported vocational and academic education levels were stated four times on ISCED 454 and one time each on ISCED 747 as well as ISCED 254. 18 Participants worked with injection moulding machines on a daily basis, but only half of them worked with one of the manufacturers, Arburg, as presented in the study task. The sample predominantly had no relevant prior experience with AR glasses (n=23), AR via tablets or smartphones (n=20), and VR technology (n=15).

7.1 Usability Measures

Table 1 gives an overview of the usability results with all subscales of the questionnaire.

Table 1
Quantitative results of the ISONORM questionnaire

	n	M	SD	Cronbach's α
Overall Usability	28	37.9	4.2	0.60
Usability Suitability for the task	28	5.0	1.0	0.54
Usability Self-Descriptiveness	28	4.2	1.1	0.77
Usability Conformity with user expectations	28	4.8	10.	0.62
Usability Suitability for learning	28	4.7	1.2	0.59
Usability Controllability	28	5.1	1.0	0.68
Usability Error tolerance	28	4.2	0.9	0.41
Usability Suitability for individualisation	28	5.0	0.8	0.66

While the average scores indicate good usability ratings for each of the scales, self-descriptiveness and error tolerance showed the lowest mean scores, thus indicating the most potential for improvements of the learning system in terms of usability. However, it must be pointed out that the reliability measure Cronbach's α varies for the usability subscales in the range from good for self-descriptiveness (α =0.77) to rejected reliability for error tolerance (α=0.41). Hence, the quantitative ratings should be interpreted with caution.

7.2 Qualitative Feedback of Apprentices on the Potential for Improvements

A qualitative content analysis was conducted with the answers to the open question that asked about improvement potential. Hereby, the answers were coded within an inductive categorisation system, and topic-based clusters were generated with reference to situational characteristics and constraints (cf. Mayring, 2015). The following text exemplifies all categories with some background information.

The data of the qualitative feedback provide convincing evidence that multiple issues exist with opportunities for improvements. The most frequently mentioned suggestion is that an assistance system function would be a good addition. This includes an option during task

processing to call up situation-appropriate information, such as material parameters, but also recommendations for (guided) actions.

Furthermore, the apprentices mentioned that they would like to have possibilities for action, which concerns both the extension of the learning task in the sense of a holistic filling study as well as further associated work actions such as a previous tool change.

In addition, some test persons noted a lack of acoustic feedback from the machine, which can provide a lot of information about the machining process. Moreover, several times there was a hint that the interaction possibility of the man-machine interface does not fully replicate the real machine, which, for example, includes dynamic updates of the temperatures of the screw heating.

Regarding the visualisations in the HMD, the feedback highlights improvements in the detail level, the use of video sequences, a higher frame rate and a better quality of the visualisations that clearly distinguishes from the environment. Some apprentices hoped for more action consequences in augmented reality, e.g. melting temperature visualisation or dynamic visualisations of more machine parts. One special recommendation suggests the visualisation of properties of the manufactured component as support instead of a separate self-guided determination. Individual feedback has still suggested to limit the duration of HMD use due to the high physical strain.

8 Discussion

8.1 Implications from Usability Incorporating Qualitative Aspects

Based on the usability results, self-descriptiveness also has some weaknesses that good documentation and help functions could fix. With these aids, apprentices would be able to start the HMD on their own without the required support of examiners.

However, related to Cronbach's alpha, there is low reliability for error tolerance. A possible explanation is a different definition of error in terms of usability and the present learning situation. Suitability for the task also indicates a diminished Cronbach alpha that might relate to missing functionalities of the man-machine interface when taking single items of the scale into account. The qualitative feedback argues in favour of the Arburg machinery experience of some participants who interact in different ways with the interface than the programmed one. Their negative ratings possibly add up to the measured effect.

Cut-offs of all subscales with alpha below 0.6 would lead to an incomplete overall usability measure as well as removing items from three-item scales because the problematic ones interfere in pairs. Therefore, the results deny any further discussions of these subscales and the overall usability due to low reliability.

8.2 Implications from Qualitative Feedback

Overall, the following recommendations for improvements should not hide the fact that the prototype also shows good interaction characteristics and high similarities in tool usage in the analysis phase of the learning task. With regard to the research question, the situated characteristics mentioned in the feedback address the following current disadvantages. The real injection-moulding machine offers a menu with sensor data logging that is demanded by some participants to gain insights into the machine state. A suitable simulation output could implement this missing feature with data derived from the properties of the digital machine twin and update them continually. Additionally, the machine menu for process parameter histories could improve the situated character of the learning task well, too. In particular, task individualisation is one advantage that could result from integrating the menu information into new learning tasks.

Other missing machine functions are incremental commands instead of auto-mode as well as linked visualisations of the machine states. When processing a filling study using this incremental workflow is a standard action that could not be part of the study due to its high time requirement, but should improve the prototype to mirror the real work tasks and behaviour. On top of that, dynamic visualisations of the tools and ejector pins can support the understanding of the tool because apprentices usually use the kinematics of a tool to comprehend its functions.

Furthermore, the requirement for acoustic and especially vibration feedback is a highly important recommendation that would lead to more situated learning scenarios. The apprentices and their trainers use these machine noise outputs to evaluate their function while running and derive states of different components from these information which is a classic feature of objective situatedness. This aligns with the demand for improved fitting of the augmented content into the environment. Accurate calibrations for the HMD and adapted colour grading might generate a better solution.

Finally, the apprentices found the system boundaries when addressing the need for further possible actions they usually process in workplace learning spaces. This is a well-known disadvantage of technical systems because they are only able to represent a predefined part of reality and do not cover, for example, the change of a tool in the machine. As a result, vocational situations have to be transferred into digital twins for simulations and modelling cannot represent their objectives holistically by definition.

8.3 Limitations

In interpreting the results, it should be taken into consideration that the used ISONORM questionnaire referred to a recently outdated standard and showed overall poor reliability. Hence, only partial results should be interpreted in combination with the results of the qualitative analysis. Another limitation that should be taken into consideration in the interpretation of the results concerns the focus on objective situation characteristics at the expense of subjective and social attributes. This is a legitimate weakness from a holistic understanding because the objective attributes derived from the results only describe situated learning in combination with subjective and social attributes. On the contrary, the results highlight the advantage of the learning task in detail and observing the action exactly without the previous planning phase and the evaluation with reflection afterwards. Hereby, the system yields a lot of information on event sequences of the action that need enrichments in social and subjective dimensions as well as the individual cognitive background. A reflection phase together with colleagues or trainers might be a solution. The objectiveness of technical action detection might point to a general flaw in using technical learning systems in the VET context.

9 Conclusion

Overall, the proposed Augmented Reality learning system and the prototype in the user study address a research gap on action-based learning systems in TVET incorporating learning from errors. The results and discussion show a pathway for adaptions to develop a standalone prototype for TVET schools enabling vocational actions on a machine mock-up using an Augmented Reality learning system. Apprentices commented on many details that point to missing objective situation characteristics of the mock-up as well as the augmented vocational situation compared to real work. The usability measurement revealed categories for technical improvements of the underlying simulation, especially the system improvement as well as the interaction with the HMD at start-up.

It should also be pointed out that situated learning always has a social and subjective dimension that was not considered in this study. Hence, these underrepresented dimensions should be the focus of ongoing and future research. Vocational actions using the prototype in

TVET schools might also support, for example, in evaluation and reflection phases addressing the impact of the performed actions and results on various guiding ideas.

Acknowledgement

The contribution of this article is part of the project 'FeDiNAR—Didactical Use of Errors with the Help of Augmented Reality'. It is funded by the Federal Ministry of Education and Research (BMBF) as part of the 'Digital Media in Vocational Education and Training' programme and is supported by the German Aerospace Center (DLR) under the funding code 01PV18005A.

References

Aarkrog, V. (2021). The Impact of Virtual Reality on Learning Processes and Learning Outcome. A study of VR-based Learning Among Social and Health Care Staff and Students. In C. Nägele, B. E. Stalder, & M. Weich (Chairs), *Pathways in Vocational Education and Training and Lifelong Learning: Proceedings of the 4th Crossing Boundaries Conference in Vocational Education*.

Agrawal, R., & Pillai, J. S. (2020). Augmented Reality Application in Vocational Education: A Case of Welding Training. In J. Jorge, A. Ferreira, N. Marquardt, & F. Chevalier (Eds.), *Companion Proceedings of the 2020 Conference on Interactive Surfaces and Spaces* (pp. 23–27). ACM. https://doi.org/10.1145/3380867.3426199

Alptekin, M., & Temmen, K. (2018). Design concept and prototype for an augmented reality based virtual preparation laboratory training in electrical engineering. In *2018 IEEE Global Engineering Education Conference (EDUCON)*.

Assila, A., Oliveira, K. M. de, & Ezzedine, H. (2016). Standardized Usability Questionnaires: Features and Quality Focus. *Electronic Journal of Computer Science and Information Technology*, *6*(1). https://ejcsit.uniten.edu.my/index.php/ejcsit/article/view/96

Atanasyan, A., Kobelt, D., Goppold, M., Cichon, T., & Schluse, M. (2020). The FeDiNAR Project: Using Augmented Reality to Turn Mistakes into Learning Opportunities. In V. Geroimenko (Ed.), *Springer Series on Cultural Computing. Augmented Reality in Education: A New Technology for Teaching and Learning* (pp. 71–86). Springer.

Bacca, J., Baldiris, S., Fabregat, R., Kinshuk, & Graf, S. (2015). Mobile Augmented Reality in Vocational Education and Training. *Procedia Computer Science*, *75*, 49–58. https://doi.org/10.1016/j.procs.2015.12.203

Billett, S. (1994). Situated learning – a workplace experience. *Australian Journal of Adult and Community Education*, *34*(2), 112–130.

Bundesinstitut für Berufsbildung. (2022). *Datensystem Auszubildende: Berichtsjahr 2020*. Verfahrensmechaniker/-in für Kunststoff- und Kautschuktechnik FR Formteile. https://www.bibb.de/dienst/dazubi/de/1867.php

Carretero, S., Cuorikan, R., & Punie, Y. (2017). *DigComp 2.1: The digital competence framework for citizens with eight proficiency levels and examples of use* (EUR 28558 EN).

Cattaneo, A. A., & Boldrini, E. (2017). Learning from errors in dual vocational education: video-enhanced instructional strategies. *Journal of Workplace Learning*, *29*(5), 357–373. https://doi.org/10.1108/JWL-01-2017-0006

Chan, V. S., Haron, H. N. H., Isham, M. I. B. M., & Mohamed, F. B. (2022). VR and AR virtual welding for psychomotor skills: A systematic review. *Multimedia Tools and Applications*, *81*(9), 12459–12493. https://doi.org/10.1007/s11042-022-12293-5

Cheung, H. K. C., & Sai Lok, E. L. (2016). Development of practical vocational training class making use of virtual reality-based simulation system and augmented reality technologies. *The 10th International Symposium on Advances in Technology Education*, 105–110. https://repository.vtc.edu.hk/ive-it-sp/101

Dobricki, M., Evi-Colombo, A., & Cattaneo, A. (2020). Situating Vocational Learning and Teaching Using Digital Technologies - A Mapping Review of Current Research Literature. *International Journal for Research in Vocational Education and Training*, *7*(3), 344–360. https://doi.org/10.13152/IJRVET.7.3.5

Gessler, M., & Howe, F. (2015). From the Reality of Work to Grounded Work-Based Learning in German Vocational Education and Training: Background, Concept and Tools. *International Journal for Research in Vocational Education and Training*, *2*(3), 214–238. https://doi.org/10.13152/IJRVET.2.3.6

Goller, M., Caruso, C., & Harteis, C. (2021). Digitalisation in Agriculture: Knowledge and Learning Requirements of German Dairy Farmers. *International Journal for Research in Vocational Education and Training*, *8*(2), 208–223. https://doi.org/10.13152/IJRVET.8.2.4

Goppold, M., Frenz, M., & Nitsch, V. (2021a). Design of Work Process Oriented Digital Learning Systems Based on Work Analysis. In C. Nägele, B. E. Stalder, & M. Weich (Chairs), *Pathways in Vocational Education and*

Training and Lifelong Learning: Proceedings of the 4th Crossing Boundaries Conference in Vocational Education.

Goppold, M., Kreischer, S., Klatt, M., Dunsche, L., Döhring, T., Tackenberg, S., Frenz, M., & Nitsch, V. (2021b). *Leitidee Ökologie als Nachhaltigkeitsdimension in Lernprozessen für zukünftige Fachkräfte in der Kunststofftechnik – Beispielhafte Lern- und Arbeitsaufgabe zur Wahl von Fertigungsparametern mit einem Augmented Reality Lernsystem* (Scientific reports = Wissenschaftliche Berichte/Hochschule Mittweida 02/2021). Mittweida. https://doi.org/10.48446/opus-12303

Goppold, M., Tackenberg, S., Frenz, M., & Nitsch, V. (2021c). The FRAM error model within a system theoretical work system to support conceptually the development of a technical learning system for learning from errors. In N. L. Black, W. P. Neumann, & I. Noy (Eds.), *Lecture Notes in Networks and Systems. Proceedings of the 21st Congress of the International Ergonomics Association (IEA 2021)* (Vol. 220, pp. 80–87). Springer International Publishing. https://doi.org/10.1007/978-3-030-74605-6_10

Güler, O., & Yücedağ, I. (2018). Developing an CNC lathe augmented reality application for industrial maintanance training. In *2018 2nd International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)*.

Han, X., Chen, Y., Feng, Q., & Luo, H. (2022). Augmented Reality in Professional Training: A Review of the Literature from 2001 to 2020. *Applied Sciences*, *12*(3), 1024. https://doi.org/10.3390/app12031024

International Organization for Standardization (2006). *Ergonomics of human-system interaction — Part 110: Interaction principles* (Norm ISO 9241-110). Geneva.

International Organization for Standardization (2020). *Ergonomics of human-system interaction — Part 110: Interaction principles* (Norm ISO 9241-110). Geneva.

Jose, J., Unnikrishnan, R., Marshall, D., & Bhavani, R. R. (2014). Haptic simulations for training plumbing skills. In *2014 IEEE International Symposium on Haptic, Audio and Visual Environments and Games (HAVE) Proceedings*.

Jose, J., Unnikrishnan, R., Marshall, D., & Bhavani, R. R. (2016). Haptics enhanced multi-tool virtual interfaces for training carpentry skills. In *2016 International Conference on Robotics and Automation for Humanitarian Applications (RAHA)*.

Lave, J., & Wenger, E. (2011). *Situated learning: Legitimate peripheral participation* (24th ed.). *Learning in doing*. Cambridge Univ. Press.

Lavrentieva, O. O., Arkhypov, I. O., Krupskij, O. P., Velykodnyi, D. O., & Filatov, S. V. (2019). Methodology of using mobile apps with augmented reality in students' vocational preparation process for transport industry. In *CEUR Workshop,* Kryvyi Rih.

Lavrentieva, O. O., Arkhypov, I. O., Kuchma, O. I., & Uchitel, A. D. (2019). Use of simulators together with virtual and augmented reality in the system of welders' vocational training: Past, present, and future. In *CEUR Workshop,* Kryvyi Rih.

Lee, I.-J. (2020). Using augmented reality to train students to visualize three-dimensional drawings of mortise–tenon joints in furniture carpentry. *Interactive Learning Environments*, *28*(7), 930–944. https://doi.org/10.1080/10494820.2019.1572629

Lester, S., & Hofmann, J. (2020). Some pedagogical observations on using augmented reality in a vocational practicum. *British Journal of Educational Technology*, *51*(3), 645–656. https://doi.org/10.1111/bjet.12901

Mayring, P. (2015). *Qualitative Inhaltsanalyse: Grundlagen und Techniken* (12th ed.). *Beltz Pädagogik*. Beltz.

Okimoto, M. L. L., Okimoto, P. C., & Goldbach, C. E. (2015). User Experience in Augmented Reality Applied to the Welding Education. *Procedia Manufacturing*, *3*, 6223–6227. https://doi.org/10.1016/j.promfg.2015.07.739

Papakostas, C., Troussas, C., Krouska, A., & Sgouropoulou, C. (2022). User acceptance of augmented reality welding simulator in engineering training. *Education and Information Technologies*, *27*(1), 791–817. https://doi.org/10.1007/s10639-020-10418-7

Prümper, J. (1997). Der Benutzungsfragebogen ISONORM 9241/10: Ergebnisse zur Reliabilität und Validität. In R. Liskowsky, B. M. Velichkovsky, & W. Wünschmann (Eds.), *Berichte des German Chapter of the ACM. Software-Ergonomie '97* (Vol. 49, pp. 253–262). Vieweg+Teubner Verlag. https://doi.org/10.1007/978-3-322-86782-7_21

Pürzel, F., Klimant, P., Wittstock, V., & Kuhl, M. (2013). Real NC Control Unit and Virtual Machine to Improve Operator Training. *Procedia Computer Science*, *25*, 98–107. https://doi.org/10.1016/j.procs.2013.11.012

Rauner, F. (2013). *Competence development and assessment in TVET (COMET): Theoretical framework and empirical results*. *Technical and vocational education and training: Vol. 16*. Springer.

Redecker, C., & Punie, Y. (2017). *European framework for the digital competence of educators: DigCompEdu*. *EUR, Scientific and technical research series: Vol. 28775*. Publications Office.

Schluse, M., Priggemeyer, M., Atorf, L., & Rossmann, J. (2018). Experimentable digital twins—Streamlining simulation-based systems engineering for Industry 4.0. *IEEE Transactions on Industrial Informatics*, *14*(4), 1722–1731. https://doi.org/10.1109/TII.2018.2804917

Sirakaya, M., & Kilic Cakmak, E. (2018). Effects of Augmented Reality on Student Achievement and Self-Efficacy in Vocational Education and Training. *International Journal for Research in Vocational Education and Training*, *5*(1), 1–18. https://doi.org/10.13152/IJRVET.5.1.1

Smith, E., McRae, K., Semple, G., Welsh, H., Evans, D., & Blackwell, P. (2021). Enhancing Vocational Training in the Post-COVID Era through Mobile Mixed Reality. *Sustainability*, *13*(11), 6144. https://doi.org/10.3390/su13116144

Sommerauer, P. (2021). *Augmented Reality in VET: Benefits of a qualitative and quantitative study for workplace training*. University of Hawai'i at Manoa Hamilton Library. https://doi.org/10.24251/HICSS.2021.196

Spöttl, G. (2008). Learning through the Work Process - Challenges and the Shaping of Skill Requirements. In G. Loose (Ed.), *Berufliche Bildung in Forschung, Schule und Arbeitswelt. Re-engineering dual training: The Malaysian experience* (pp. 31–44).

Stender, B., Paehr, J., & Jambor, T. N. (2021). Using AR/VR for Technical Subjects in Vocational Training – Of Substancial Benefit or Just Another Technical Gimmick? In *Proceedings of the 2021 IEEE Global Engineering Education Conference (EDUCON): Date and venue: 21-23 April, 2021, Vienna, Austria.* IEEE.

Tawfik, A. A., Rong, H., & Choi, I. (2015). Failing to learn: towards a unified design approach for failure-based learning. *Educational Technology Research and Development*, *63*(6), 975–994. https://doi.org/10.1007/s11423-015-9399-0

Teräs, M., & Moreno Herrera, L. (2019). Using digital devices for learning vocational expertise in high- and low-technology contexts – Case studies in Finnish and & Cuban contexts. In F. Marhuenda-Fluixá & M. J. Chisvert-Tarazona (Chairs), *Pedagogical concerns and market demands in VET Proceedings of the 3rd Crossing Boundaries*. https://zenodo.org/record/2651250

Wang, X., Ong, S. K., & Nee, A. Y. C. (2016). A comprehensive survey of augmented reality assembly research. *Advances in Manufacturing*, *4*(1), 1–22. https://doi.org/10.1007/s40436-015-0131-4

Zinn, B. (2015). Editorial: Conditional variables of 'Ausbildung 4.0' - Vocational education for the future. *Journal of Technical Education*, *3*(2). https://doi.org/10.48513/JOTED.V3I2.55

Biographical notes

Marvin Goppold, M.Sc., is a research associate at RWTH Aachen University in the TVET department at the institute for industrial engineering and ergonomics. His research scope includes empirical research on technical vocations and integration of results in learning concepts for TVET.

Dr phil. Dipl.-Ing. **Martin Frenz** is a professor at RWTH Aachen University and head of the TVET department at the institute for industrial engineering and ergonomics. His research scope focuses on workplace learning, teacher education for technical vocational schools as well as education of apprenticeship trainers.

Dr-Ing. **Verena Nitsch** is a professor at RWTH Aachen University. She is the Director of the Institute of Industrial Engineering and Ergonomics. Her research focuses on human-machine interaction and human-oriented technology development.

VETNET
European Research Network
Vocational Education and Training

Greppmair, A.C. (2022). Staying or leaving academia? Career development of VET doctoral researchers in times of uncertainty. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 55–68). https://doi.org/10.5281/zenodo.6975393

Staying or Leaving Academia? Career Development of VET Doctoral Researchers in Times of Uncertainty

Greppmair, Anja-Christina
anja.greppmair@uni-bremen.de, Institute Technology and Education ITB, University of Bremen

Abstract

Context: In recent years, there has been an increasing focus on the promotion of emerging researchers. Due to the growing number of PhD students and the decrease in post-doctoral positions, the preparation of PhD students for careers outside academia has become more and more important. This study addresses the career aspirations of doctoral researchers in the field of vocational education and training, considering the pandemic-related influences on their career development and the support offered within the doctoral programme.
Approach: Six doctoral researchers from three different European countries (Germany, England, Sweden) were interviewed online in semi-structured interviews. The countries were chosen because of their different VET systems. In addition, the interview partners conduct their doctorate under different organizational conditions: structured programmes vs. individual doctoral education. The data was analysed using the method of focused analysis of qualitative interviews.
Findings: Due to the COVID-19 pandemic, the framework conditions of the doctorate have changed, and many challenges have arisen for doctoral researchers, independent of the structure of the doctoral programme or the VET system. Nevertheless, the structured doctoral programme in Sweden, a country with a science-oriented VET system, tends to prepare students more strongly for a career within academia than the doctoral programmes in the other countries. With regard to the career aspirations of the doctoral students surveyed, on the other hand, a strong tendency toward career aspirations outside academia can be observed.
Conclusion: The pandemic-related circumstances have not allowed the doctoral researchers to network within the scientific community and beyond as they had hoped. The result - regardless of the doctoral programme or country - is that the interviewees are facing an uncertain future with regard to the end of their doctorate.

Keywords: doctoral education, career development, career aspirations, PhD students, vocational education and training

1 Problem Statement

The times when doctorates served the primary goal of professorships or tenure-track positions are long gone. The number of doctoral researchers far exceeds the number of academic positions available (Fuhrmann et al., 2011; Konsortium Bundesbericht Wissenschaftlicher Nachwuchs, 2021; Seo et al., 2021). Recent studies have concluded that careers outside academia can no longer be described as alternative career paths but have become the predominant career path for young academics (Fuhrmann et al., 2011; St. Clair et al., 2017). Furthermore, as doctoral researchers increasingly pursue careers outside academia, preparation for both academic

career opportunities as well as non-academic career paths is becoming more important (European University Association, 2019; Konsortium Bundesbericht Wissenschaftlicher Nachwuchs, 2021).

In Europe, doctoral education has undergone major changes in recent years. In 2011, the European Commission developed "The European Framework for Research Careers", which divides researchers into four broad profiles – including necessary and desirable characteristics – that are independent of country, profession, private or public sector (European Commission, 2011):

- R1 First Stage Researcher (up to the point of PhD)
- R2 Recognised Researcher (PhD holders or equivalent who are not yet fully independent)
- R3 Established Researcher (researchers who have developed a level of independence.)
- R4 Leading Researcher (researchers leading their research area or field)

In this study, the terms "first stage researcher", "PhD student", "doctoral student" and "doctoral researcher" are used synonymously.

Results of a study by the Council for Doctoral Education of the European University Association (EUA, 2019) show that doctoral education nowadays predominantly takes place in structured programmes or schools rather than as individual education only. The EUA study concludes that universities in Europe offer support opportunities that pursue both academic and non-academic career paths and that while doctoral researchers are mainly seen as future academics, they are also increasingly seen as tomorrow's professionals.

2 Theoretical Frame and Research Questions

In order to understand doctoral researchers‘ career decision making, Seo et al. (2021) used the social cognitive career theory (SCCT)‘s model of career self-management (CSM) by Lent and Brown (2013). They found out that advice from faculty members has a significant impact on the desire to pursue a career inside academia or to stay in the faculty and that doctoral researchers in the field of social sciences are more likely to stay in academia than those of science and engineering.

Due to the COVID-19 pandemic, there have been unpredictable changes in private and professional lives worldwide. The circumstances of this uncertain time - such as the closure of facilities, contact and travel restrictions - make it difficult for all academics to conduct their research. Social distancing measures reduce face-to-face meetings and network interactions. Consequently, collaboration and the natural exchange of ideas through informal conversations are limited (Termini & Traver, 2020). Therefore, this study also examines the influence of the current Corona situation on the career development of first stage researchers in Europe, considering different organisational types of doctoral education: individual education vs. structured programmes/schools (European University Association, 2007, 2019).

This study aims to analyse the career development of doctoral researchers in the field of vocational education and training (VET). VET has been chosen as field of research because the study is embedded in a work package on promoting emerging researchers as part of the scientific *Meta-Project on Research for the Internationalization of Vocational Training* (MP-IN-VET), funded by the German Federal Ministry of Education and Research (BMBF). In order to gain new insights that can be used in this networking effort, the participants in this study are primarily not from the funding line, have been contacted randomly and come from countries beyond the project, which will be explained in the following chapter.

The research questions are:

(1) What differences in the professional development of doctoral researchers result from the different types of doctoral training or the VET systems of the countries?

(2) To what extent do the Corona-related circumstances impact the career development of VET doctoral researchers?
(3) How well do VET doctoral researchers feel prepared for a career inside and outside academia?
(4) Are they more likely to pursue a career inside or outside academia?

3 Methodology

Previous studies have mainly focused on the natural and engineering sciences (Seo et al., 2021; St. Clair et al., 2017). What these studies also do not focus on are the COVID-19-related challenges and opportunities that influence the career development of doctoral researchers at the current time.

In order to gain a deeper insight into the topic, a qualitative research approach is applied. To answer the research questions, semi-structured interviews were conducted from March to June 2022 with six first stage researchers (R1) in vocational education and training who are currently in the data collection/analysis or "all-but-dissertation" stage. The interviewees complete their doctorate in three different European countries (Germany, Sweden, United Kingdom (UK)). Per country, two interviews were conducted with doctoral researchers from different universities. These three countries were selected because of their different VET models. They can be classified according to Greinert's (2004) typology as follows: market orientation (UK), science orientation (Sweden), vocational orientation (Germany). Since these forms are historically determined, there is an assumption that these traditions may also have an influence on the formation of PhD programmes. In addition, the three countries offer different organizational conditions for the doctorate in vocational education and training:

- Germany (individual doctoral education, no compulsory studies, financed by temporary project employment, teaching obligations may be contractually regulated)
- Sweden (structured PhD programme in education, obligatory course work, paid positions as employee/PhD student, 20 % of the working time may be spent for work within the department, e.g. for teaching)
- UK (both individual and structured doctoral education, high tuition fees to cover study costs, obligatory course work only in the structured programme)

The interviews were conducted online via Zoom, recorded with OBS, and transcribed verbatim. Categories were developed from the interview guideline (see table 2) and were used to code all interviews. It has to be noted here that this article represents only one aspect of the entire study. In addition to the career development and career aspirations of the doctoral researchers, other aspects of professional development (such as participation in trainings, informal learning, networking, internationalisation) and the structure of the different doctoral programmes (such as financing, supervision, publishing, teaching and study obligation) with their perceived advantages and disadvantages were also surveyed.

Table 2
Information on the Interviewees

Acronym	Gender	Country & Ed. Type	Educational Background	PhD Motivation
GER1	Female	Germany (individual, full-time)	Apprenticeship as industrial clerk, work and travel experience, several years tour guide abroad, employee at agency for language travels, studies in business education	Never intended to do a doctorate, was asked by supervisor, hopes the title will open doors for her
GER2	Male	Germany (individual, full-time)	Apprenticeship as electronics technician for industrial engineering, studies in electrical engineering and working as a tutor, then Master's degree for teaching at vocational schools	Interested in the content, asked the supervisor for a job, the title has no significance for him
SWE1	Female	Sweden (structured, full-time)	Bachelor's degree in primary school teaching, Master's degree in international and comparative education, internships at international organisations abroad	Wanted to do a PhD since she was 17, wants to find answers and a stable salary for four years, applied for the programme
SWE2	Male	Sweden (structured, full-time)	Apprenticeship as electrician, teacher in philosophy and history for upper-secondary education, incl. being a "first teacher" (train instructors how to teach)	Wants to understand people, does not care about the title, applied for the programme
UK1	Female	England (individual, full-time)	Teacher (vice principle) in a non-European country, Master's degree with focus on technical vocational education and training	Got scholarship to continue her master's studies; wants to contribute her quotes in the world and use the title to her advantage
UK2	Female	England (structured, part-time)	Studied communication and media, worked abroad as English language teacher, then did teacher qualification and Master's degree in education policy and society, currently part-time employed as teacher at a vocational school	Supervisor of the Master thesis encouraged her to do a PhD, then she applied as she wants to understand certain problems and to find solutions for practice

Of the six interviews, two were conducted in German (GER1, GER2) and the other four in English (SWE1, SWE2, UK1, UK2). The data was coded with MAXQDA software and analysed using the method of focused analysis of qualitative interviews according to Kuckartz and Rädiker (2020), in which text segments from all interviewees are compiled on a specific topic and thus can be processed into a summarizing text.

Table 3
Categories and Sub-Categories of the Study

	Category PhD	Corona	Career Development
Sub-Categories	- Background Information - Motivation - Added Value/Advantages - Disadvantages	- Impact on Doctoral Project - Impact on Professional Development - Impact on Career Development - General Challenges - Chances - Other influencing factors or findings	- Preparation through university - Individual feeling of being prepared - Career aspiration outside academia - Career aspiration inside academia - Other influencing factors or findings

4 Findings

The presentation of the findings is structured according to the individual research questions, starting with an analysis of the differences between the different types of doctoral education and the VET systems.

4.1 Differences between Types of Doctoral Education and the VET Systems

In order to address the question of possible differences in the preparation of doctoral researchers for a post-doctoral career through their universities, it should be mentioned that the interviewees come from countries with different VET systems according to Greinert (2004) and that they do their doctorates in programmes with different degrees of structure (see table 3).

Table 4
Overview of Interviewees by VET System and Structure of the Doctorate

Country	VET Model	Interviewee	Type of Doct. Ed.	Status	Study Obligation
Germany	Vocational orientation	GER1	Individual	Full-time Employee & PhD Student	None
		GER2	Individual	Full-time Employee & PhD Student	None
Sweden	Science orientation	SWE1	Structured	Full-time Employee & PhD Student	90 ECTS
		SWE2	Structured	Full-time Employee & PhD Student	90 ECTS
United Kingdom (England)	Market orientation	UK1	Individual	PhD Student (scholarship for study fees only)	None
		UK2	Structured	Part-time teacher & Part-time PhD Student (studentship covers a stipend and study fees)	Compulsory induction week

First of all, it should be noted that doctoral researchers in Germany and Sweden finance their doctorates through an employment contract as research associates. In England, on the other hand, the interviewees have a status as PhD students only and have to pay high tuition fees, which in the case of UK1 and UK2 are covered by scholarships. While UK2 is doing a doctorate in a structured programme and also receives financial support for living expenses, UK1 has to pay for her own living expenses within the framework of the individual doctorate. With regard to the financing of the doctorate, clear differences can be seen between the different VET systems:

- Self-financed or via scholarships in England (market orientation) vs.
- Employee status in Germany and Sweden (Vocational & Science Orientation).

With regard to the professional development of doctoral researchers through the university, it should be noted that the structured programme in Sweden provides the strongest institutionalised support for the (academic) training of doctoral researchers. This is evidenced by this statement from SWE2:

> *It's more of an apprenticeship programme than when I became an electrician. ... they have apprenticeship written in the curriculum because very much of the development as a PhD is, according to my experience, is very much on text. I write a text, I send it to my supervisors, we have a meeting about it, and they give me comments. I take these comments, and I do and re-do and work, and battle anxiety and all the things that come with the writing process and I see that I develop as a writer, but it's, that is the main*

focus, it's about writing texts and getting comments, texts, and working to become published, how to become published, what do you do, how do you think.

In addition to the mandatory 90 ECTS credits, this strong focus on publishing reflects the science orientation of the Swedish VET system. The regular submission of literature reviews also plays an important role in the structured doctorate of interviewee UK2, but for the purpose of developing the doctoral topic and less against the background of publication. Unlike the Swedish doctoral researchers, where the focus is on publishing, and both interview partners do cumulative doctorates, only the best dissertations (monographies) are published at UK1's department (see Vocational Education System England: Market Orientation). UK2 is also writing a 100,000 word dissertation. However, at the time of the interview, she did not know whether her dissertation will or must be published. The two German doctoral researchers are also writing a monography. Due to the embedding or financing of the doctorate through third-party funding, their current publications have a strong project reference and are less related to the dissertation. Beyond that, there is no obligation to study. However, UK1, as well as GER1 and GER2 from the individual programmes and UK2 from the structured programme (only with a compulsory introductory week that introduces empirical work), have the opportunity to participate by interest in a comprehensive pool of seminars offered by their university.

4.2 Impact of the Pandemic

The pandemic-related restrictions and changes in work life and society have influenced different aspects of the interviewees' doctoral projects as well as their professional development. From the interview data, the answers could be allocated based on the following categories: Accessibility, travel restriction, networking, research design, digitisation, informal get-together, geo-political situation, individual and health problems.

With regard to *accessibility*, it was mentioned that the doctoral project could only be registered with a delay because the university was temporarily closed and inaccessible (GER1). It was also no longer possible to reach or visit vocational schools in the home country and abroad (GER1, GER2, SWE2). Instead of experiencing school practice, SWE2, therefore, devoted more time to literature. It was also described as difficult to carry out acquisitions of new contacts/interview partners and meetings without a local presence (GER1, SWE2); many emails or calls remained unanswered (GER1).

Actually, I would have liked to go to schools much more and learn in a way that I could really look at school practice, talk to the teachers etc. ... None of that was possible. (GER2, translated by the author)

The issue of *travel restrictions* in particular meant that field access was uncertain for GER1 and there were difficulties with the time difference. In the case of GER2, the project partners could not be invited to a meeting to get to know each other and to start the project as planned. In addition, there were no travels abroad for data collection (GER1) or as a possible study visit abroad (SWE1, SWE2).

So, it was never part of my plan to travel for data collection. I wanted to focus the study on Sweden. But what I wanted to do and then still find to do, is like I wanted to have a study visiting a university abroad, mostly for networking purposes. (SWE1)

The lack of *networking* opportunities was mentioned several times (GER1, SWE1, SWE2). In addition, it was regretted that (international) conference participation in presence was not possible (GER1, SWE1, UK1, UK2):

> *I have only attended virtual events so far, so I imagine it would have been different and run differently in presence and I'm sure there would have been good networking, but that has not been my experience, to be honest. (GER1, translated by the author)*

> *But career-wise I think it's hurting me, because I don't have the networking, I don't have the teaching in person, which means that I will apply for a job that I have never tried before. In the future if I want to become a lecturer. And then, of course, like any types of connection with the industry are not there. I think it hasn't been very helpful in our case. And interviewing is hard, collecting data is hard, people have been busy with moving online and back in the classroom and back online, so they were not that much available. I see a lot of negatives into that. I am sorry. (SWE1)*

Due to the difficult accessibility and lack of travel opportunities, five of the six doctoral researchers interviewed had to adapt their *research design*. For example, the research methods had to be rescheduled or adapted to the pandemic-related contact restrictions (GER1, GER2, SWE1), as they were no longer possible in person and could not be conducted online; for example a method similar to family constellation (GER2). In addition, two doctoral researchers struggled with a very low response rate or high drop-outs (GER1, SWE2). Because of the adjustments to the research design and the difficulty in reaching contact persons, half of the interviewees experienced time constraints in their doctoral project, which were partially compensated for by extending third-party funding or scholarships (GER1, SWE1, UK1).

> *I think the main thing is one of the groups was very hard to get hold of through telephone, so I missed the opportunity to go to the school to say: "Hey, you promised me an interview." (SWE2)*

The pandemic-related *digitisation* caused some challenges from the respondents' point of view with regard to conducting online interviews. GER1 mentioned the poorer quality of interviews due to connection problems, and SWE2 struggles with interview recordings in different file formats due to a mixture of smartphone and videoconferencing programmes that have to be played through different audio players. UK2 stated that all social events, as well as seminar groups and trainings, take place online. The trainings are also mostly self-study videos, and when online trainings with participants take place, many of them turn off their cameras:

> *The social aspect is completely missing, which feels like isolation. (UK2)*

It is precisely this social aspect, the loss of *informal get-togethers*, that has the greatest negative impact on the professional development of the doctoral students surveyed. Due to the pandemic, not only were there no informal conversations with participants in their PhD projects (GER2), but there were also fewer people on campus and in the offices during and after the pandemic (SWE2, UK1, UK2). Working in a home office also took away the possibility of informal corridor talks, which are perceived as very valuable (GER1, SWE1, SWE2).

> *At our institute yes, we rather stay at home and just sometimes meet at the university. ... just grab a coffee, talk to someone, that really enriches your professional life and*

everything and that is something which we, at the moment, don't have. In the last year, I worked at the university just one day, which is maybe a little bit my fault, but you will not really meet people there. It's a very sad situation. The feeling of a community within the department was kind of lost during the pandemic. (SWE2)

But the informal aspects are also very very useful and fun and it gives, I think it gives a lot more depth to the education. Also, like grabbing a cup of coffee is in some way arena for learning also because if someone else took a cup of coffee I can ask them about things. Or as others ask me about things also. (SWE1)

In addition to the previously mentioned negative factors of the pandemic on the doctoral researchers' PhD projects, other aspects were mentioned that are summarised here. For example, the *geo-political situation in Eastern Europe* was mentioned (GER1, UK1) and the uncertainty as to what impact this could have on career opportunities. Other complaints were that due to the pandemic, teaching experience in person was not possible, a network for job applications was lacking (SWE1) and information events for the time after the doctorate were not held (UK1). Moreover, one interviewee also complained about *health problems* due to the work in the home office:

I didn't have a proper office, and I didn't have a proper desk or chair or anything. I had a lot of, like, physical pain like from sitting in the wrong chair with the wrong table. Psychological it was like crazy like I was working here, and I was cooking here. And that is not productive, of course. And that has been a really hard time for me. (SWE1)

In addition, there were further *individual problems* that hindered progress in the meantime: mental reasons (UK1), psyche/depression (GER2, SWE1, SWE2, UK1), lack of motivation/work ethic (SWE2), and the feeling of isolation/lack of human interaction (GER2, SWE1, SWE2, UK1, UK2).

It was all my friends in the PhD, everyone had to take extensions, it was a demoralising wee challenging time. ... You know, it was from sad news every day, it was from family members getting sick, it was the whole isolation and depression that came with it. Not being able to meet colleagues, not even to hear from people, Zoom calls were people getting fatigued. You know, Zoom calls, it was mentally too much. It was the fear, you know, that the new media projected; it was everything. So that thing cut off PhD life, to be honest. (UK1)

Besides all the negative points mentioned before, *positive aspects* that the pandemic has brought were also listed, especially in the area of digitisation: the "Zoom culture" has become normal and has opened up new communication opportunities (UK2), doctoral researchers and colleagues are used to digital video and collaboration tools (SWE2), video conferencing systems allow to attend a meeting or conference and do something else at the same time (SWE1), and tools for asynchronous work, e.g. Miro, continue to be used after the pandemic (GER2). In addition, GER2 mentioned that accessibility is generally better, and GER1 found it easier to reach people from other universities. SWE1 and SWE2 both reflected on their teaching methods.

If you would walk around here, you would never think there has been a pandemic, you would never think there is still Corona, but in our teaching, we have, we still

use some digital aspects that are left in because, yeah, these are good. And also meetings with other people can be done through Zoom without having to; it's easy to have digital meetings now. For better and for worse. (SWE2)

With regard to the pandemic situation, it can be concluded that there are no significant differences between the countries or doctoral programmes - basically, all interview partners have to deal with the same challenges. Only in Sweden there was no hard lockdown as in Germany and England, but the urgent recommendation to work from the home office:

For us, there was not many restrictions in society at all. I think the restriction that people, in general, most complained about was that restaurants had to close at ten. That is what people complained about. And at the university, there was a policy of work at home when you can. Classes were mostly through Zoom or other types of, yeah, like Microsoft Teams, but some people were at the office; I was here, for example, I have a hard time working at home. (SWE2)

4.3 University Preparation for Careers Inside and Outside Academia

Events organised by the university on post-doctoral career paths are compulsory in the structured programmes (SWE1, SWE2, UK2), while in the individual doctorate (GER1, GER2, UK1) participation in such an event is based on personal initiative, whereby GER1 was unsure whether such an offer even existed at all at her university. UK1 attended a programme called "What to do with a PhD?", which was offered by the university, and which was very helpful for her personally. However, she criticises that it is easy to miss such events for the following reason:

I mean, university has this career newsletter, career experts, … An email is just sent, and if you miss the email, you miss it. ... in the end I feel that we have a lot of value in terms of professional development going on. But you tend just to not know, if you miss the email. (UK1)

In the structured doctoral programmes of the respondents from Sweden and England, an information session on career opportunities after the doctorate takes place as part of the introduction to PhD studies. From the point of view of UK2, the timing within the "induction programme" was too early and there was too much information at once within one week. Also in Sweden, the information on career opportunities after the doctorate takes place at the beginning of the doctorate:

When I started the first years, we go through this obligatory programme that is called introduction to PhD-programme, to PhD studies. And in that block of seminars, there was one discussion about how academia is structured and how are different positions within academy and how one moves from a PhD-student like graduate to get in a lecturer position and so on. So, that was like an overview there. ... But we have this introduction once. So, this is something we talked about; yes, then we have the seminars that happen on the university level. That are about funding and post-docs. This is like research outside of academia or after PhD that the information is always on this university general level. No one has ever talked about industry opportunities and stuff, that is a no. I guess it might happen on a personal level like I meet you and you meet me, and you say: "SWE1, there is this option", but nothing like organised from the department. (SWE1)

In the structured programmes, these events, which are organised at the university level, on the one hand, take place at a time when this content is not the focus of doctoral researchers, and on the other hand, they mainly focus on a career within academia.

Within the scope of *supervision*, the three interviewees from structured programmes reported that they had informal discussions with their supervisors, but the ideas were mostly within academia. The second supervisor from UK2 suggested a post-doc that not necessarily has to be very academic but where the results of the PhD can be applied in another context. To conclude, she feels that she learns "how to fit in that group" and she has the feeling that "academia is far removed from practice", which makes her worry about whether her PhD studies have an influence on her so that she will behave differently than before. While GER1 had an informal conversation about her career development, UK1 stated that no one has ever questioned her what her career aspiration after the PhD is. For GER2 this is the complete opposite. In annual meetings, the long-term perspective is addressed, and there is also a lot of informal discussion with the supervisor about the future after the PhD. The supervisor puts a lot of thought into this and also takes the doctoral researcher to meetings regarding his next career step by establishing contacts that could be helpful later on.

It is evident from the interview data that in the university context, the preparation of doctoral researchers for post-doctoral career opportunities has a strong focus on an academic career:

> *Oh, it's lacking here; this is something the university as whole lacks in, because we are very much in a development process for being inside the university, not much outside university. (SWE2)*

As a result, the many career opportunities outside academia remain unknown:

> *I am very curious on what opportunities I do have outside, so, I have been asking and pushing, but I think people might actually not know that, at the end of the day. I am not sure, but I still have not figured out what are the opportunities outside academia. (SWE1)*

Thus, it depends on the individual supervisor whether and to what extent career paths outside academia are identified. In addition, it can be noted that the doctoral researchers face an uncertain professional future:

> *Also, a problem is that everyone who works here wants us to keep working here, so there is a will to keep us here. But to keep us here, there must be any money. … and these things can be sensitive, so we don't talk about it. (SWE2)*

4.4 Staying or Leaving Academia?

After talking about the differences between individual and structured doctorates, the impact of the pandemic on the doctoral project and career development, as well as the university preparation for careers inside and outside academia, the final research question will be answered in this section: Are VET doctoral researchers more likely to pursue a career inside or outside academia?

Of the six interviewees, only SWE2 pursues a career inside academia:

> *The hope is getting a post-doc or other type of teaching position, but it's, yeah, it's a gloom horizon. … my hope, my end goal is somewhen becoming a lecturer doing more teaching than I do now and therefore less research, but I want to still be able to continue my research project and do new stuff, and I also like teaching. So, but if I, but*

becoming a lecturer is hard, so my hopes are, lie in a post-doc for a year or two after. And if I don't, if I am not able to get a post-doc then maybe try another university or go back to teaching.

For him, a career outside academia, such as going back to teaching, is only his plan B. On the contrary, SWE1 pursues an academic career only as the second (teaching) and third (post-doc) option. She is more interested in the change that research can bring. From her perspective, university research brings change, but not with the same impact as she can see outside academia. That is why she would like to do research connected to policy. Ideally, that would mean to her to be employed at the Ministry of Education, working on curricular programmes or teacher training, and also doing research. However, as SWE1 is not convinced of having a chance to get such a position at the ministry level, she would also be open to other opportunities:

I would prefer to work with something that has a research part. A part of my work to be research-connected, and the other part can be teaching, can be administration, project management, but I want a part that is research.

Even though UK2's second supervisor suggested a post-doc position after the doctorate in order to apply the results of her dissertation in another context, her career aspirations are currently not focused on this idea. She can imagine self-employment as a consultant for colleges, working with the management team to build structures, and at the same time continuing her teaching job. GER1 would like to work in the field of project management in international projects. GER2 is not aiming for an academic career either. He can well imagine working for a social partner, in the public service or in an affiliated institution. In addition, like UK2, he could imagine being self-employed in the future. UK1 would also like to find a position outside academia, as she realised

... that academia will not be fulfilling for me. It will be boring as a matter of fact for my kind of person. ... I like to make changes. I don't say academia does not give you the opportunity to make changes, but industry gives me more opportunities. So, I am going into talent development and management.

Finally, a few general aspects can be observed. For example, GER1 is uncertain because she has no idea how good her career opportunities are due to the pandemic and geopolitical situation. In addition, the two doctoral students from Germany mentioned the desire for planning security and a permanent employment contract. GER2 would like to be able to take out a loan after completing his doctorate. This is something that a job at the university cannot currently offer him. For SWE2, the uncertainty of not knowing what will happen to him after his doctorate is very stressful.

So that, those PhDs that are at the end of their PhD programme like myself and others in my cohort, there is some kind of growing anxiety of what is supposed to happen after. And we are a bit overcrowded in this department. So, we know that when the four of us are done, then maybe doesn't exist any work for us here or if it does, there is room for one of us, and that's very sad because we have been not living together, but developing together, in four years now. And even if someone gets to stay, it wouldn't be the same because the other three are gone. Or something happens and everybody gets to stay; we don't know. And the unknowing part is not good. (SWE2)

In summary, it can be noted that only one of the six doctoral researchers interviewed is aiming for a career in academia; all the others would like to pursue a non-academic career path.

5 Discussion

The doctorate during and after the pandemic is not comparable to the time before Corona, and the geopolitical situation also plays a role in personal well-being and career prospects for some interviewees. Due to the COVID-19 pandemic, the framework conditions of the doctorate have changed, and many challenges have arisen for doctoral researchers. To summarize, the following factors can be stated to have a negative influence on the doctoral project: reduced face-to-face meetings and network interactions, the decline in informal feedback, limited field access, adaptation of research methods, delay in completion of the dissertation (Konsortium Bundesbericht Wissenschaftlicher Nachwuchs, 2021; Termini & Traver, 2020). In addition, seminars and further education courses are conducted predominantly online (Autor:innengruppe Bildungsberichtserstattung, 2022). On the other hand, also positive aspects were highlighted: improvement of digital competencies, an increased virtual international collaboration (Konsortium Bundesbericht Wissenschaftlicher Nachwuchs, 2021; Termini & Traver, 2020; Wößmann et al., 2021), and some tools for collaborations have been integrated into post-pandemic teaching.

The observations from the field of social sciences that doctoral researchers often pursue an academic career (Seo et al., 2021) cannot be confirmed on the basis of the interviews conducted with doctoral researchers from the field of VET. Careers outside academia have become their predominant career path (Fuhrmann et al., 2011; St. Clair et al., 2017), which underlines the importance of preparing doctoral researchers also for non-academic career paths (European University Association, 2019; Konsortium Bundesbericht Wissenschaftlicher Nachwuchs, 2021).

Although the results of the presented study confirm the tendency that universities prepare students for an academic career (career development support as an integral part of structured programmes, EUA, 2019), five out of six interview partners prefer a career outside academia. It is not surprising that the one person with career aspirations within academia comes from a structured programme with a science-oriented VET system (Sweden). In the case of the individual doctorate in Germany (VET model: vocational orientation), it is more a matter of the relationship between doctoral researcher and supervisor, comparable to the relationship between apprentice and training instructor in a dual approach, who takes the apprentice by the hand. The degree of guidance and support depends strongly on the individual personality of the supervisor and the bonding between the doctoral student and supervisor. In this context, research questions might be: What career goal should the doctorate prepare the individuals for? And what structure should a doctoral programme have in this regard?

With regard to career opportunities after the doctorate, the universities offer a lot (e.g. through their own career centres), but only some of them are attended (for individual doctorates), or they take place at a time that is not relevant for the doctoral researchers (introductory programme to PhD studies). The fact that some of the doctoral researchers interviewed took little input from the events could also be due to the fact that these offers are more general and less domain-specific. The supervisors could take a more active role here, pointing out these general offers of the university, reflecting on the event with the doctoral researchers, discussing open questions and illustrating the stronger connection to non-university career opportunities in the field of VET and beyond. This could lead to the doctoral researchers being less disoriented and being able to prepare themselves more specifically for the time after their doctorate - be it by attending relevant events or specifically looking for non-university networking opportunities.

Since all interview partners come from the VET field, the results cannot be generalised to doctoral researchers from other disciplines. In addition, the pandemic situation is an exceptional situation, and it remains to be seen to what extent this will have long-term effects and whether career patterns and desires may stay stable or change over time.

With regard to the personal effects of the pandemic, the current education report in Germany criticises the lack of support structures for socio-emotional relationships among children and adolescents (Autor:innengruppe Bildungsberichtserstattung, 2022). The results of the present study show that this is also of importance in the field of doctorates. However, there are no findings that cover the extent to which the interviewees sought and made use of support opportunities to talk about the feeling of isolation and their own depression, nor how and whether they coped with this situation and how they will deal with such situations in the future. Further research is needed on this. Additionally, it would be interesting to track the further career development of the interviewees. Can they pursue their planned career paths? What obstacles might they encounter and how could the universities provide concrete support?

The following quote will conclude this paper, demonstrating how challenging the current time is for the career development of doctoral researchers:

> *For me this is the huge, the biggest damage it has done for PhD-life is the networking. For two years, we have no conferences, we meet no people; we have no guest researchers. How on earth are we supposed to connect with people? And become members of a society that is out there and not only within our department. But also, within our department it is so hard like people have been recruited all these years and we did a meeting the other day, and there is fifteen new people, and you don't know anyone. So, I think the networking is like crazily damaged, and online conferences are solutions, but they cannot really compensate for the personal things. So, like this random talk with someone that just happened to sit next to you. This doesn't happen anymore. (SWE1)*

Acknowledgement

The author acknowledges funding from the German Federal Ministry of Education and Research (project number: 01BF19001).

References

Autor:innengruppe Bildungsberichtserstattung (2022). *Bildung in Deutschland 2022. Ein indikatorengestützter Bericht mit einer Analyse zum Bildungspersonal*. wbv Publikation. DOI: 10.3278/6001820hw

European Commission (2011). *TOWARDS A EUROPEAN FRAMEWORK FOR RESEARCH CAREERS.* https://cdn5.euraxess.org/sites/default/files/policy_library/towards_a_european_framework_for_research_careers_final.pdf

European University Association (2019). *Survey. Doctoral education in Europe today: Approaches and institutional structures.* Geneva, Switzerland. https://eua.eu/downloads/publications/ online %20eua %20cde %20survey %2016.01.2019.pdf

European University Association (2007). *Doctoral programmes in Europe's universities: Achievements and challenges. Report prepared for European Universities and Ministers of higher education.* https://eua.eu/downloads/publications/doctoral_programmes_in_europe_s_universities %20achievements %20and %20challenges %20report %20prepared %20for.pdf

Fuhrmann, C. N., Halme, D. G., O'Sullivan, P. S., & Lindstaedt, B. (2011). Improving graduate education to support a branching career pipeline: Recommendations based on a survey of doctoral students in the basic biomedical sciences. *CBE life sciences education*, *10*(3), 239-49. https://doi.org/10.1187/cbe.11-02-0013

Greinert, W.-D. (2004). Die europäischen Berufsausbildungssysteme – Überlegungen zum theoretischen Rahmen der Darstellung ihrer historischen Entwicklung. *Europäische Zeitschrift – Berufsbildung*, *32*(2), 18 – 26. https://www.cedefop.europa.eu/files/32-de.pdf

Konsortium Bundesbericht Wissenschaftlicher Nachwuchs (2021). *Bundesbericht Wissenschaftlicher Nachwuchs 2021. Statistische Daten und Forschungsbefunde zu Promovierenden und Promovierten in Deutschland.* wbv Publikation. https://www.buwin.de/dateien/buwin-2021.pdf

Kuckartz, U., & Rädiker, S. (2020). Fokussierte Interviewanalyse mit MAXQDA. Schritt für Schritt. Springer VS. https://doi.org/10.1007/978-3-658-31468-2

Lent, R. W., & Brown, S. D. (2013). Social cognitive model of career self-management: Toward a unifying view of adaptive career behavior across the life span. *Journal of Counseling Psychology*, 60, 557–568. https://doi.org/10.1037/a0033446

Seo, G., Ahn, J., Huang, W.-H., Makela, J. P., & Yeo, H. T. (2021). Pursuing careers inside or outside academia? Factors associated with doctoral students' career decision making. *Journal of Career Development*. *48*(6), 957-972. https://doi.org/10.1177 %2F0894845320907968

St. Clair R., Hutto T., MacBeth C., Newstetter W., McCarty N. A., & Melkers J. (2017). The "new normal": Adapting doctoral trainee career preparation for broad career paths in science. *PLoS ONE*, *12*(5): e0177035. https://doi.org/10.1371/journal.pone.0177035

Termini, C. A., & Traver, D. (2020). Impact of COVID-19 on early career scientists: an optimistic guide for the future. *BMC Biology*, *18*(95). https://doi.org/10.1186/s12915-020-00821-4

Wößmann, L., Freundl, V., Grewenig, E., Lergetporer, P., Werner, K., & Zierow, L. (2021). Bildung erneut im Lockdown: Wie verbrachten Schulkinder die Schulschließungen Anfang 2021? *ifo Schnelldienst*, *74*(05). https://www.ifo.de/DocDL/sd-2021-05-woessmann-etal-corona-schulschliessungen.pdf

Biographical notes

Dr **Anja-Christina Greppmair** is a post-doctoral researcher at the Institute Technology and Education (ITB) at the University of Bremen. Her research interest focuses on internationalisation and transfer of VET, professional development, career development, teaching and learning in adult and continuing education.

VETNET
European Research Network
Vocational Education and Training

Kühn, I. K., & Meyne, L. (2022). Business model development and adaption of VET service providers in international contexts. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 69–80). https://doi.org/10.5281/zenodo.6975407

Business Model Development and Adaption of VET Service Providers in International Contexts

Kühn, Ida Kristina
kristina.kuehn@uni-bremen.de, University of Bremen, Institute Technology and Education (ITB)

Meyne, Lisa
lmeyne@uni-bremen.de, University Bremen, Institute Technology and Education (ITB)

Abstract

Context: The attraction to internationalize vocational education and training (VET) generates various business models among German VET providers seeking new markets and expanding their portfolio of services internationally. To support German VET providers in their internationalization, the Federal Ministry of Education and Research (BMBF) has created two funding programs (BEX and IBB) for the development of international business models in VET. In the context of this paper, adaptations of the business models with regard to the course of the projects over both funding periods are considered in order to find out what factors were considered by the VET providers in that process.
Approach: 18 projects from two funding lines (BEX and IBB) were analysed, each project is a consortium of at least a VET provider and a research institution. The sample includes all funded projects in which at least one organization was funded subsequently in both funding lines. This allows for better comparability between the cases and between the two funding lines. The research design was thus constructed as a longitudinal study. The data includes project documents and qualitative interviews with project actors. The nine categories of the Business Model Canvas according to Osterwalder and Pigneur were applied to identify adoptions made in the business models of the selected projects.
Findings: Substantial changes to the original project planning with regard to the business models can be seen with reference to the reduction of the complexity of the offered VET services. Adjustments to the business models are primarily determined by industrial factors, especially with regard to the stakeholders involved, and changes based on market factors to adapt the VET services to the needs of partners and customers in the target country. A considerable part of the adjustments to the business models are also based on pandemic-related factors.
Conclusion: It can be assumed that the analyzed VET providers have a high level of problem-solving expertise due to the consortium approach. The digitalization of some elements of the business models can possibly be understood as an innovation driver so that innovations can be expected. Further research in the form of a journal contribution will look at these and other aspects in more detail. It would be necessary to consider degrees and patterns of innovation regarding the analysed projects and the database presented.

Keywords: vocational education providers, innovation, internationalisation, business model

1 Introduction and Problem Statement

The *international attractiveness* of dual vocational education and training (VET) creates new opportunities for education service providers from the German VET sector. It opens international markets to those VET providers who want to develop their business units. New markets require new offers and thus new processes to meet the customers' needs. This brings the question of the scope of business model-related innovations into focus.

As a *support for the sector* to internationalize its activities, the Federal Ministry of Education and Research (BMBF) created two successive funding programs, a first one supported the development of viable international business models ("Vocational Training Export BEX", 2010-2017). A second one provided financial support to providers for the demand-driven development and model implementation of education and training provision for international markets ("Internationalization of Vocational Education IBB", ongoing since 2017) (BMBF, 2017). Details have been presented in further research with regard to the predecessor funding program (BEX) and the successor funding program (IBB) (see e.g. Kühn, 2021; Kühn & Greppmair, 2021; Meyne, 2021; Peters & Krichewsky-Wegener, 2021; Siemer & Gessler, 2021).

These two funding lines represent the *context of the research.* Previous research in this context showed that most companies applying for support in IBB were just beginning to develop international activities at the time. Only half of the VET service providers in that funding line had an internationalisation strategy at the project start, while the other half had one under development or none (Kühn et al., 2020). From BEX to the beginning of IBB, Kühn & Greppmair (2021) identified, based on related samples, a number of lessons learned in different areas concerning the development of international business models (Kühn & Greppmair, 2021). VET service providers undertake certain adaptions of their business models related to the new challenges. Gessler et al. (2018) found that the developed business models are "not part of the standard offers of the company" (Gessler et al., 2019, p. 261). That means that the small and medium-sized enterprises need to handle uncertain novelties. Therefore, they are assumed to apply certain strategies. Coming back to the introductory research context, the VET service providers are required to develop (economically) sustainable business models, while the frame for this development in IBB appears broader to a certain degree in comparison to BEX. It is not yet clear, what (innovation) strategies lead the relevant processes of business model development and transfer. This research aims to identify adoptions done within the VET providers' business models within each funding program and between both programs. The sample consists of enterprises that were active in both contexts. The leading research questions for this research are: *(1) What adaptions have been made in the course of the projects with regard to the originally planned business models and why? (2) What can we learn about the strategic orientation of the adaptions identified?* This paper can be classified as preparatory work for a long paper that highlights innovation processes.

2 Theoretical Background and Frame

To answer the *first research question*, the nine elements of the Business Model Canvas (BMC), such as key partners, key activities and key resources (Osterwalder & Pigneur, 2013) are used. Unplanned adjustments to business models are usually based on changes in the environment. The approach of mapping the business model environment according to Osterwalder and Pigneur (2011) serves to identify and evaluate those changes, using four categories of key forces: Industry forces, market forces, and macroeconomic forces, whereby these are in turn characterized on the basis of 18 external factors.

To answer the *second research question*, the so-called St. Gallen approach is used. Gassmann et al. (2021) emphasize the possibility of focused discussions using their reduced model compared to canvas models. The customer is the focus of the St. Gallen Business Model and forms the first dimension "customer/segment". To describe the target customers, the BMC

categories of the customer segment and customer relationships are listed in the context of this paper, as the communication options are crucial to how the customer segment can be reached. The second dimension "value proposition" describes the offered service/product, which is of benefit to the customer (Gassmann et al., 2021). The two BMC categories of value proposition and channels are thus subsumed under this dimension, as the channels are decisive in how the service/product offered is made available to the customer. The "value chain" forms the third dimension of the St. Gallen Business Model, so that the BMC categories of key partners, key activities and key resources are assigned to this dimension, as these represent the value chain for service provision. The last dimension "profit mechanism" directly targets the cost structure and the revenue mechanisms according to Gassmann et al. (2021), which is why the BMC categories of revenue sources and cost structure are located under this dimension (see Table 1).

Table 5

Theory-Based Categories of Data Collection and Analysis (own compilation)

Business Model Canvas by Osterwalder & Pigneur (2013)

key partners	key activities	key resources	value propositions	channels	customer relationships	customer segments	cost structure	revenue streams
	Value chain		Value propositions		Customer segment		Profit mechanism	

St. Gallen Business Model by Gassmann et al. (2021)

Business Model Environment by Osterwalder & Pigneur (2011)

Key trends:	Market forces:	Macro-economic forces:	Industry forces:
- Technology trends	- Market segments	- Global market conditions	- Value chain actors
- Regulatory trends	- Needs and demands		- Stakeholders
- Socio-cultural trends	- Market Issues	- Capital markets	- Competitors
- Socioeconomic trends	- Switching costs	- Resources	- New entrants
	- Revenue attractiveness	- Economic infrastructure	- Substitute products

The following chapter explains the method of data collection with regard to the categories already mentioned in the context of the two funding lines BEX and IBB.

3 Methodology

The sample of the research consists of 18 projects, nine in BEX and nine in IBB. Selected were those cases in which at least one organisation was involved in both funding contexts so that the research design corresponds to a longitudinal study. The analysis is based primarily on project documents, such as application forms, interim and final reports, and documents collected following particular research questions (Business Modell Canvases, interview transcriptions, protocols). This research bases on a document analysis focusing on an organisation-based approach, which is promising despite its limitation: "A high degree of selection and controlled self-presentation" (Schmidt, 2017, p. 447). The advantage lies in a non-reactive approach avoiding the distortion of results, for example through social desirability. In addition, no disruption of organisational processes is necessary. Furthermore, it opens up the possibility of analysing events and assessments that lie in the past (Schmidt, 2017). In a first step, the analysis was conducted to identify adoptions made from the intended/planned to the final business model within each project in each funding program, as well as the related reasoning, where available. In a second step, the kind of adjustments made in BEX and IBB were compared between the funding lines in order to identify differences in this respect.

The data were collected from 2019 until 2022 (continuing in the case of IBB). Interviews lasted between 30 and 90 minutes and were recorded and logged. Table 2 gives an overview of the data included. Two researchers conducted the coding procedure to establish the greatest possible comprehensibility and objectivity. For the transparency of the analysis, an MS Excel document based on the category system was filled with quotations and paraphrases that allowed a conclusion to be drawn about the respective underlying document. The documents were anonymised following a structure to prevent inferences about individual projects.

Table 2
Overview of Data Base (own compilation)

Sources	BEX	IBB
Application form	9	9
Interim report	18	104[1]
Final report	9	7
Business Modell Canvas	-[2]	9
Final interview protocol	9	-[3]

Within the first step, the BEX-related documents are analysed following the presented category system (see Table 1). Afterwards, the same was made for the related IBB projects.

4 Analysis

The first research question was: *What adaptions have been made in the course of the projects with regard to the originally planned business models and why?* In a first step, the adaptions made in BEX are shortly presented (4.1) so that subsequently the adjustments within IBB are shown (4.2). The identified changes are structured by the introduced category system. This is followed by a mapping of the adaptations within the business models of the selected IBB projects, applying the Business Model Environment according to Osterwalder and Pigneur (2011). Finally, the adaptation strategies of the projects are located with reference to the reasons (4.3). The detailed findings for the adaptions made in BEX and IBB regarding the business models are presented in the appendix of this paper in Table 4.

The core of a business model is the service provided. To illustrate the project data, Table 3 gives an overview of the identified value propositions as the core of the business models for VET providers in both funding lines.

Table 3
VET Services in BEX and IBB (own compilation)

VET Service	BEX	IBB
Training centres	B1; B4; B7; B8	I1; I4; I7; I8
Education cooperation	B3; B7	I1; I5; I7
Initial training structures and further training offers	B3; B4; B5; B6; B7	I4; I5; I6; I7; I9
Further training system	B9	-
Contribution to system	-	I3; I5; I9
Development & distribution of VET services	B1; B2; B6; B7; B9	I2; I3; I6

[1] The high number of analyzed interim reports in IBB results from the design of the funding line, as each project partner had to submit a separate interim report annually during the project period.

[2] This data was not available for the BEX funding program as the scientific monitoring of that context applied other methods for their research.

[3] Will be respected in a journal contribution.

In the case of BEX, these were (1) the establishment of training centres or specialised academies (B1; B4; B7; B8), (2) initialisation of education cooperation (B3; B7), (3) establishment of initial training structures and further training offers (B3; B4; B5; B7), (4) development of a further training system (B9), (5) development of digital VET offers (B6) and (6) distribution of vocational training services (including digital services and licensing; B1; B2; B7; B9).

For IBB, there were the (1) establishment of training centres or specialised academies or competence centres (including the support of local partners with the establishment: I1; I4; I7; I8), (2) initialisation of education cooperation (I1; I5; I7), (3) establishment of initial training structures and further training offers (I4; I5; I6; I7; I9), (4) contribution to existing VET systems in the project country (I3; I5; I9), (5) development and distribution of vocational training services (including the support of local partners: I2; I3; I6). Two aspects can be observed: Firstly, the aspect of development, testing and implementation of VET services appears in a union. Secondly, nearly half of the projects were constantly referred to the choice of the value proposition; however, the picture is highly diverse. Overall, it is noticeable that the dual aspect was named much more clearly in IBB than in BEX.

4.1 Adaptions in the BEX Funding Line

The aim of this funding line was the development of a sustainable business model in the context of VET at the international level. That means for possible adaptions a strong relation to the development of such business models and a probably wide range of those through all dimensions of the development processes.

At first, it can be stated that the projects in BEX all followed a systematic business model development approach related to common models (Bullinger & Scheer, 2006; Leimeister, 2020). Development phases, such as start phase, analysis, conception, preparation, testing and implementation (Bullinger & Scheer, 2006) are recognizable. This allows to compare the developed business models since they all refer to the same theoretical frame. Subsequently, the dimensions of the BMC are described based on the projects' data.

In a first step, the adjustments identified for the adaption processes in BEX are described. Most changes relate to the BMC elements *value proposition*, *customer relationships*, *cost structure* and *channels*. Changes within the first mentioned categories were the increasing importance of customer-related adaptions (use of new terms, such as "cooperation" (B3), "overcoming distance […], transparency and trust" (B6) instead of vague ideas). Here, there was a revaluation of a rather technical understanding of customer relations identified. Moreover, a stronger combination of novelty (VET service in a new market) with customer involvement took place (see i.e. case B3 in Table 4). Finally, the creation of new business segments was observed ("change of the country necessary", B2; "consultancy for German customers", B1; B7).

Adaptions regarding customer relationships showed that descriptions of those relations developed from a rather vague resp. a technical and unsorted collection to a precise and differentiated state within the BEX program, including a new value base for the relations, created.

The changes relevant to cost structure addressed the reduction of fixed costs, where possible, while variable costs were chosen as a basis for a business model (i.e. B3; B6). Channels, finally, showed a growing combination of direct channels and stronger customer involvement according to the adaption process (B3; B6).

Overall, in BEX the involvement of customers stands out in terms of business model adaptions. However, there were some aspects confirmed by the actors, in detail a low-threshold contact offer for customers (*key activities*), the weight of the key resources on intellectual and human resources (*key resources*), the addressed customer segments (*customer segments*) and participation fees as the main *revenue stream*. Transferred to the introduced model of Business Model Environment, these changes can be mainly described as driven by market forces (Market

Segments - Needs & Demands; Osterwalder & Pigneur, 2011). In some cases, crises arose that had to be managed by the actors. These are political changes resp. crises (key trends/regulatory trends), (unexpected) competitors at the target market (industry forces/competitors) and loss of project partners (industry forces/stakeholders).

4.2 Adaptions in the IBB Funding Line

The aim of the IBB funding line was also the development of a sustainable business model regarding a selected target country, whereby the focus here is to a greater extent on the establishment of cooperation. Just like the analysed projects from the BEX funding line, the IBB projects followed a systematic business model development approach, whereby the approach of Osterwalder and Pigneur (2013) was applied directly to enable comparability of the cases. The following is a brief description of the main factors causing changes in the business models of the IBB projects (Osterwalder and Pigneur, 2011). Changes do not occur evenly across the nine IBB projects in all nine areas of the Business Model Canvas. Changes are particularly evident in the categories of key partners, key activities, key resources, value propositions, and channels. Much less affected are the categories of customer relationships, customer segments, cost structure, and revenue sources (see Table 4 in the appendix).

Adaptions in the category of key partners are mainly made towards changes at the personnel level on the part of the involved partners in the target country (Industry Forces - Stakeholders), so that in some projects new partners have been added (see the cases I2, I3, I4, I7 in Table 4), while in others some have been cancelled (see the cases I3, I5, I6 in Table 4). Changes in key activities in the projects include permanent and continuous adaptation to the situation and needs in the target country (Market Forces - Needs & Demands; see the cases I3, I4, I5, and I6 in Table 4). In addition, new challenges arise based on the pandemic, resulting in a changed market with new competitors (Industry Forces – Competitors; see the cases I1, I2, and I8 in Table 4). Adjustments to key resources arise in the analysed projects primarily as a result of the pandemic so that changes are only indirectly attributable to factors in the BMC environment. Changes to the value proposition result primarily from changes in the needs of partners in the target country with regard to the scope and content of the VET service, so that the focus in most projects shifts to further training measures and modularization of the offering (Industry Forces - Stakeholders & Market Forces - Needs and Demands; see Table 3 and the adaptions of the cases I1, I3, I8 in Table 4).

Adjustments in customer relationships increasingly exist with regard to digital communication, whereby the importance of personal and direct communication is also emphasized (Industry Forces – Stakeholders; see cases I1, I2, I3, I4 in Table 4). Channels to increase awareness of the VET service could not be perceived in part due to the pandemic, so there was an increased shift to digital channels (political crisis; not to be located in the BMC environment). Significant changes in customer segments were not made. Changes in the cost structure and revenue streams arise with regard to the reallocation of financial resources (see the cases I1, I2, I3, I5, and I6 in Table 4) on the part of the project associations due to the lack of financial support of the local partners and the resulting lack of sales opportunities (Macro-Economic Forces - Capital Markets; Market Forces - Market Issues & Revenue Attractiveness).

To summarize the results with regard to the first research question: What adjustments were made with respect to the originally planned business model development and why? It should be noted that adjustments to the business models are primarily determined by the factors "Industry Forces - Stakeholders" and "Market Forces - Needs and Demands" (Osterwalder & Pigneur, 2011). In addition, a considerable extent of the adjustments to the business models can be attributed to pandemic-related factors.

4.3 Strategic orientation of the Developed Business Models

The second research question was: *(2) What can we learn about the strategic orientation of the adaptions identified?* In order to answer this question, the analysed projects from the BEX and IBB funding lines were classified in terms of their degree of adjustments in relation to the categories of the business model. Subsequently, the strategy of adaption of the projects can be derived from this. In order to work out the core elements of the adaptions of the business models, the St. Gallen Business Model by Gassmann and Frankenberger (2016)[4] was used. This approach provides the four dimensions of customer/segment, value propositions, value chain and revenue mechanism. The BMC business model with its nine categories can thus be directly transferred to the St. Gallen Business Model[5]. This approach of Gassmann et al. (2013, 2021) serves to reduce the complexity of the data in a way that allows a comparison of business models regarding their main strategic orientation when adjusting their business model to relevant needs. The results of the reduction are presented in Table 5.

Table 5
Strategic Orientation of the Adaptions of the Developed Business Models (own compilation)

Dimension \ Project	B1	B2	B3	B4	B5	B6	B7	B8	B9	I1	I2	I3	I4	I5	I6	I7	I8	I9
Customer/segment	x	x	x				x			x	x	x	x	x	x	x	x	x
Value proposition	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Value chain				x	x			x	x	x	x	x	x	x		x		x
Profit mechanism																		

Overall, it can be seen that various reasons for adaptions of the business models can be identified across the two funding lines regarding the four dimensions in Table 5. Adjustments based on the loss of a project partner occur in two projects in different dimensions of the business model (B1: Customer/segment, I5: Value chain). Adjustments to the business model as a result of political changes are also found in two projects in different dimensions (B2: Customer/segment, I5: Value proposition). Moreover, three projects report adjustments to their business model as a reaction to unforeseen competitors (B2: Customer/segments, I1: Value propositions, I9: Value chain).

Adjustments due to the unexpected digitalization of customer relationships caused by the pandemic are found in all IBB projects in the dimension of the customer/segments, as well as the unexpected expansion of digital channels in the dimension of value propositions as a reason for pandemic-related changes. To avoid the cancellation of the project as a consequence of the loss of the project partner, two projects have made adaptations in the dimension of the value chain (B4, B5). Furthermore, adaptations of the service based on the needs of the partners in the project country are found in two of the nine IBB projects (I1: Value chain, I3: Value proposition). One IBB project also had to adjust the value chain because of the difficulty of finding partners in the target country (I3).

For BEX, two main patterns of adjustments can be observed. Either the business models are adapted with a scope on customers and value proposition, or the changes are made with a scope on value proposition and value chain. In the dimension "customer/segment", changes can be attributed i.a. to the loss of project partners (B1), political changes and unforeseen competitors (industry forces/competitors; B2). The case of profit mechanisms is difficult, as there is a recognizable shift away from fixed costs without concrete numbers to evaluate concrete adaptions. When comparing both groups within BEX, it shows that one more project in the value-

[4] First published in Gassmann et al. (2013).
[5] The assignment of the BMC categories to the four dimensions of the St. Gallen Model can be found in Table 1.

focused pattern was cancelled. One project focused on value proposition and did not provide clear data for the assignment of other innovation indicators.

For the IBB projects, the picture is in some respects different from the adjustment patterns of the BEX projects. Basically, it should be noted that based on the Covid pandemic, the IBB projects had to make adaptions in the category of customer relationships (customer/segment) and in the category of channels (value chain) in order to maintain project activities during the pandemic. This aspect can be treated as a limitation of the research since it is not possible to make assumptions about what changes would probably not have been made without that special situation. In the IBB projects, however, it seems that the adjustment strategies focus on the dimensions of value propositions and value chain, which can be attributed i.e. to the adaptation of the value proposition to the needs of partners in the project country and to the expansion of key partners due i.e. to the loss of other partners (new focus). An alternative interpretation would be that adaptions concerning the customer/segment dimension would have been made without the context of the pandemic and that this factor only worked as a driver. This aspect needs further investigation; at the same time, the analysed data suggest an increase in customer orientation from BEX to IBB (see Table 4 in the appendix).

5 Discussion and Conclusion

The results show similarities as well as differences regarding changes compared to the originally planned business models and the actual design of these at the end of the funding period of the projects in both funding programs. While in BEX the business models of the analysed projects are adjusted either in terms of customers and value proposition or in terms of value proposition and value chain, the business models of the IBB projects are adjusted mainly in terms of the dimensions of value propositions and value chain. At the same time, it should be noted that certain adjustments in the direction of the digitalization of channels and relationships with customers seemed inevitable due to the pandemic. In summary, factors relating to stakeholders and competitors (industry forces), as well as needs and demands in the target country (market forces), are the main reasons for changes in business models during the project (see Osterwalder & Pigneur, 2011). Increasing alignment with local structures, key partners, networks and also political support in the target country (see appendix Table 4) can be seen as a strategy of German VET SMEs abroad, which lack the necessary resources for larger ventures outside such funding contexts. A growing efficiency in resource planning and the increasing involvement of local partners indicate that SMEs have learned to compensate for their weaknesses in international markets, which can be assumed by comparing the BEX and IBB programs. These new strategic orientations of the projects can probably be considered innovations in this context.

It can be assumed that major adaptions cannot be afforded by the majority of the analysed players. The digitalization of certain factors of the business models can possibly be understood as an innovation driver so that larger developments and innovations could be expected in the area of product innovation. However, the pandemic-driven digitalisation caused a certain number of adaptions made in the field of customers/segments. The strong orientation towards customers can also mean that innovations must be closely monitored, even or especially if they are imposed. This would explain the strong process orientation within most of the projects that serve to align the adaptation to the needs of the customers. This statement would confirm "the emerging interest of innovation research in small improvements" (Schulz-Schaeffer, 2021, p. 35; translated by the authors) so that innovations are often incremental and closely controlled (Schulz-Schaeffer, 2021). Other explanations cannot be excluded, though, such as the possibility that radical innovation is hindered by the funding rules and procedures applying to IBB and BEX. This aspect needs to be addressed in the course of further research.

The providers also have a high level of problem-solving expertise due to the consortium approach, as well as to their international experience. The growth of know-how in digital teaching and digital communication channels can lead to changed business models for VET service providers in the long term, and further research in this area would be worth pursuing.

In the context of this paper, the question thus arises as to the innovation content of the projects analysed in the two funding programs: What degree of innovation could be recorded in the context of the projects considered and the data basis presented? Are there any patterns of innovation emerging from VET providers' internationalisation processes and how do both aspects relate?

This research is mainly limited by the context of the funding program. Moreover, the sample consists of German VET providers. Nevertheless, in times of globalisation, SMEs from all over the world can take part in internationalisation processes. The findings of this study may serve as an example of what VET service providers need to take into consideration, in particular when starting businesses abroad. The close relation of resources, and the unique selling point in close exchange with the customers appear relevant aspects also in international contexts.

References

Bullinger, H.-J., & Scheer, A.-W. (2006). Service Engineering – Ein Rahmenkonzept für die systematische Entwicklung von Dienstleistungen. In H.-J. Bullinger & A.-W. Scheer (Eds.), *Service Engineering. Entwicklung und Gestaltung innovativer Dienstleistungen* (pp. 51–82). Springer Gabler.

Bundesministerium für Bildung und Forschung. (BMBF) (2017). *BMBF-Bekanntmachung zur Förderung der Internationalisierung der Berufsbildung.* https://www.berufsbildung-international.de/de/foerderung-bekanntmachungen-und-ausschreibungen-bmbf-bekanntmachung.html

Gassmann, O., Frankenberger, K., & Choudury, M. (2021). *Geschäftsmodelle entwickeln. 55 innovative Konzepte mit dem St. Galler Business Model Navigator* (3rd Ed.). Carl Hanser Verlag GmbH & Co. KG.

Gassmann, O., & Frankenberger, K. (2016). Geschäftsmodelle entwickeln: Von der Kunst zum Handwerk. In P. Granig, E. Hartlieb & D. Lingenhel (Eds.), *Geschäftsmodellinnovationen. Vom Trend zum Geschäftsmodell* (pp. 17–33). Springer Gabler.

Gassmann, O., Frankeberger, K., & Csik, M. (2013). *Geschäftsmodelle entwickeln.* Hanser Verlag.

Gessler, M., Peters, S., Holle, L., & Kühn, I. K. (2019). Internalisation of German VET providers: New business models for new markets? In F. Marhuenda & M. J. Chisvert-Tarazona (Eds.), *Pedagogical concerns and market demands in VET. Proceedings of the 3rd Crossing Boundaries in VET conference, Vocational Education and Training Network (VETNET)* (pp. 261–271). https://doi.org/10.5281/zenodo.2641676

Kühn, I. K. (2021). Geschäftsmodellentwicklung, Dienstleistungsentwicklung und Dienstleistungstransfer: Lessons learned für die Internationalisierung der Berufsbildung. In D. Frommberger & M. Gessler (Eds.), *wb-ibb Working Papers 2/2021.* Universität Osnabrück & Universität Bremen. https://doi.org/10.5281/zenodo.4943476

Kühn, I. K., & Greppmair, A-C. (2021). Business model development and transfer in the con-text of internationalisation: Lessons learned of German VET providers. 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. 160–169). https://doi.org/10.5281/zenodo.517142

Kühn, I. K., Peters, S., & Holle, L. (2020). Internationalisation strategies of German VET providers. What is important for business models in new markets? In C. Nägele, B. E. Stalder & N. Kersh (Eds.), *Trends in vocational education and training research, Vol. III. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VET-NET)* (pp. *168–177).* https://doi.org/10.5281/zenodo.4006667

Leimeister, J. M. (2020). *Dienstleistungsengineering und -management. Data-driven Service Innovation (2nd Ed.).* Springer Gabler. https://doi.org/10.1007/978-3-662-59858-0

Meyne, L. (2021). Komplexität von Berufsbildungsdienstleistungen. Ein Erhebungsinstrument für die internationale Berufsbildungsforschung. In D. Frommberger & M. Gessler (Eds.), *wb-ibb Working Papers 3/2021.* Universität Osnabrück & Universität Bremen. https://doi.org/10.5281/zenodo.5006815

Osterwalder, A., & Pigneur, Y. (2013). *Business model generation. A handbook for visionaries, game changers, and challengers* (1. Ed.). Wiley.

Osterwalder, A., & Pigneur, Y. (2011). *Business Model Generation. Ein Handbuch für Visionäre, Spielveränderer und Herausforderer (1st. Ed.).* Campus Verlag.

Peters, S., & Krichewsky-Wegener, L. (2021). International cooperation in VET: A case study of expansive

learning in a German-Greek project on greening VET. 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. 216–230). https://doi.org/10.5281/zenodo.52055

Schmidt, U. (2017). Dokumentenanalyse in der Organisationsforschung. In S. Liebig, W. Matiaske & S. Rosenbohm (Eds.), *Handbuch empirische Organisationsforschung* (pp. 443–466). Springer Gabler. https://doi.org/10.1007/978-3-658-08493-6

Schulz-Schaeffer, I. (2021). Innovation im Verhältnis zu Neuheit und Wandel. In B. Blättel-Mink, I. Schulz-Schaeffer & A. Windeler (Eds.), *Handbuch Innovationsforschung. Sozialwissenschaftliche Perspektiven* (pp. 25–42). Springer VS.

Siemer, C., & Gessler, M. (2021). The Role of Research Partners in Funded Model Projects in the Context of the Internationalisation of VET: Research Partners as Promoters. European Conference on Educational Research (ECER), Geneva, Switzerland. https://doi.org/10.5281/zenodo.5172437

Siemer, C., & Gessler, M. (2021). The role of research partners in funded model projects in the context of the internationalisation of VET: Research partners as promoters. 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. 270–278). https://doi.org/10.5281/zenodo.51724

Biographical notes

Dr **Ida Kristina Kühn** is a post-doctoral researcher at the Institute of Technology and Education (ITB) at the University of Bremen. Her research interest focuses i.e. on school-to-work transitions, extracurricular teaching and learning in national and international contexts.

Lisa Meyne is a doctorate candidate and a research associate at the Institute of Technology and Education (ITB) at the University of Bremen. Her research interests focus i.e. on the complexity of vocational training services and transfer in international contexts.

Appendix

Table 4

Results of the BMC-Based Analysis of the BEX and IBB Projects (own compiliation)

Dimension of BMC	BEX starting idea (application form)	BEX final form (interim and final report)	IBB starting idea (application form and Business Modell Canvas)	IBB final form (interim and final report)
Key partners	German Economic partners in project country (B1; B2; B4; B8) Organisations of project country in Germany (B3; B6) Partner organisations in project country (B3; B5; B7) active design of relation to competitors (B2)	expanded or supplemented on a project-specific basis: involvement of universities in project country (B8) involvement of German chamber of commerce in project country (B9)	Companies in project country (I1, I2, I3, I4, I5, I6, I7, I8, I9), German Economic partners in project country (I2, I6, I9), educational institutions in project country (I1, I2, I3, I4, I5, I6, I7, I8, I9), associations & chambers (I1, I2, I3, I4, I5, I7, I9), authorities & ministries (I1, I2, I3, I4, I6, I9). Translators (I9)	Expanded cooperation in project country: Cooperation with state governments (I2), Institute for Vocational Education (I3) & Associations/chambers (I7) & companies (I4, I7). Cancelled as partner in project country: Universities (I6), Ministry of Education (I3) & educational cooperation partner in the project country (I5).
Key activities	Demonstration of dual elements (B1) Further education and train-the-trainer activities (B1; B2; B3; B6) Digital offers (B2; B9) Establishment of an educational institution (B4; B5; B7; B8) active promotion using well-known label (B1)	Low-threshold contact offer has been confirmed, customer focus has become even stronger online promotion extended network creation more important (B4; B8)	Networking (I1, I2, I3, I4, I5, I6, I7, I8, I9) Research & development (I5, I6, I9) Establishing sales opportunities (I6, I7) Measures to increase the attractiveness of vocational education (I3) Establishment of an educational institution (I1, I8) Digital learning offer (I1, I2, I6, I9)	Due to the pandemic, all projects had to digitally reorganize or postpone their activities, which included e.g. the evaluation of the project (I3), work process analyses (I7), the communication with partners and implementation of the educational services in the project country (I1, I2, I3, I4, I5, I6, I7, I8, I9).
Key resources	physical ressources (B1; B2; B5) intellectual ressources (B1; B2; B3; B4; B5; B6; B9) financial resources (B2) human resources (B1; B2; B3; B4; B5; B6; B7; B8; B9)	the distribution with weight on intellectual and human resources did not change; in opposite, it was confirmed by increasing use of popular labels (B1; B8) and cooperation became more important	Human resources (I1, I2,I3, I4, I5, I6, I9) Physical resources (I1, I2, I3, I7) Intellectual resources (I1, I2, I4, I5, I6, I8, I9) Business premises in project country (I9) Proven educational services (I4, I5) Financial resources (I7)	Changes occur, among others, with regard to the loss of personnel resources (I1, I3) & the lack of possibility to obtain course materials through sanctions (I5). The potential of digital media, including learning videos (I7) and know-how on digital teaching (I3), has been added as a resource.
Value proposition	Training programmes modelled on the German dual model (B1; B2; B3; B4; B6; B7; B8), Novelty of VET service in specific markets (fist mover: B2; B5; B8; B9; early follower: B3; B1; B4; B6) Support of suppliers in project country (B2; B8), certification of achieved competences (B3; B5; B9), combination of novelty with concomitant customer-related offers (B3)	customer related adaptions (B7; B8) combination of novelty with concomitant customer-related offers intensified (B3; B6; B7) enabling customers to problem-solving creation of new business segments (B2; B7)	Establishment of a certification system (I1, I2, I3, I4, I5), development of consulting services (I1, I3, I6, I7, I9), offering further VET (I2, I3, I5, I6, I9), offering initial VET (I4, I7), offering initial & further VET (I1, I8), train-the-trainer-activities (I1, I2, I8, I9), career orientation activities (I3), selling the trademark "Made in Germany" (I4, I5, I6, I7, I9)	Reduction of the compelxity of the VET service (I1, I3, I8) Customer related adaptions (I3, I4, I5, I6) Change in the initial situation due to competitors (I1, I2, I8) Adding additional value propositions (I3, I4, I8) Pandemic-related omission of full testing of VET service, only piloting (I3)

Customer relationships	Events with public effectiveness (B1; B2; B3; B5; B6; B8), public Relations and Marketing (B1; B3; B4; B5; B6; B8) active design of customer-supplier-relation (B1; B2; B5; B7), information material and platforms (B1; B2; B5; B7; B8; B9), Creation of business cooperation (B2), Addressing leaders and managers (B2; B4), co-creative relations (B2; B9), adressing the German community (B5; B7)	rather vague formulations about the customer relation become clear and differenciated during the project duration. Marketing goals and relationship building are thought of more strongly together New terms are: Cooperation, overcoming distance, facilitating entry, transparency and trust, which show a revaluation of the customer relations	Long-term cooperation and regular contacts (I1, I2, I7, I9) Accessibility after implementation (I2) Direct and personal contact (I1, I5, I6, I9) Friendly business relations (I1, I3) Exchange and innovation impulses for both sides (I3, I4) Platform-based relationships (I6)	Customer relationships continue to be characterized by direct contact, at the same time a strong increase in digital communication channels can be seen (I1, I2, I3, I4, I5, I6, I7, I8, I9). Due to the pandemic, most of the communication between the involved partnerns took place exclusively digitally.
Channels	use of direct channels (B1; B2; B4; B7; B8; B9) involvement of partners with customer data bases (B3; B5)	connection of both as lesson learned from development process (B6)	Social media (I1, I2, I3, I5, I9) Websites/homepages (I1, I2, I5, I7, I9) personal contact (I1, I2, I3, I4, I5) conferences & transfer events (I2, I6, I7) Publications/Flyers/brochures (I1, I2, I5)	Due to the pandemic, channels are also becoming increasingly digital due to lack of presence in the target country (I1, I2, I3, I4), trade show visits have been eliminated (I1, I3), involvement of project partners in project country for marketing increased (I1)
Customer segments	VET teachers (B1; B2; B3; B5; B7; B8) Skilled workers/management in companies (B2; B3; B5; B7; B9) Training staff and/or apprentices/students (B1; B7; B8) further education staff/multipliers (B1; B2), German VET service providers (B6; B9), Particular target groups without VET backgroud (B4)	customer segments were not changed during development process with regard to the follow-up funding line, the largest segments were confirmed, while the further education segment increased	vocational schools & students (I1, I3, I4, I5, I6, I7, I8), Pupils (vocational orientation) (I3), Colleges/universities (I1, I4, I5, I7), Teachers (I1, I7, I8), Businesses & employees (I1, I2, I3, I4, I5, I6, I7, I8, I9), Suppliers (I2), Associations (I2, I3, I9), Public and private educational institutions (I1, I3, I4, I5, I6, I7, I8, I9), regional administration (I4)	The customer segments have not changed significantly, only a smaller number of the target group could be reached (I5) or universities have not been further addressed as customers (I7).
Cost structure	Rent, material and administration when setting up the infrastructure on site (B1) variable costs cannot be defined clearly at project start Sales savings (B6)	general development reduction of fix costs and choice of variable costs as basis for cost structure	Personnel costs (I1, I2, I3, I4, I5, I6, I7, I8, I9), training materials (I3, I5, I6) IT infrastructure and technical equipment (I1, I2, I3 I6, I7, I9), marketing & advertising (I1, I3, I5, I9), translator and interpreter costs (I1, I3, I6, I9), facilities in project country (I1, I4, I6, I9), course/module development (I2, I3, I6, I9), Travel costs (I2, I5, I6, I9), partner costs (I5), Certification (I9)	Shift in cost structure in favor of personnel costs (I1, I4, I5, I8), reduction in travel costs due to the pandemic (I1, I2, I3, I5, I6). Funding from an educational partner in the target country no longer possible due to changed economic situation (I5).
Revenue streams	Licences (B3; B4; B6; B9) Participation fees (B1; B2; B4; B5; B7; B8) Consulting (B3; B6; B8) (Development and) sale of material and equipment (B1; B3; B7)	Participation fees remain the vast part of revenue streams Licensing decreases, while sale of modules and programmes in VET and CVET increases	Certification/license fees (I2, I5, I6, I8), public tenders of government in target country (I4), consulting fees (I5, I6, I7), software as a service (I6), trainings/workshops & participant fees (I1, I2, I3, I4, I5, I6, I7, I8, I9)	Focus remains on revenue from participant fees. Funding by the governments of the project country is no longer the focus & licensing as a source was discarded after examination (I2). Cost-neutral extension of the project (I2, I3, I4, I5, I6, I7).

VETNET
European Research Network
Vocational Education and Training

Marhuenda-Fluixà, F, Chisvert-Tarazona, M. J., Palomares-Montero, D., & Tárraga-Mínguez, R. (2022). Guidance in second chance schools: Accompaniment at the core of vocational training. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 81–89). https://doi.org/10.5281/zenodo.6976634

Guidance in Second Chance Schools: Accompaniment at the Core of Vocational Training[1]

Marhuenda-Fluixà, Fernando
fernando.marhuenda@uv.es, University of Valencia

Chisvert-Tarazona, María José
maria.jose.chisvert@uv.es, University of Valencia

Palomares-Montero, Davinia
davinia.palomares@uv.es, University of Valencia

Tárraga-Mínguez, Raúl
raul.tarraga@uv.es, University of Valencia

Abstract

Context: Second Chance Schools (E2O, its Spanish acronym) represent an educational response that tries to deal with early school leaving and provide a path for educational re-engagement, labour inclusion and personal reconstruction. This study aims to describe and analyse the guidance model of the Spanish E2O.
Approach: In 2021, we conducted semi-structured interviews with the management of twenty-four schools, 10 professionals in companies hiring youth after finishing their training in E2O, as well as 9 teachers in secondary schools to which former students of E2O returned. Additionally, we conducted a survey among 351 youth who had finished their E2O, and we analysed the record of another 1592 youth who had finished their E2O in schoolyear 2019/2020. We present a descriptive analysis of the quantitative data obtained here.
Findings: The analysis of the interviews shows that the guidance in the E2O is considered a process of personal accompaniment. Some of the defining elements of this process are comprehensiveness (employment, vocational and personal guidance), fluidity in communication through formal and informal channels and the adaptation of the process to each student. The guidance processes begin with an initial phase in which a reception and initial diagnosis process is carried out; it continues with a constant monitoring phase during the itinerary, with formal and informal meetings; and it concludes with a preparation phase for the departure of E2O itself. The quantitative assessment of young people about the orientation processes in the E2O is very positive, although there are some nuances regarding the assessment of flexibility.
Conclusion: The orientation processes developed in the E2Os are a key aspect behind success in educational re-engagement, professional insertion, and personal reconstruction.

Keywords: accompaniment, employment, second chance school, guidance, life project.

[1] This contribution is a short summary, freely translated into English, of an article written in Spanish that is currently under review by a Spanish education journal.

1 Introduction

Our paper focuses on analysing guidance models and processes of training within second chance schools (E2O hereafter, using the Spanish acronym), recalling the notion coined by the European Commission (1995). In Spain, they are basically promoted by non-for-profit organisations also by social economy institutions.

E2O are units that those organisations provide, including transition programs into employment or to reengage in formal education, addressed to young people living in vulnerable circumstances. The Spanish Association of E2O gathers nowadays 43 schools accredited as such through a process of external evaluation. They share educational and social aims, and they are managed by associations, foundations, and cooperatives.

Youth attending these programs usually has a record of early school leaving. Their motives to enrol in E2O vary from the need to overcome suffering, reinforcing emancipation processes, entry into the labour market or the support of relevant others (Christodoulou et al., 2018; Kiprianos & Mpourgos, 2020). One of the main tools E2O use are guidance in different regards, such as personal, vocational, and professional.

Research has described some of the guidance strategies used by E2O, its pace, agents involved as well as its results.

1.1 What is Subject to Counselling, and How is it Conducted?

Villardón-Gallego et al. (2020) have indicated that self-knowledge, an increase in self-confidence, development of a feeling of responsibility and of strategies for emotional coping with conflict are central dimensions of the educational model of E2O. All of these, related to reflection and knowledge of oneself, are precisely the starting point of any guidance process and the basis upon which decision-making and maturity processes are grounded.

Another crucial element is the emotional domain that E2O carry on. Many youths in these schools have the chance to think and plan profound changes in their life trajectories (Martins et al., 2020). This is favoured by well-rooted methodologies in E2O that are also key in guidance, such as group dynamics and activities of the group and individual reflection upon academic aspects (Villardón-Gallego et al., 2020).

Another requirement of guidance is to 'position students at the core of all decisions' (McGregor et al., 2015, p. 621), which is also part of the essence of second chances, conscious that their role is not to decide instead of their students, but to equip them with the strategies and opportunities to make their own decisions.

1.2 When to Provide Counselling?

Retention in E2O demands participants to commit to regularly attending the school with a view on the mid and not the short-term. Such a routine of daily attendance, with the accompaniment of the same professionals, provides the youth with the opportunity to face a period of stability that is a change in contrast to their past educational trajectories. More than any program that they attend, the key seems to be in agreeing on personalised itineraries that allow each youth to think and work in their own training process in the mid and long-run (Martínez-Morales, 2021).

Within this framework, pedagogical itineraries in E2O have an average length of two years, varying according to the needs of the youth, entailing training and guidance. There is no rush in E2O, and there is not the pressure of ordinary secondary schools that require an adaptation to the curriculum; rather, on the contrary, it is the school that adapts to the youth to have an impact upon his/her school and life process (Martínez-Clares et al., 2014).

1.3 Who Takes Charge of Counselling?

Research has shown that teachers and trainers worry about the personal and emotional welfare of students (Riele et al., 2017). Professionals in these organisations develop an identity in which emotional dimensions are relevant, such as the ethics of care and welfare of their students, as well as the personalisation of training, to a larger extent than academic performance (Meo & Tarabini, 2020). Teams in E2O provide relevant adults for each youth, supporting them with contrasting views, both in the definition of the itinerary as well as in the evaluation of the achievement of aims.

There is further evidence that when youth is asked for their views, empathy, accompaniment, support, and active listening are valued features (Montserrat & Melendro, 2017). They appreciate key elements that are mobilised by guidance processes with greater intensity than in their experience in previous schools; by establishing a link of trust among youth and educators. E2O, aware of the difficulties of young people in vulnerable circumstances to make decisions, put guidance at the core of their educational model and refer to it rather as an accompaniment than pastoral care, yielding relevance to the personalisation of any intervention (Martins et al., 2020).

1.4 Assessing Guidance in E2O.

Some variables related to guidance processes are daily used in natural as well as planned and purposeful ways in second chance schools. Aspects such as proactivity and the constant work to maintain motivation (Prieto, 2015); flexibility and effort to promote a significative and individualised education (Corchuelo et al., 2016); as well as the construction of a feeling of belonging to a community that provides collective challenges to all its members (González-Faraco et al., 2019).

Espinoza et al. (2020) have identified that the most highly valued dimension by students is the staff in E2O programs, particularly staff with teaching and training responsibilities. This result relates to the appreciation that students show for the capacity of teachers to communicate in the classroom as well as to solve problems. It is also an indicator of the appropriateness of their training itineraries, agreed to thanks to the initial guidance.

Finally, those youth who finalise their itineraries in E2O prove to have a good attitude towards the demands of the workplace, appropriate qualifications regarding the needs of the labour market, as well as engagement, will and interest to work (Villardón-Gallego et al., 2020).

Therefore, our aim in this paper is to analyse personal, vocational, and professional guidance in the model that accredited E2O in Spain conduct nowadays.

2 Method

Our study applies a multimethodological analysis attempting to understand our object study from a holistic perspective. We apply a mixed methodology that combines qualitative and quantitative information and analysis. Our research is conducted in cooperation with the Spanish Association of Second Chance Schools, and it has received the approval of the Ethics in Research Committee of the *Universitat de València*. Qualitative information consisted of interviews with twenty-four E2O management teams, 10 professionals in companies hiring youth after completing their training in E2O and 9 to teachers in secondary schools to which youth returned after E2O. All interviews were conducted between March-May 2021.

Our quantitative study had two sources of information. We conducted a survey of 351 youth who had completed their training in 2019/2020 (out of a total population of 2711 youth as reported by the Spanish Association of Second Chance Schools). In parallel, we had developed a database fulfilled by professionals in E2O, providing data of 1592 individuals out of the

same population, reporting data on their current situation in terms of study or work, as well as the programs they had taken at the E2O. The quantitative analysis we present here is descriptive.

Semi-structured interviews covered issues about curriculum, organisation, counselling, and accreditation. In this paper, we focus on counselling. Information was gathered and analysed with MAXQDA Plus 2020, following the thematic analysis procedure by Braun and Clarke (2006). Therefore, we select relevant issues and proceed to conceptualise them rigorously. We applied the procedure described by Barnes (1996), which consists of successive comparisons among content in the interviews and theoretical concepts as defined in the identification of fundamental themes (Barnes, 1996).

The questionnaire consisted of twenty-three multiple-choice items with a Likert scale. A group of seven experts from three different Spanish universities took part in the process of validation of content, together with four educationalists working in E2O.

The database with data from E2O provides information according to indicators on competencies acquired by youth in relation to their profile and training.

The results of the questionnaire and the database were analysed through descriptive statistics, used to find out the perception of former E2O youth on their curriculum within them.

3 Results

Our analysis of personal, vocational and professional guidance in E2O tries to tackle what is understood by guidance in these schools, what is the role it plays within their educational provision, to what extent counselling becomes part of a wider accompaniment process and how it is conducted, when, who is in charge of it; we also point to the synergies among schools and companies and what is the result of guidance and accompaniment upon the training in E2O.

3.1 What and How is Counselled in E2O

Professional guidance is considered by E2O management as a process of 'personal accompaniment' (E28). These organisations make sense of it through several features: integrality, fluent communication, adaptation to each young person and flexibility when it comes to decision-making.

The integral approach is rooted in a typology of guidance (occupational, vocational, and personal) as well as among those who benefit from it, both young persons and their families. E2O provide guidance within a specific subject in the curriculum (FOL, the Spanish acronym for Training and Guidance for Work, *Formación y Orientación Laboral*), both within formal and non-formal vocational education and training: 'Employment professionals (…) coordinate the preparation of simulated work interviews, which is part of the training process' (E5). Guidance happens also at the end of the itinerary: 'What young people do in the classroom (…) where the kids are getting trained while they start preparing their CV, those who want to work' (E5).

Most E2Os have a wide approach towards guidance, not reduced to labour issues, even in those cases that it is the only expectation of young people. Managers in E2O make it explicit that the axis of guidance processes is vocational guidance, trying to widen the expectations of young people inside and outside the organisation. However, aware of the different needs of youth, schools adapt and agree on viable itineraries.

They also offer guidance at a personal level: 'We work with young people whose needs are mainly social, personal, crucial in their lives' (E25). Therefore, E2Os foster accompaniment and guidance from a holistic approach, paying attention not only to vocational and labour issues but also to the social and personal lives of their youth.

Integrality applies to families too that are invited to join guidance processes: 'Integral means that you work with the mother or father, sometimes even at a psychological level. Perhaps they do not have a job, and therefore we invite them to join some guidance program, and

we try to help them find a job' (E2). Ordinary secondary schools are aware of this kind of support that they are not able to provide, an accompaniment that embeds emotional as well as community dimensions: 'It is basically an accompaniment that includes the emotional side of the person, affections, where the important piece is the person herself (…), it is a real, true significative support … in all dimensions' (F_E13).

Another relevant feature of guidance in E2O relates to their ability to establish permanent and fluent communication channels, both in training, guidance, and support: 'Yes, we are very insistent in the beginning, then they thank us for being there for them. That they appreciate a different relation (to that of ordinary secondary schools), they tell us so' (E32). Such communication is possible thanks to several channels: 'Group assemblies, individual care, WhatsApp communication, telephone calls, satisfaction questionnaires' (E16).

However, communication would be nothing without the guarantee that students are listened to, and they are able to respond in a way that these organisations are able to satisfy the demands of each of the individuals they serve by 'identifying the needs of each person, as well as their strengths' (E4). Ordinary secondary schools are aware of such individualisation in the guidance process that E2O provide, something that they feel unable to offer and that does not allow them to consider the chance to recover these youth after finishing their process at E2O.

3.2 Guidance Along the Steps of the Itineraries

Another relevant feature of guidance in E2O refers to the use of time as a key to allowing them to progress at the pace of each youth. Decisions are taken with enough time, and they are subject to review. Guidance is defined in these institutions as '(…) the way in which one starts taking a position in his/her own life, and then the moment will come when you decide which direction you want to take' (E24). Guidance is therefore structured all along the process, and so it is identified across different moments: welcome, follow-up, preparation to leave the E2O and follow-up once you have left the E2O.

Upon the arrival of the young person to the school, the welcoming process is key to success. In this initial moment, the young person must find his/her place within the school while jointly defining his/her aims and planning a personalised itinerary. A vocational project is designed to consider expectations, interests, personal trajectory, and profile. Despite the relevance of this initial process, the resulting itinerary and agreed decisions are reviewed along the whole process within the E2O.

Some schools apply a diagnostic of employability in the welcoming phase, which may lead to an itinerary where training plays a minor role while guidance and entry into the labour market become most relevant: 'A diagnostic of employability that is performed slowly and that identifies particular needs of the young person, either about training, guidance or access into the labour market' (E27).

The follow-up phase is 'constant' (E8), and it allows to assess whether 'the aims of the itinerary are achieved' (E27). This phase evaluates the progress and allows to review decisions. It is performed through 'the lens of personal accompaniment'(E28), hence safeguarding proximity and being close to the young person. If changes are necessary, these are not circumscribed only to the individual but also to the school, that must rethink its relation to the young person through a new turn in the training itinerary: 'Plans, above all, must be planned but also reviewed and redirected' (E9).

Once the itinerary has finished, guidance is directed towards the preparation of exit of the individual, often towards employment, upon agreement of the young person and the team: 'Towards the end of the school year, we work a lot upon labour dimensions, job interview and all the abilities the youth have developed' (E25). Even though guidance refers mainly to continuing training out of the E2O: 'guidance towards qualifying in different types of studies' (E42).

Once the itinerary is over in the institution, there is a follow-up of at least six months, which is mandatory in E2O to achieve accreditation. This follow-up may be face to face or by telephone: 'Once over (…) we have six months to reinforce and conduct a follow-up, while the relation to the youth becomes looser, both face to face and by phone' (E27).

The young person 'sees how the process goes by, considering the entry-level and trusting in the support achieved towards a better future' (E17). This process from the welcoming stage to the final one cannot work if young people do not have a proactive attitude towards accompaniment and guidance: 'There is a common requirement in our school: either you have the motivation, or this will not work out well' (E4).

3.3 Who Conducts Counselling in E2O: Specialisation and Allocation of Responsibilities?

Agents involved in guidance have a background which is mainly psychological, despite some teams are multidisciplinary, incorporating complementary experience or even vocation: 'We have social workers, psychologists, pedagogues, local development agents …, so in the end, it is not so much which is your background, but which is your experience or even which is your calling' (E34). However, E2Os insist on training and specialisation of staff in charge of guidance: 'Master programs linked to guidance or counselling …' (E17).

In some cases, an area has been developed within the organisation behind E2O in which staff oversees prospecting and mediation actions: 'They spend all day out in the street, establishing relations to companies for the sake of the people we work for' (E8). They try to consolidate their work experience modules and the chances of hiring people. Similarly, companies make explicit the meaning achieved through the agreements they sign with E2O: 'These are commitments which are not mandatory though we generally apply them so that we get people for performing a stage of work experience and we may hire someone too, perhaps one to three new staff in a year or two' (T_E26).

There are initiatives where E2O take the lead to guarantee the appropriateness of the experience for the youth they serve, like projects that sometimes require training in the school and in the company: 'Other projects that we have (…) are mixed training with companies where we provide some training, the company provides some, facilitates work experience …' (E35).

These are synergies that some E2Os are still trying to develop by establishing good relations with companies. They get in touch with SMEs that are close to them: 'We have tried to respond to such demands by connecting to small companies, looking in detail in our own area, but we still have a lot to improve here' (E13). There are cases in which there is a clear lack of proper staff as well as funding to add this service within the schools: 'We need much time to establish good relations to companies, we do not have the time for that, we do not get the funding for that' (E13).

3.4 Assessing Guidance: Provisional Analysis of the Results

Guidance is considered very relevant by these schools: 'It is guidance and accompaniment (…) where our success relies upon' (E34). In fact, it is a service used by all youth who attend E2O.

Former E2O students are very satisfied with guidance. They get average evaluations around 3,56 (out of 4) in dimensions like 'I have received guidance to take decisions' or 3.29 in 'I have been able to know and select among different training chances'. Another relevant dimension is that of 'I have started a training and, if I thought I made a mistake, I could change to another one …', with an average of 2.75, perhaps because the training offer in E2O is not as varied as it might be.

When analysing the importance awarded to training and guidance, we observe that occupational guidance is extremely valued, with 89 % of students agreeing to it and an average of

3.46. However, it is somewhat below the relevance achieved by obtaining the GCSE and slightly above vocational training. Low behind those falls the weight of the preparation of the entrance examinations to formal VET.

Results of E2O six months after finalising the itineraries show that 49 % of young people keep studying, while 30 % neither study nor work. Nevertheless, this percentage decreases to 24 % 9 months after leaving the E2O. Given that young people search for a job, the lack of it, according to the economic context, has a strong impact upon vulnerable youth. We need to examine longer periods of time to capture the effect of E2O on labour itineraries of youth, and, in some cases, there is a need to widen the provision and intensity of guidance services beyond the training period in E2O.

4 Discussion and Conclusions

Guidance in E2O is part of a wider process, that of personalised accompaniment, which constitutes the axis of socio-educational intervention in these schools. Guidance is not a momentary action, but it is rather incorporated into the educational process that is shaped around the personalised itinerary. We agree with Ceniceros (2003) in considering the itinerary both as the result of guidance and as a tool to develop guidance itself. The authorship of the itinerary lies in the hands of the young person, and it is the mission of the staff to provide guidance in order to help the young person a) clarify his/her needs; b) get a diagnosis through which to improve his/her abilities and employability; c) help the young person to raise consciousness about his/her potential, limits, circumstances and the context surrounding him/her; all of these both in labour as well as in civic terms. In accordance with Martins et al. (2020), we consider E2O as an opportunity to reflect and plan profound changes in occupational and life trajectories.

The itinerary revised over time allows the youth to explore his/her capacities, interests, and expectations, but also to test them in different training programs through the performance of practical activities that allow him/her to make mistakes and correct him/herself. Exploration is an exercise prior to engagement, and both are more accessible before the lack of pressure of time. However, the itinerary itself requires each youth the commitment to exploration and, later, to select based on experience and the knowledge of different occupational possibilities, as Villardón-Gallego et al. (2020) have pointed out.

These decisions are taken upon the basis of formative assessment, which is, in turn, possible thanks to the lack of curriculum mandates behind most of the training programs offered by E2O, taking advantage of not being formal VET. Assessment is at the service of guidance, which provides relevant information about each youth.

Furthermore, guidance is supported upon different dimensions of the life of the youth, as Jacinto (2017) has shown, while E2Os set the material conditions that make possible, sufficient life circumstances to make guidance useful and relevant. Networks in which E2O take part are a fundamental resource for this.

Guidance is, therefore, at the service of shaping a life project that, at the same time, becomes crucial for the process of personal re-structuration of the young person, an internal process through which the young person matures, a task intrinsic to adolescence and relevant for transitions into adulthood.

Even work experience in companies, the same as occupational qualification, has an instrumental role beyond qualification. The conditions provided for the young person to develop his/her itinerary allow him/her to taste, make mistakes and to better define a life project. The length of the itineraries is also personalised, the same as the access to training, which is permanently open along the schoolyear. Time runs in favour and not against the interest of the young person, as Zacarés and Linares had explained (2006).

Education addressed to young people with school trajectories that lack structure and which aim to improve success needs guidance to occupy a central position in educational practice, as is the case in E2O, without renouncing specialisation but involving all the staff members.

E2Os have ambitious aims with their students, aims that go far beyond the merely academic and professional domains. Along their itineraries, processes of personal reflection are fostered that help young people analyse the motives that caused their difficulties along their attendance to ordinary schools, and these allow them to make decisions about the direction they want to take for their lives in the short, medium, and long term, not only regarding their academic or occupational aspirations but also about their personal lives.

References

Barnes, D.M. (1996). An analysis of the Grounded theory method and the concept of culture. *Qualitative Health Research, 6*(3), 429-441. https://doi.org/10.1177/104973239600600309

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Ceniceros, J.C. (2003). *Orientación sociolaboral basada en itinerarios. Una propuesta metodológica para la intervención con personas en riesgo de exclusión.* Fundación Tomillo.

Christodoulou, M., Kiprianos, P., & Papachristopoulou, E. (2018). Becoming a Lifelong Learner through Life Disruptions: Exploring Motivational Pathways in Second Chance Schools' Students. *Sociological Research Online, 23*(3), 606-621. https://doi.org/10.1177/1360780418770460

European Commission (1995). *Libro Blanco Sobre la Educación y la Formación. Enseñar y Aprender. Hacia la Sociedad del Conocimiento.* https://evalua.catedu.es/documentos/aragon/NormativaVarios/

Corchuelo, C., Cejudo, C.M., González, J. C., & Morón, J.A. (2016). Al borde del precipicio: las escuelas de segunda oportunidad, promotoras de inserción social y educativa. *International Journal of Educational Research and Innovation, 6*, 95-109. https://upo.es/revistas/index.php/IJERI/article/view/1848

Espinoza, O., González, L., McGinn, N., & Castillo, D. (2020). Alternative education programs for high school age students in Chile. *Education and Urban Society, 52*(4), 561-589. https://doi.org/10.1177/0013124519879428

González-Faraco, J.C., Luzón-Trujillo, A., & Corchuelo-Fernández, C. (2019). Initial vocational education and training in a second chance school in Andalusia (Spain): A case study. *The Australian Educational Researcher, 46*(5), 827-842. https://doi.org/10.1007/s13384-019-00304-8

Jacinto, C. (2017). Redistribución y afectividad como dimensiones de la justicia social. Las intervenciones del tercer sector en las transiciones de la educación al trabajo. *Profesorado, Revista de Currículum y Formación de Profesorado, 21*(4), 177-195. https://doi.org/10.30827/profesorado.v21i4.10051

Kiprianos, P., & Mpourgos, I. (2020). Back to school: From dropout to Second Chance Schools. *Journal of Adult and Continuing Education, 28*(1), 27-48. https://doi.org/10.1177/1477971420979725

Martínez-Clares, P., Pérez-Cusó, F.J., & Martínez-Juárez, M. (2014). Orientación profesional en educación secundaria. *Revista Electrónica Interuniversitaria de Formación del Profesorado*, *17*(1), 57-71. http://dx.doi.org/10.6018/reifop.17.1.198841

Martínez-Morales, I. (Coord.) (2021). *La formación en las escuelas de segunda oportunidad (E2O) acreditadas en España: perfil, trayectoria y condiciones de éxito de las y los jóvenes.* Ministerio de Educación y Formación Profesional.

Martins, F., Carneiro, A., Campos, L., Ribeiro, L.M., Negrão, M., Baptista, M.I., & Matos, R. (2020). Derecho a una segunda oportunidad: lecciones aprendidas de la experiencia de quien abandonó y regresó a la educación. *Pedagogía Social: Revista Interuniversitaria, 36,* 139-153. http://orcid.org/0000-0002-8853-786X

McGregor, G., Mills, M., Te Riele, K., & Hayes, D. (2015). Excluded from school: Getting a second chance at a 'meaningful' education. *International Journal of Inclusive Education, 19*(6), 608-625. https://doi.org/10.1080/13603116.2014.961684

Meo, A., & Tarabini, A. (2020). Teachers' identities in second chance schools: A comparative analysis of Buenos Aires and Barcelona. *Teaching and Teacher Education, 88,* 102963. https://doi.org/10.1016/j.tate.2019.102963

Montserrat, C., & Melendro, M. (2017). ¿Qué habilidades y competencias se valoran de los profesionales que trabajan con adolescencia en riesgo de exclusión social? Análisis desde la acción socioeducativa. *Educación XX1, 20*(2), 113-135. https://doi.org/10.5944/educxx1.19034

Prieto, B. (2015). El camino desde la vulnerabilidad escolar hacia el desenganche educativo. El papel de las escuelas de segunda oportunidad en la estrategia contra el abandono educativo. *Profesorado. Revista de Currículum y Formación de Profesorado, 19*(3), 110-125. https://recyt.fecyt.es/index.php/profesorado/article/view/43633

Riele, K., Mills, M., McGregor, G., & Baroutsis, A. (2017). Exploring the affective dimension of teachers' work in alternative school settings. *Teaching Education, 28*(1), 56-71. https://doi.org/10.1080/10476210.2016.1238064

Villardón-Gallego, L., Flores-Moncada, L., Yáñez-Marquina, L., & García-Montero, R. (2020). Best Practices in the Development of Transversal Competences among Youths in Vulnerable Situations. *Education Sciences, 10*(9), 230. https://doi.org/10.3390/educsci10090230

Zacarés, J.J., & Llinares, L. (2006). Experiencias positivas, identidad personal y significado del trabajo como elementos de optimización del desarrollo de los jóvenes. Lecciones aprendidas para los futuros programas de cualificación profesional inicial. *Revista de Educación*, *341*, 123-147.

Biographical notes

Dr **Fernando Marhuenda-Fluixá** is a full university professor at the University of Valencia. He teaches didactics and organisation of VET and social education, as well as on the social economy and coordinates the research group *Transicions*.

Dr **María José Chisvert-Tarazona** is a professor at the Department of Didactics and School Organisation, University of Valencia. She conducts research on Educational Management, Adult Education and Didactics as a member of the research group *Transicions*.

Dr **Davinia Palomares-Montero** is a professor at the Department of Didactics and School Organisation, University of Valencia. She conducts research on social entrepreneurship and second chance schools as a member of the research group *Transicions*.

Dr **Raúl Tárraga-Mínguez** is a professor at the Department of Didactics and School Organisation, University of Valencia. He was previously a special education teacher. His research interests are inclusive education and teacher education.

VETNET
European Research Network
Vocational Education and Training

Maslo, I. (2022). What are the key elements of classroom practice that meet the super-diverse personalised demands of adult learners in VET? In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 90–99). https://doi.org/10.5281/zenodo.6976672

What are the Key Elements of Classroom Practice that Meet the Super-Diverse Personalised Demands of Adult Learners in VET?

Maslo, Irina
irina.maslo@lu.lv, University of Latvia

Abstract

Context: Adult educational practice doesn't adequately promote adult participation in VET in Latvia. One of the obstacles is the discrepancy between the offer provided by VET and the demand adults can accept. This issue is significant from an international perspective.
Approach: The holistic, inclusive approach of this study implies three interconnected sub-systems of universal, selected and indicated personalised needs of VET learners, recognising a range of super-diverse needs of young adults that are not just academic and professional (particularly in dual VET practice).
Findings: The findings of the study reveal the "resistance theorists' perspective": students react to the form rather than the substance of schooling. This is evident in young adults' narratives, which appeal for changes in schooling organisation, discover the key elements of the process of schooling and its crucial didactic design elements, guiding the learning classes towards understanding subject-matter content in a way that helps the students to think and participate in productive dialogue with teachers, encouraging young adults to embed the acquired school-matter-knowledge in their own work and life.
Conclusion: he key elements of classroom practice that meet the super-diverse personalised demands of adult learners in VET may affect their attitudes toward learning and, in turn, their learning behaviours. All of this means that the analytical results of the current study will be of interest to a wide range of VET stakeholders where the value of adult learning is central.

Keywords: young adults in VET, super-diversity, personalised learning, good classroom practice

1 Introduction

Adult education professionals working in formal VET educational structures with diverse educative patterns and various professional practices should be better equipped to meet the demands expressed by adult learners with fewer opportunities to combine education, training, employment, and family. Adult educators' mission is to contribute to mobilising the potential of these learners by the employment of an alternative cultural schooling perspective in classroom practice, which would enrich all learners faced with many challenges in their personalised social and cultural life and work contexts and better support them all in a world that is increasingly diverse.

Several psychological studies have been conducted in recent years, with Downes (2014) mapping them with a holistic approach that **"**addresses why people are reluctant to engage in education and training**"** (p.4) investigated in the context of the need to implement a new holistic structural system of preventive measures. This paper considers these issues, presenting evidence from secondary analyses of low-educated and low-skilled adults' narratives who

frequently struggle to maintain their lives, are disoriented in life and at work, and have low self-esteem.

The secondary analysis of the interviews was conducted in the Asian and European Lifelong Learning (ASEM HUB LLL) perspective in 2011–2015 in the framework of the Latvian National Research Program project "Identification and Analysis of New Challenges and Solutions that Have Influence on Engagement and Reintegration of Adults (18–24 years old) in Lifelong Learning" funded by the ESF project "Support to Education Research" (sub-activity 1.2.2.3.2.), and in 2016–2019 of the interviews of 18–26-year-old young adults) in the Horizon 2020 project "Adult Education as a Means for Active Participatory Citizenship" (EduMAP Grant agreement ID: 693388), in relation to the research question: "What are the key elements of classroom practice that could support adult learning in VET?"

In both investigations (Maslo & Fernández González, 2015; Pata et al., 2021), the "voices" of young adults were analysed in terms of the situation "one is in, why one is in it, and what one can do to get out". We found evidence that a set of complex and multifaceted reasons to reject traditional schooling and we identified the need to implement a targeted preventive strategy and to transform subsequent lifelong learning opportunities.

The paper will discuss the kind of support adult educators need to ensure in order to provide confidence and hope to adult learners who might feel lost, misunderstood, or even abandoned by the VET formal or non-formal education system.

The first chapter will focus on the theoretical definition of super-diversity of personalised learning demand and then discuss the methods to answer the question of how aspirations of low-skilled young adults in Latvia contribute to a successful pathway towards VET education.

The following chapter will describe the key elements of classroom practises that could support adult learning in VET.

Finally, a concluding discussion will be initiated.

2 Super-Diverse Personalised Demands of Adult Learners in VET

The theoretical and methodological approaches to understanding the range of super-diverse needs of young adults that are not just academic and professional and the demands of adult learners in the transformation of schooling in VET are being considered in this paper chapter. Increasingly, literature reviews (e.g. Minns & McFadden, 2000) emphasise that young people have diverse needs. This has enabled a conceptual approach to addressing young people's unmet needs and recognising the diversity in their experiences (e.g. Stokes, 2000), which has made a significant contribution to a holistic, inclusive approach (Dwyer et al., 1998) in transnational perspective and particularly in Latvian education practise (Lieģeniece, 1999).

Based on Burkhart (2004) and Downes's (2014), the holistic, inclusive approach of this study implies interconnected sub-systems of personalised needs of VET learners, recognising a range of super-diverse needs of young adults that are not just academic and professional (particularly in dual VET practice). Those are 1) a universal sub-system for a broad educational community-wide system for all VET learners; 2) a selective sub-system for VET learners at high risk of exclusion from vocational education with a high potential for re-entry to VET; and 3) an indicated specialized, individualised sub-system for adults at high risk of exclusion with chronic multiple risk factors. Following this argument, the multi-faceted nature of the super-diversity of personalised learning needs in this paper is understood as diverse combinations of social well-being (self-confidence, mental health, relationships with teachers and peers in the classroom), and relevance to schooling for learners' life and work in their personal situation.

2.1 Understanding of Adult Learners' Schooling Demands in VET

The understanding of the demands of adult learners in VET (1st objective) was explored using the methodology of "perspective discrepancy assessment" on experienced practice. The

theoretical basis for defining the key elements of classroom practice to support adult learning in VET is built on the "organizational concept of perspective" developed by Mezirow (1981), which consists of three components: 1) a definition of the situation one is in and why one is in it; 2) the conditions that are proper and reasonable to engage in given the situation; and 3) "criteria" of judgement value against which people are judged, developed in the notion of "perspective discrepancy assessment" (p.144-145).

A framework for the case studies for the selection of good practise and for the detailed description of good practice was worked out. This was based on the key factors in determining "good practices" (Federighi & Torlone, 2010, p. 56).

2.2 Methodology for Identifying Key Elements of Classroom Practice to Support Adult Learning in VET

An objective hermeneutic analysis approach (Wernet, 2009), in favour of the youth's 18–26 judgments as the creators of real VET practise and research subjects, was chosen. The researcher was tasked with developing a category system using "open coding" (Corbin & Strauss, 1990), which reveals the conceptual framework of the support adult educators must provide to adult learners who may feel lost, misunderstood, or even abandoned by the VET formal education system (2nd objective).

Two hermeneutic analysis strategies were used for this purpose: empathy and assumption formulation. In the first cycle of hermeneutic analysis, the possibility of software word analysis of the judgments was used to understand the judgement as close as possible to the text (word codes). The second strategy revealed what was meant by the "open coding" judgement in the second cycle of analysis (content codes). In the third cycle of the analysis, a meta-code system was created.

To provide answers to the research questions posed in this paper (3rd objective), "What are the key elements of classroom practise that could support adult learning in VET?", the statements were coded (Saldaña, 2016), particular codes analysed, meta-codes created and added to the texts, a meta-codes analysis table was created and implications determined using AQUAD 7 Qualitative Comparative Analyses (QCA) options (Huber & Gürtler, 2012) to inspect the properties of sufficient and necessary conditions in a data frame, most notably, of minimally sufficient and necessary conditions that appear in cases (Benoît & Ragin, 2008, 63-68; Baumgartner & Thiem, 2015, p. 6).

3 Results

The definition of a range of combinations of super-diverse personalised needs and demands of young adults schooling in VET that is not just academic and professional (1st objective), the conceptual framework of the support adult educators must provide to adult learners who may feel lost, misunderstood, or even abandoned by the VET formal education system (2nd objective), and the key elements of good classroom practise that support adult learning in VET (3rd. objective) were defined.

3.1 Super-Diversity of Personalised Needs of Adults

A set of super-diverse combinations of personalised needs that are not just academic and professional has been found in young adults' narratives. The minimally sufficient and necessary universal, selective, and indicated ones that appear in cases are synthesised in the following matrix, see Table1.

Table 1
Matrix: MetaCode: Personalised Needs of Young Adults

Content Codes	Example quotes
Life and work situation (universal)*	*I started schooling after 5 years of interruption, because I had an important work …Then a child came, and I thought that I should start again from the beginning, in order to be able to study choreography (Interview VYA_15).* *I got pregnant and for two years I did not go to the school. Now I am in 10th grade, my son has 2 years. I study and in parallel I work in a store as seller, I went to some courses (Interview VYA_9).*
Limited possibilities of combining schooling with work (selective)**	*I also discussed other options, but all the other options stopped when I could combine it with work (Interview VYA_4).* *… Of course, I was also very busy at work, so I didn't finish. I don't get along with those long projects. If there was some two-year training or something I do now (Interview VYA_10).* *If I have to work in parallel, I have not really much time at home for homework. I have many other things to do during the day (Interview VYA_16).*
Rejection of traditional schooling (indicated)***	*Too many lessons; necessity of going to school for face-to face lessons every day (Interview VYA_15.)* *Homework overload, where the accent is on homework not on working during the lessons, which does not allow the combination of schooling and hobbies and free time (Interview VYA_29.).* *Tension on achievement, and therefore giving priority to more successful students rather than promoting the learning success of all (Interview VYA_24).*

* Adult learners who return to education and training later in life do so for a variety of subjective and objective reasons, including the birth of a child, army obligations, previous learning experiences, and an unwillingness to learn.
** It is necessary to mention the limited possibilities of combining schooling with work, mainly because there is no school sometimes close to home, due to living in a rural location or by getting a job abroad, not always for earning money, but spurred by the need to feel like an adult or to get work experience.
*** This results in the missed opportunity of success in self-development and the dominance of compulsory learning over voluntary learning, which is based on the individual's desire to learn new things; a lack of opportunities to learn from mistakes, which is a good way to success in learning instead of just counting mistakes in the exams for the purpose of marking (dominantly bad grades); a low social impact of learning outcomes; not getting a better salary; no advancement/promotion in career; and the absence of timely formative feedback on learning quality.

Some similarities permeate all three adults' judgments. These are 1) the value of education as a "criterion" of judgement (value standards by which adult learners have judged their personalised needs); 2) the existence of a transformative learning environment in the family, friends, community, or workplace, and in particular at vocational school (transversal personalised needs).

3.2 Adult Learners' Schooling Demands in VET

A set of super-diverse combinations of personalised demands of adult learners in VET has been found in young adults' narratives, which has to be mentioned in VET. The minimally sufficient and necessary ones that appear in cases are synthesised in the following matrix, see Table 2.

Table 2
Matrix: MetaCode: Adult Learners' Schooling Demands in VET

Content Codes	Example quotes
Organisation of schooling*	*The Vocational high school was the only one that offered studies in the evening, say in the afternoon around it. Classes started at four until about nine or ten, and then it was possible (Interview VYA_25).* *Give more connection with some kind of enterprise so that all that was learned goes somewhere afterwards (Interview VYA_7).* *We have actively used e-mail, Skype, face-to-face discussions, and mobile phones. free of charge, available materials and possibilities to use universities' web access to scientific databases, use libraries, use educational materials, I-net, books, collaboration, previous knowledge and practice, scientific web-based portals, participating at web-conference sessions (Interview VYA_2.)*
Didactical design**	*The main thing that you learned, and not the fact that you were present in every lecture, and not that all your home tasks are done, is that you know, you understand, and can (Interview VYA_3).* *We were from 18 to 29 years old, in case you didn't know, and this is a huge difference. Sitting there on a school bench with their members of the course, this really is a huge difference. Why do we all have to be equated with 18 years old? It just does not work for 25-year-olds. This was a distinct childhood approach... academic and professional education are completely different approaches (Interview VY_30).* *I learned that working while studying at the same time has many advantages. Students can implement what they have learned in their practical work. So, they can see how it works and reflect on whether it is a good way to learn, react, or behave for them and how it is for the learners. If it is helpful, you have in mind what you have learned and can try it directly and don't have to be informed again when you want to exercise it later (Interview VYA_5).*
Process of schooling ***	I referred to my real practice, analysed and structured it. The structured critics from my group mates gave me so many useful goals for the future and many ideas for my *practise* improvement (Interview *VYA_23*). *I think you can learn every day on the streets. There are people who have never attended school but have learned a lot in their lives by doing their jobs. You feel you have learnt it when you use it in your life (Interview VYA_10).* *I learn from my own mistakes and other people's mistakes. The more they do wrong, the more I do right. If I meet a smart person, I feel the need to learn. I feel that I have learnt something when I can say something that I thought was unknown (Interview VYA_21).*

*Face-to-face, online, or web-based communication is an excellent medium for facilitating social relationships among diverse adult learners. This will help the low-skilled adult learners to maintain their sense of trust or confidence with others since their own point of view is acknowledged in the learning community, developing a sense of collaboration in VET and with enterprises.
** Guiding rather than instructing the learning community toward understanding subject topics in a way that assists adult learners in clarifying their thoughts and participating in a productive work-based dialogue, encouraging them to explore new real and future life and work-related knowledge, creating good relationships with other course participants to enhance their sense of belonging, and positioning themselves critically in the learning community.
*** In particular, a learning environment that facilitates learning only emotionally but not socially is unhelpful – adult VET education must be adult-learner-centred rather than child-centred. Adults need to be able to communicate with the teacher as an equal 'learning partner' (learning in dialogue with the teacher as an experienced colleague).

3.3 Important Aspects of Organization of Schooling

The key organisational aspects of support of adult learning that facilitate the engagement of young adults in learning are:

Aspect 1. The learning process has to be organised as a combination of distance learning and blended learning that takes place in different mental, virtual, interpersonal, and physical locations; as motivational, facilitative, and compensatory lessons; and/or as a summary text, presentation of images, or statistical information using interactive learning materials such as videos, demonstrations, etc.

Aspect 2. The organisation of individual, peer and group consultations simultaneously (synchronously) and at different times (asynchronously), using not only e-exercises, e-tasks and e-tests (basic elements of distance learning), but also through collaboration and interaction between adult learners and teachers as adult educators in forum discussions, Skype conferences, chat rooms and surveys (new key elements of an e-learning culture)

Aspect 3. The following opportunities have to be provided for adult learning:

- To learn individually at a pace and time that suits you;
- To combine work and study, for example, by living and working in another country;
- To schedule your own study time;
- To communicate online, as face-to-face attendance is not mandatory;
- Instead of discussing issues with classmates, you should discuss them with people from VET, local communities, and businesses.
- To choose learning resources and learn according to your needs and abilities;
- To acquire new knowledge, develop skills, and demonstrate one's competence in various work and life situations.

3.4 Crucial Didactic Design Elements

Based on the analysis, the implicit key elements for creating cultures of didactic support, oriented to the acquisition of learning outcomes, were unfolded. These key elements indicate the path towards an innovative culture of modernisation of education in a lifelong learning context.

The following key elements of didactic culture were unfolded:

Step1. In this first step, it is important to encourage learners to develop a sense of community:

- To keep the discussion focused on relevant issues that will help the youth learn from the feedback provided about their learning strengths and weaknesses;
- To communicate clearly about the topics and practical tasks of important subject matters;
- To provide clear guidelines instead of instructions on how to participate in learning activities and on the important deadlines for learning activities;
- To identify the topics that facilitate learning among young adults.

Step 2: Guiding the learning community toward understanding subject topics and tasks in a way that assists learners in clarifying their meanings and participating in productive dialogue, encouraging adults to explore new knowledge, build good relationships with other course participants to increase their sense of belonging, and position themselves critically in the learning community, enriching it with their differences.

Step 3. Face-to-face, online or web-based communication is an excellent medium for facilitating social relationships where the adult learners feel socially comfortable. This will help them to maintain their sense of trust or confidence with others since their point of view is acknowledged in the learning community by developing a sense of collaboration.

Step 4. The use of problem-solving activities in the learning process increases the young adults' interest in subject issues, provokes their curiosity, and motivates them to explore content-related questions and use a variety of sources of information for exploring the problems

posed. Brainstorming and finding relevant information help young adult learners solve content-related questions.

Step 5. Face-to-face, online or web-based discussions are valuable in helping young adult learners appreciate different perspectives. Combining new information with previous knowledge will help them to answer practical questions raised during the learning activities more effectively. In this way, their competencies in constructing explanations and solutions and reflecting on subject content will also increase. This will lead to a better understanding of fundamental concepts and will enhance their ability to formulate their own questions and to test and apply in practice the new knowledge they have created.

3.5 Key Elements of the Process of Schooling

The course e-environment has to be designed to support young adults' self-directed independent work by providing broad interactive individual and collaborative e-learning opportunities (via Group-Skype/WhatsApp/ZOOM/Teams, instant messaging, group and joint forums) for active participation in the pedagogically guided course activities of interconnected course sessions/modules.

In self-directed small and peer discussions on work and life situations-oriented inter-disciplinary subject matters topics, the specialised knowledge in specialisation fields for developing new ideas or processes at the forefront of work or study contexts, including research of learners' knowledge, skills, and competences, will be discovered. Active participation in video lectures, live lectures presented on Zoom and recorded prone to dropping out, webinars, and practical virtual activities, directly related to the formulated learning outcomes, will be ensured through effective guiding of young adults' self-directed learning.

The facilitators' staff (teachers, entrepreneurs, etc.) will provide effective pedagogical leadership of individual and collaborative practical activities instead of teaching, ensuring objective and subjective conditions for adult self-directed learning and the achievement of their course's internationally recognised learning outcomes:

3.6 Guidelines for students

Involve yourself in small and peer discussion groups related to session/module units on discovering the specialised knowledge skills in specialisation fields for the development of new ideas or processes at the forefront of work or study contexts, including research of your knowledge, skills, and competences related to learning outcomes assessment questions:

- integrate your informal knowledge of ITC in the studies using Group Skype/WhatsApp/ZOOM/Teams/etc., instant messaging, group-and joint-forums;
- develop and demonstrate your intrapreneurship in collaborative deep studies of the module units' content resources by strengthening the collective capacity of group-mates by creating small and peer-discussion groups for discovering the work or life situation-related issues;
- demonstrate personal involvement in mastering the collaborative activities of small discussion groups and peers;
- demonstrate your participation in the self-improvement of the intended international learning outcomes of peer and small discussion groups;
- demonstrate eagerness and tenacity in transforming project challenges into new learning opportunities;
- giving formative feedback to peers; and making self-assessment of competences using forums and/or self-evaluation-rubrics.

3.7 Guidelines for teachers (trainers/mentors/tutors)

The teacher provides effective pedagogical leadership of collaborative learning versus teaching, ensuring the following objective and subjective conditions for students' successful learning and the achievement of international learning outcomes:

- catalyse the opportunities for integrating students' informal knowledge of ITC into the studies using Group-Skype/WhatsApp/ZOOM/Teams/etc., instant messaging, small groups and joint forums;
- facilitate the development of students' intrapreneurship in the creation of spiritual, physical, and virtual learning spaces for collaborative deep studies of the topic content resources. strengthening the collective capacity of students for small and peer group discussions on specialised knowledge and skills in specialisation fields for the development of new ideas or processes at the forefront of work or study contexts, including research of their knowledge, skills, and competencies related to learning outcomes assessment questions;

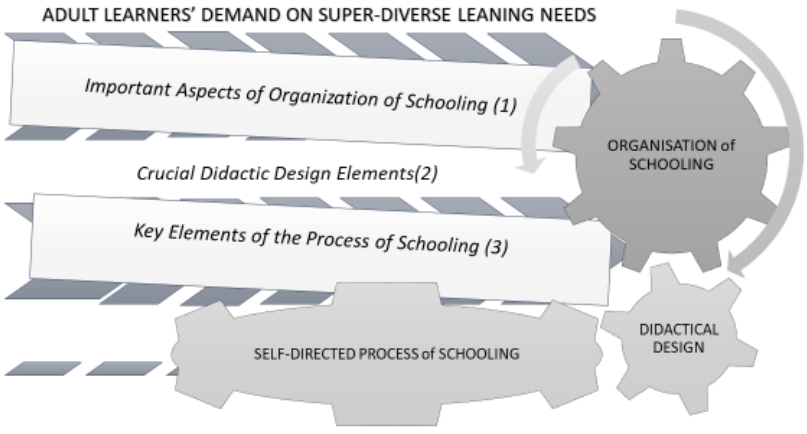
1. support the personal involvement of students in collaborative studies by strengthening learner-to-content interactions in the online learning environment;
2. provide ongoing and timely formative feedback and competency evaluation;
3. demonstrate own self-enhancement in facilitating students' success in learning;
4. facilitate the supportive social climate by strengthening learner-to-instructor and learner-to-learner interactions in the online learning environment.

4 Concluding Discussion

The key elements of classroom practice that support adult learning in VET, referring to the extremely diverse personalised learning needs and learning opportunities demand evident in low-skilled adult narratives, include three essential components.

The implications concern the organisation, didactic and process of facilitating adult learning in general, especially in formal VET, see Figure 1.

Figure 1
Key Elements of Classroom Practice that Meet the Super-Diverse Personalised Demands of Adult Learners in VET



(1) The demand for the creation of the availability of time for learning in direct connection with life phases and the vocational history of low-skilled adults *as important aspects of the organisation of schooling;*

(2) The demand for a variety of learning opportunities linked to super-diverse personalised learning needs to be adequately provided by guiding *versus* teaching the learning classes towards understanding subject topics in a way that helps the students to clarify their thinking and participation in productive dialogue encourages adults to explore new A sense of belonging and a sense of trust or confidence since their point of view is acknowledged by others, helps to develop a sense of collaboration that leads to understanding fundamental concepts and the ability to describe the ways to test and apply the created knowledge and develop solutions that have to be applied in practice *as crucial didactic design elements*;
(3) The demand for productive classroom experience (related to work and daily life, based on less formal and embedded methods, based on codified knowledge which the subject does not yet possess, which is in use in his/her life or work environment) in favour of "learning in dialogue", preferring to learn from experienced, life-wise people, most of whom are teachers, and technological learning frequently affected by social instead of emotional wellbeing *as key elements of the self-directed process of schooling of adults*.

To meet the universal, selective, indicated, and transversal personalised learning needs of adult learners, a complex set of pedagogical measures must be implemented as a holistic system in which vocational education as a value is central in creating a family, school, and workplace community learning culture.

Support cultures of transformational learning opportunities have to be seen as key, as a kind of learning where learning outcomes are reached. In this sense, the positive learning experience of changing the organisation, process and didactic of schooling has an important role.

The results of the secondary analysis of the findings of international studies presented in this paper may contribute to pedagogical knowledge in widely differing fields. The results could also be of interest regarding the theoretical framework and methodology of the presented analysis, with its unique combination of the theories of super-diversity of personalised learning needs of adults at risk of exclusion from education and training, adult learners' demand for inclusive classroom practices, and the evaluation of these, for anyone interested in professional development.

References

Baumgartner, M., & Thiem, A. (2015). Identifying complex causal dependencies in configurational data with coincidence analysis. *The R Journal*, *7*(1), 176. https://doi.org/10.32614/RJ-2015-014

Burkhart, G. **(**2011). Prevención ambiental de drogas en la Unión Europea. ¿Por qué es tan impopular este tipo de prevención? *Adicciones*, *23*(2), 87. https://doi.org/10.20882/adicciones.151

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, *13*(1), 3–21. https://doi.org/10.1007/BF00988593

Downes, P. (2014). *Access to education in europe*. Springer Netherlands. https://doi.org/10.1007/978-94-017-8795-6

Dwyer, P., & Wyn, J. (1998). Post-compulsory education policy in Australia and its impact on participant pathways and outcomes in the 1990s. *Journal of Education Policy*, *13*(3), 285–300. https://doi.org/10.1080/0268093980130301

Federighi, P., & Torlone, F. (2010). Low skilled take their qualifications "one step up". Firenze University Press. https://doi.org/10.36253/978-88-6453-179-3

Harshman, J. (2013). Resistance theory. In J. Ainsworth (Ed.), *Sociology of education: An a-to-z guide* (Vol. 1, pp. 654-655). SAGE Publications. https://dx.doi.org/10.4135/9781452276151.n341

Huber, G. L., & G*ü*rtel, L. (2012). Manual for the AQUAD 7 software (first published in 2003). Ingeborg Huber Verlag. http://www.aquad.de/E_Manual7.html

Lieģeniece, D. (1999). *Kopveseluma pieeja audzināšanā [Holistic approach to upbringing]*. RaKa. http://www.e-raka.lv/katalogs/book-9921

Maslo, I., & Fernández González, M. (2015). *Supporting the engagement and reintegration of 18-24-year-old*

early school-leavers in lifelong learning: Evidences for targeted compensatory and preventive strategy in education. University of Latvia, Faculty of Education, Psychology and Art, Scientific Institute of Pedagogy. http://www.pzi.lu.lv/publikacijas/2013-2015-gads/2015-gads/; https://asemlllhub.org/wp-content/uploads/2021/06/ASEM_FINAL_2015_riga.pdf

Mezirow, J. (1981). A critical theory of adult learning and education. *Adult Education*, *32*(1), 3–24. https://doi.org/10.1177/074171368103200101

Munns, G., & McFadden, M. (2000). First chance, second chance or last chance? Resistance and response to education. *British Journal of Sociology of Education*, *21*(1), 59–75. https://doi.org/10.1080/01425690095162

OECD. (2019). *OECD skills strategy Latvia: Assessment and recommendations*. OECD. https://doi.org/10.1787/74fe3bf8-en

Pata, K., Maslo, I., Jõgi, L. (2021). Transforming Adult Education from Neo-liberal to Holistically Inclusive Adult Education in Baltic States. In: Kersh, N., Toiviainen, H., Pitkänen, P., Zarifis, G.K. (Eds) *Young Adults and Active Citizenship*, *Lifelong Learning Book Series, Vol 26*. Springer, Cham. https://doi.org/10.1007/978-3-030-65002-5_8

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3E [Third edition]). SAGE.

Stokes, H. (2000). *Out of education: A report for the Victorian full service schools program*. Dept. of Education, Employment and Training, Victoria. https://nla.gov.au/nla.cat-vn2020110

Wernet, A. (2009). *Einführung in die Interpretationstechnik der Objektiven Hermeneutik* (3. Aufl). VS Verlag für Sozialwissenschaften.

Biographical notes

Irina Maslo is a professor in the Department of Education Sciences and Pedagogical Innovation at the University of Latvia's Faculty of Education, Psychology, and Art. Her research relates to designing adult learning facilities in diverse inclusive contexts.

VETNET
European Research Network
Vocational Education and Training

Milovanovitch, M. (2022). System change for lifelong learning: Cross-country digest of policies for lifelong learning in countries of the European neighbourhood. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 100–111). https://doi.org/10.5281/zenodo.6977034

System Change for Lifelong learning: Cross-Country Digest of Policies for Lifelong Learning in Countries of the European Neighbourhood

Milovanovitch, Mihaylo
mihaylo.milovanovitch@etf.europa.eu, European Training Foundation

Abstract

Context: Since 2010, the European Training Foundation – an EU Agency – is partnering with countries in South-East Europe, Central Asia, the Eastern Partnership region, South and East Mediterranean and Turkey for regular biannual reviews of developments in the field of vocational education and training. The latest round in 2018-2021 shows that in all countries, education and training systems are under pressure to find ways to meet the learning demand of a growing number of people – youth and adults - who see their career choices and life prospects challenged by recent developments, such as the COVID19 pandemic. In this context, lifelong learning is seeing a certain resurgence as a priority in the policy and reform discourse of national authorities in these countries. The purpose of our work was to explore whether the creation of lifelong learning opportunities is a priority in the reform agenda of these countries in education and training and if yes, we wanted to investigate the ways in which lifelong learning is influencing reforms in particular in vocational education and training (IVET and CVET).
Approach: Our research is based on an inductive thematic analysis of a total of 26 national reports, 22 bilateral interviews with partner country representatives, and a focus group with international partners. These three sources were compiled into a repository covering the immediate pre-pandemic period (2018-2020), the phase of initial lockdown and provider closures in 2020, and the time of emerging reopening and post-pandemic debate in 2020-2021. We then carried out inductive thematic analysis which returned 5 000 segments of evidence that were deemed relevant for their explanatory power regarding the research questions.
Findings and conclusions: Our findings show that at present, the creation and promotion of opportunities for LLL is gaining in importance, but also that it is still an underdeveloped policy area: the narratives of countries are often dominated by referrals to decades-old legacy systems of adult education and to preservation instead of change and where they refer to LLL in a more forward-looking manner, they do so by declaring LLL as the broader goal of policy reforms, without a clear association with policy implementation actions. Although the countries in our sample do not yet operationalize LLL as a stand-alone area of planning and action, they do devote time and resources to other areas which are essential as the elements of building blocks of a lifelong learning system, such as recognition of prior learning or individualised support for learners. The selection of elements in focus of reform is still quite limited and they are not necessarily well-connected and coordinated yet. This fist into a broader pattern of fragmentation of LLL as a policy domain, which may prevent the planning and coordination of actions and the division of responsibilities. Addressing this fragmentation could be an important step towards promoting LLL as a practical and not only strategic policy solution.

Keywords: lifelong learning, policy reform, COVID19, EU neighbourhood

1 Introduction

1.1 Research Focus

This chapter summarises the findings of a cross-country research[1] by the European Training Foundation (ETF) of policies and actions in support of lifelong learning in 26 countries in South-East Europe, Central Asia, the Eastern Partnership region, South and East Mediterranean and Turkey. A full list of countries covered in the research can be found in Table 1 below.

The purpose of our work was to explore whether the creation of lifelong learning opportunities is a priority in the reform agenda of these countries in education and training and if yes, we wanted to investigate the ways in which lifelong learning is influencing reforms in particular in vocational education and training (IVET and CVET).

We were also interested in the efforts of national authorities and local stakeholders to implement their reform plans in the wake of changing circumstances before and during the COVID19 pandemic, as well as in the policy gaps and lessons to be learned in a cross-country perspective.

1.2 Sources of Evidence

For the preparation of this contribution, we relied on primary evidence from several sources. The first sources were national reports prepared by ETF partner countries in the course of the most recent round (2018-2020) of the Torino Process: a biennial, country-led review of VET in the partner regions listed above. These reports capture the results of structured self-reporting by national authorities and stakeholders regarding socio-economic developments, challenges with human capital development (HCD) and policy responses to these challenges which fall within the remit of VET systems.

In view of the protracted duration of the COVID 19 pandemic, we felt that it is important to generate additional layers of evidence that capture developments after 2020, provide an insight into the changes in policy environments as a result of the public health crisis, and take note of perspectives from an even wider selection of stakeholders in each country. We, therefore, carried out two complementary rounds of evidence collection beyond the national reporting of countries.

The first of these supplementary sources were semi-structured interviews with country representatives who have direct exposure to, and stake in, the success of VET reforms (e.g. national and regional public officials). The interviews took place from December 2020 to January 2021 in an online setting and covered the target of system change reforms, experiences with implementation and translation into professional practice of these reforms, lifelong learning as a policy priority, and imagining the future.

The second source of supplementary evidence was a virtual focus group discussion with international partners in January 2021, which provided us with the most recent evidence. The focus group gathered 24 international experts and representatives of international organisations, such as the British council, GIZ, ILO, OECD, SDC and UNESCO, etc. to discuss along the same lines and themes as their national counterparts did in the course of the interview campaign. The focus group discussion was organised with the aim of gaining the perspective of the donors and matching it to that of the countries.

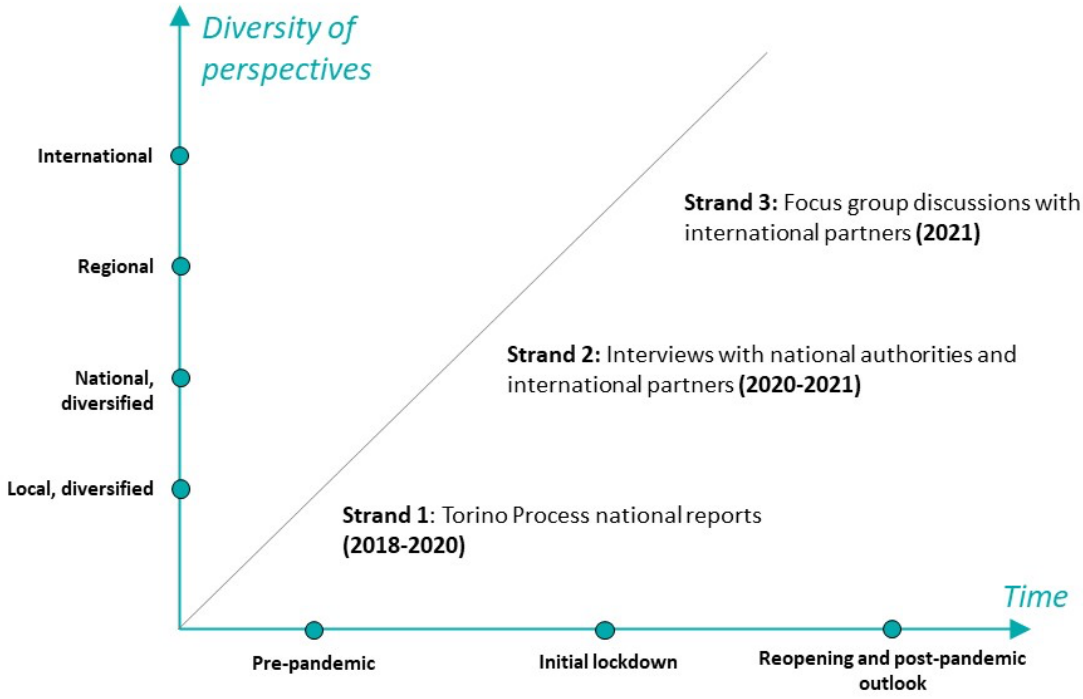
The interviews provided crucial updates about the influence of the pandemic on the shape and progress of policy reforms in VET and education more broadly, while the focus groups' discussion supplied an additional layer of insight into the priorities of the donor and

[1] The full report can be found at https://www.etf.europa.eu/sites/default/files/2022-03/torino_process_cross-country_digest_2018-21.pdf

international expert community regarding system change and anticipated developments and priorities for the future

The evidence from these three sources was compiled into a repository covering the immediate pre-pandemic period (2018-2020), the phase of initial lockdown and provider closures in 2020, and the time of emerging reopening and post-pandemic debate in 2020-2021 (Figure 1).

Figure 1
Cross-country evidence by source and time period



1.3 Method of Analysis

The findings presented in this chapter are the result of an inductive thematic analysis of 26 national Torino Process reports and 22 bilateral interviews with partner country representatives (Table 1), as well as a focus group with international partners, resulting in a total of 2 500 pages of reporting and transcripts, as well as big and administrative data for the period since 2011, which covered the VET sector and the socioeconomic context in which education and training take place.

The units of analysis were segments deemed to be of relevance because they referred – directly or indirectly – to system change in the area of VET which was a) intentional (purposeful) and b) 'live' at the moment of reporting, that is under implementation or planned for implementation.

After narrowing down the data to those of relevance in line with these two features, and after multiple rounds of inductive thematic analysis and negotiations of meaning, we developed a coding system which returned 5 000 segments of evidence that were deemed relevant for its explanatory power regarding three broader questions: 1) What are the system change priorities of countries participating in the Torino Process? 2) Why are countries engaging in system change along the lines of these priorities? 3) How are they implementing these reform priorities and what progress are they making?

Table 1
Sources of evidence: geographic coverage by type of source

	National report	Interview
Albania	x	x
Algeria	x	no
Armenia	x	x
Azerbaijan	x	x
Belarus	x	x
Bosnia and Herzegovina	x	x
Egypt	x	x
Georgia	x	x
Israel	x	x2
Jordan	x	no
Kazakhstan	x	x
Kosovo	x	x
Kyrgyz Republic	x	x
Lebanon	x	no
North Macedonia	x	x
Moldova	x	x
Montenegro	x	x
Morocco	x	x
Palestine	x	x
Russia	x	x
Serbia	x	x
Tajikistan	x	x
Tunisia	x	no
Turkey	x	no
Ukraine	x	x
Uzbekistan	x	x

At the next state, we disaggregated these broad questions into more specific inquires which covered the relationship between reform priorities, including lifelong learning, e.g. whether some reforms tend to be conceived and implemented together with others; which of them lead to challenges and which to success; whether there is an association between reform targets and the likelihood of system-wide implementation; and also what role the international partners play in promoting system change.

This chapter presents a purposeful selection of findings from this rich repository of evidence, which reveal the relative significance of lifelong learning in the process of reform and system change in the partner countries at the time of evidence collection, the strategic significance of LLL as a driver of changes in policy and practice in VET, the interpretation of countries with regard to lifelong learning, as well as some of the more widespread challenges concerning the implementation of policy commitments in this respect.

1.4 Methodological Limitations

Our approach has advantages, such as flexibility of focus and stakeholder involvement, but it also has some important limitations.

The first one is that our findings remain interpretative in nature despite careful consideration and an ample degree of intercoder agreement. The positions, values and judgments of the research team inadvertently influence decisions about the coding which underpins the analysis presented in this contribution. While this can be also seen as an advantage because it provides flexibility and receptivity for different perspectives, the analysis may be susceptible to involuntary bias.

Another limitation is that the Torino Process reporting may vary to a considerable degree between countries in terms of stakeholder participation, the rigour of quality assurance, as well as the degree to which political sensitivities may have influenced the narrative around certain

themes and policy descriptions. The reliability and quality of evidence harvested from the national Torino Process reports may vary between countries, just like the information generated in the course of the interviews and focus group discussion. Therefore, the results of cross-country comparisons should be used with caution.

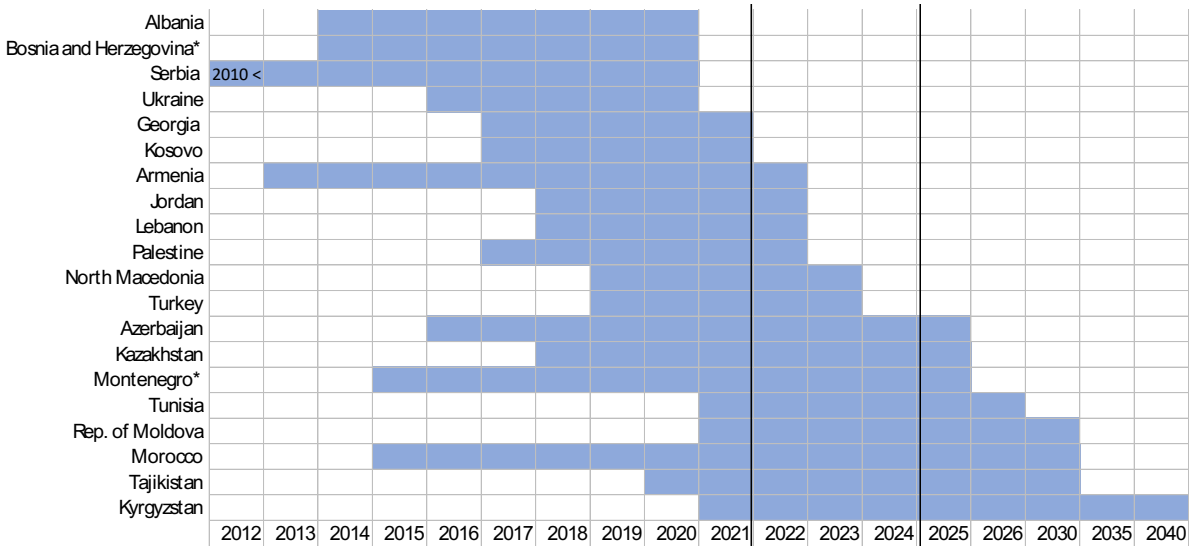
2 The Concept of "Lifelong Learning" in Our Research

As a growing number of learners and workers see their career choices and life prospects challenged by such developments, education systems will have to find ways of opening up and creating new pathways of learning throughout life – pathways which can accommodate the learning needs, circumstances and expectations of unprecedented diversity and number of learners. The cross-country evidence in the previous chapter suggests that this is an imperative especially for workers in sectors at risk who may need up- and reskilling, and for young people and adults more broadly to ensure that they remain employable in a new, digital, and green economy.

This paper cultivates a notion of lifelong learning that draws on this anticipatory, demand-driven perspective. It is aligned with an understanding of lifelong learning as a concept which puts people and their learning needs and settings at the centre of attention. In this sense, lifelong learning refers to any learning activity undertaken throughout life for personal, social and/or professional reasons, which may take place anywhere, anytime and for any purpose of importance to an individual (ETF, 2022)

Much of the evidence collected for this digest confirms that this may be an opportune moment for a structured reflection on how to best create and sustain viable learning opportunities for all who need and want them. At the time we carried our analysis in 2021 for example, the strategic plans for human capital development of most partner countries were about to renew or expire or were at the stage of long-term implementation planning (Figure 2).

Figure 2.
Timing of national development strategies with reference to lifelong learning, ETF partner countries (2021)



Note. Countries marked with an * had a stand-alone lifelong learning/adult education strategy.
Source: (ETF, 2022)

Overall, the Torino Process evidence shows that discussions on how long-standing challenges can be tackled by creating learning opportunities for much wider segments of the population than those usually covered through the formal education system are becoming

increasingly common and mainstream. Most countries thereby consider that the modification of policy and incentive frameworks and practices in education and training is the way to go in this respect (ETF, 2021).

3 Lifelong Learning as a Reform Target/Policy Solution

We opted for a broader, learner-centred understanding of lifelong learning because it reflects the heightened significance of the concept from the policy point of view in ETF partner countries. The concept presents LLL as a flexible, highly adaptable, and wide-reaching policy priority that can be mobilised as a narrative and course of action in response to a number of challenges, in particular challenges that can be traced back to the low or inadequate skills of diverse populations and to the changing skills demand in their environments, as discussed in the previous chapter above.

The broader concept of LLL has advantages also from the methodological point of view because it allows for more flexible interpretations at the stage of coding and analysis of evidence, which accounts for the diversity of contexts, formulations, aspirations and use-cases that the partner countries and stakeholders describe. In this sense, we translated the concept into a two-layered approach to the identification and recording of data of relevance to lifelong learning.

The first layer features segments with direct references to lifelong learning (Type 1 segments), such as that below:

Quote 1: *'Lifelong learning is also an important component of the National Employment Strategy (2017-2019). The political component of the said paper regarding strengthening of the education-employment relationship contains actions to encourage lifelong learning and to create open learning environments.'*

The second layer features segments which do not refer to lifelong learning directly (Type 2 segments), but which describe priorities and actions that fall in the field of lifelong learning in the sense of the definitions above, specifically the provision of opportunities for learning beyond formal education and in response to challenges that may be remedied through learning opportunities for populations that are not within the remit of the formal system. Quote 2 provides a typical example of a Type 2 segment:

Quote 2: *'(The) free education is intended for unemployed and self-employed youth, as well as people who do not have a professional education … persons not admitted to educational institutions looking for work, from among those in difficult life situations and members of low-income families…'*

Despite our conceptual openness, it seems that for most partner countries it is rather early in the process of operationalising lifelong learning as a policy solution. In the vast majority of strategic plans which we reviewed, lifelong learning was not a stand-alone, clearly outlined strategic priority for development yet. Rather, most countries seem to still rely on decades-old legacy systems of adult education, referring to them as lifelong learning in the context of narratives about the preservation and perhaps optimisation of what is already available, and less so in the context of actual change. Quote 3 describes a typical example.[2]

Quote 3: *'Here we failed again, from my point of view. We don't offer lifelong learning, it's adult education that we offer … But the programmes and everything, it's the same curriculum … Of course, for lifelong learning, there are a lot of things that you have to change in programmes and curriculums, it's a different thing, but it depends on the needs of the candidates, whoever is interested.' (Interview with senior official)*

[2] The names of countries are omitted from the quotes on purpose to avoid creating an impression that the chapter singles out specific countries.

The snapshot we extracted from the stakeholder narratives and other data has showed us that, until 2021, none of the partner countries had reported lifelong learning as a solution (policy response) to external and internal challenges. This finding fits into the currently prevailing, broader pattern of limited strategic thinking about lifelong learning as a viable solution and a stand-alone area of policy planning.

However, there are important nuances. Experience from other countries shows that, among the many areas of policy and practice which countries may prioritise, some can be seen as the building blocks or elements of a lifelong learning (eco)system in the sense of an enabling environment for lifelong learning (London, 2011) (UNESCO, 2020). Further examples of such elements include adult learning strategies, qualification frameworks, outcomes-based qualifications, attention to key competences, validation of prior learning, training for jobseekers, better mechanisms for inclusive governance, closer cooperation among all those involved, etc.

Although, for the most part, the partner countries do not yet count lifelong learning as a stand-alone, viable policy area, they do devote time and resources to areas which are essential as elements of any lifelong learning system along the lines of the above. The Torino Process evidence too confirms that certain areas of policy response (the recognition of non-formal and informal learning in Quote 4 or career guidance in Quote 5, for example), are customarily seen as elements of broader, systemic efforts to provide learning opportunities for all in new and better, more accessible environments.

Quote 4: *'Until 2020, the project will develop assessment tools for the recognition of non-formal, and informal learning, determine the stages, procedures and methodology for the recognition of lifelong learning.'*

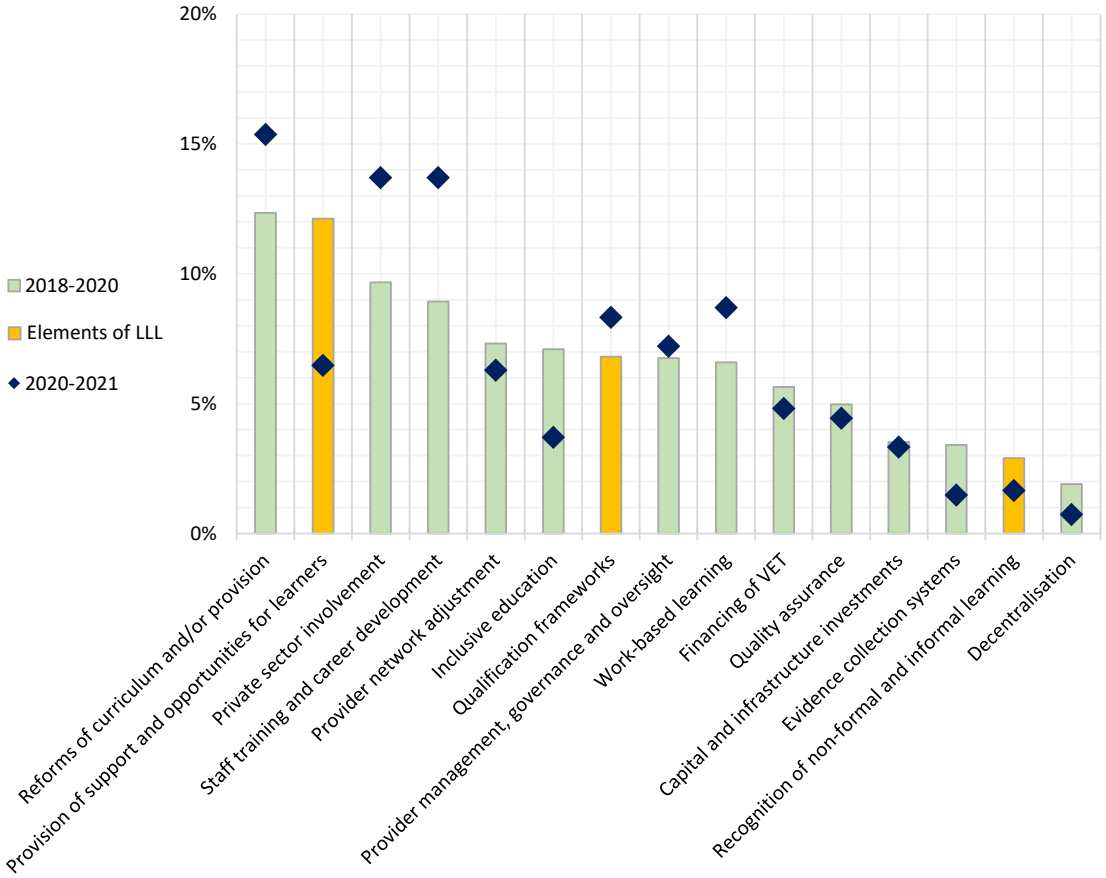
Quote 5: *'In order to promote the approach and participation of adults in lifelong learning, the Employment Agency carries out career guidance programs in vocational schools…'*

The selection of such elements in the 26 countries we covered is still small and includes the recognition of non-formal and informal learning, certain forms of provision of support and opportunities for (adult) learners and aspects of the partner countries' work on establishing and improving their national qualification frameworks (Figure 3).

The evidence also suggests that, as a consequence of the public health crisis, in 2020-2021 most of these areas – which were not among the most prominent to start with – have suffered a setback in terms of time, resources and attention as other policy areas with more imminent problems took precedence as part of the crisis responses of countries. The recognition of prior/informal and non-formal learning (RFIL) became even rarer as a point of reference, and while qualification frameworks remained relatively stable in the list of priority, support and opportunities for learners and adult learners in particular became considerably less present in the overview of key system change reforms provided by the partner countries. Overall, longer-term priorities have given way to more imminent tasks and challenges, such as support for staff, involvement of the private sector in addressing the fallout of the crisis, finding solutions for work-based learning and adapting the study and training content to the new reality.

An important conclusion to be drawn from the interviews is that lifelong learning is highly fragmented in terms of policy planning and action in all partner countries. The creation of opportunities for lifelong learning has not yet been consolidated as an area in its own right, with its own specific goals, solutions and responsibilities for planning and implementation. Perhaps it is understandable that in times that call for trade-offs, such as the pandemic, areas of relevance for lifelong learning are among the first to be 'downgraded' to make space for other priorities which are more 'mainstream' in terms of vision, planning and commitments.

Figure 3.
Areas of policy response in education and VET by aggregate prevalence, 2018-2020 and 2020-2021



Note. Source: (ETF, 2022)

For the partner countries, tackling this fragmentation may be an important step towards acknowledging lifelong learning as a high-priority, practical policy solution and not only as one aspirational goal among many others. Ultimately, the aim is to add lifelong learning to the field of viable, systemic policy interventions that are seen as pragmatic, sustainable responses to internal and external challenges.

4 Lifelong Learning as a Justification for Reforms in VET

4.1 Overview of Reform Justifications Before and During the COVID19 Pandemic

To document the prevalent justifications for reforms and to understand the relative significance of lifelong learning among them, we expanded our coding system to include the purposes of system change as reported by counterparts in ETF partner countries. Purpose in this sense refers to the reasons they give for the policy interventions presented in the preceding chapter. All sources had an abundance of segments conveying information about drivers of system change from the stakeholders' points of view and how these drivers relate to key values and aspirational goals in education and training, such as boosting access, improving efficiency, increasing the labour market relevance of learning and training outcomes, etc.

The creation of opportunities for lifelong learning may not be yet consolidated as a standalone area of policy action in the partner countries, but it is frequently quoted as a justification for actions in other areas. Our data shows that practitioners, decision-makers, and

stakeholders do refer to it when explaining what they aspire to and what they hope to achieve through various reforms.

In total, the analysis of data revealed seven more shared themes that describe the reform and system change aspirations of the partner countries: promotion of access and participation in VET; promotion of greening and lessening of environmental impact; better labour market relevance of VET outcomes; promotion of innovation and excellence; improvement of quality of education and training; increase in the efficiency of the provider network and its use of resources; and better working conditions for staff in the VET system (Table 2).

Table 2.
Reform and system change aspirations by prevalence, 2018-2020 and 2020-2021

Prevalence of justifications for reform 2018-2020			Prevalence of justifications for reform 2020-2021		
1	Labour market relevance	27.9%	1	Better quality	19.7%
2	Better quality	20.1%	2	Labour market relevance	17.7%
3	Better access and participation in VET	16.0%	3	Promotion and support for AE and LLL	17.2%
4	Promotion and support for AE and LLL	12.6%	4	System efficiency	16.7%
5	System efficiency	11.7%	5	Better access and participation in VET	15.8%
6	Promoting innovation and excellence	5.9%	6	Working conditions for staff	7.4%
7	Working conditions for staff	5.2%	7	Promoting innovation and excellence	5.4%
8	Greening and environmental impact	0.7%	8	Greening and environmental impact	0%

Note. Source: (ETF, 2022)

The evidence we collected suggests that before the pandemic, lifelong learning and adult education were not among the most common reasons for change. Strategic aspirations directly aligned with country commitments to the Sustainable Development Goals (SDGs) were the most prevalent reasons for reform: access and participation in VET; the quality of learning and training; and boosting the labour market relevance of VET programmes. Yet lifelong learning was more common than other, possibly higher anticipated and better established justifications, such as system efficiency, innovation, or the working conditions of staff.

During the public health crisis, the creation of opportunities for lifelong learning has become somewhat more prominent as a driver of change – an observation based on the frequent presence of narratives about the need to create opportunities for lifelong learning for learners outside formal education (see Quote 6, for example). In the period 2020-2021, LLL was the third most prevalent strategic target, while the quality of education and training became the most prominent concern.

Quote 6: *'We have a lot of lifelong learning initiatives during this pandemic period. For example, people who lost their jobs were just insisting on training and so VET schools were organised, and the money was allocated for those courses from the government and from the ministry to retrain people for new occupations, to retrain adult education for particular skills, which are need in this changing world.' (Interview with a civil society representative).*

It may be tempting to interpret this last finding as a testimony of strategic responsiveness in times of crisis, but, in reality, the changes we detected in the data for that period are in part also due to a more balanced, holistic approach to communicating about the reform agenda in countries. The COVID19 crisis forced many of them to reconsider and review their priorities and rearrange their resource planning and in the process of doing that, they recalled the justifications of all of their reform plans, including those that may have started a while ago.

4.2 Policy Solutions Which Promote Lifelong Learning

If lifelong learning is one of the more visible justifications for change, which of the policy responses we recorded in the previous chapter does it justify? In other words, which policy responses are supposed to create and promote opportunities for lifelong learning?

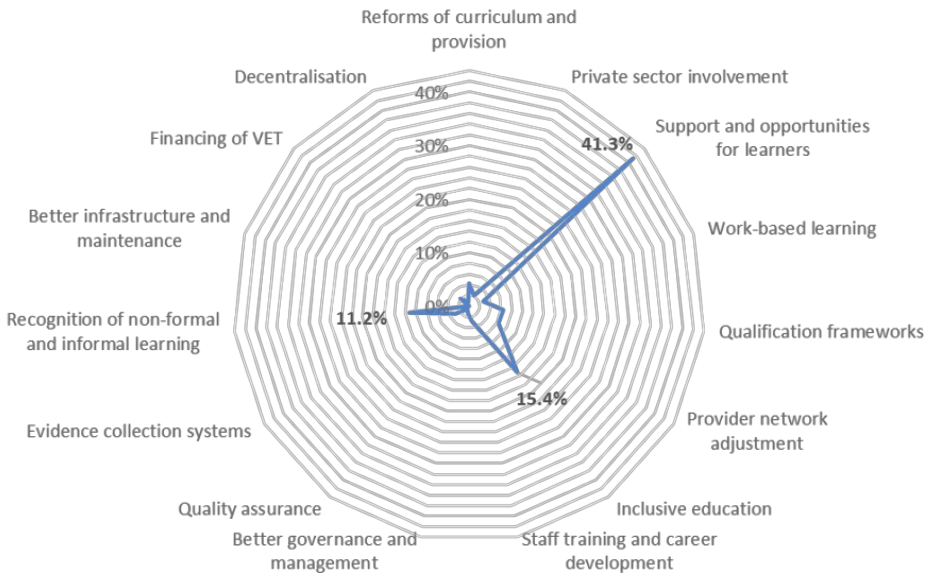
The evidence we collected shows that almost two-thirds of the countries which participated in the last round of the Torino Process have put in place reforms or have committed to reforms which, in one way or another, use lifelong learning as a justification or a long term aspiration: by promoting opportunities for lifelong learning in the form of second chance education, an expansion of the network of providers of adult education, upskilling and reskilling programmes and second chance education opportunities, etc.

Quote 7: *'Another priority is expanding participation in lifelong learning by increasing the number of adults included in second chance education, among others. (…) Certain groups, e.g. rural, people at poverty risk, … have a low attainment level with no prospects of getting a job. (…) The main priorities for lifelong learning include the expansion of the supply of adult education …; inclusion of the lower educated population (this is becoming a priority area of intervention …); the development of an integrated system where learning can happen in different moments and in different forms, using the national qualification framework as a reference.'*

Quote 8: *'Starting from the 2020/2021 academic year, 147 vocational colleges and 143 technical schools will start implementing programmes based on the principle of 'Education throughout life'. Accordingly, the creation of a lifelong education system requires changes that will affect the scale, content and system of delivery of educational services.'*

All references of this type connect to one or more of the reform priority areas described in the previous chapter, although some policies are more readily associated with the creation of lifelong learning opportunities than others. The partner countries refer to lifelong learning most commonly as a justification for reforms that aim at improving support and opportunities for learners overall; boosting the inclusiveness of providers; and establishing viable mechanisms for the recognition of non-formal and informal learning – RFIL (Figure 4).

Figure 4.
Policy responses promoting lifelong learning, by prevalence in national reporting



Note. Source: (ETF, 2022)

Common to all is that, unlike some other areas of justification which address gaps and structural demands within the formal system, such as funding or infrastructure investment, lifelong learning remains the aspiration that is most closely associated with people and their individual needs. It drives change in areas which are meant to address these needs, such as inclusive education and support for additional learning opportunities, etc. So, although lifelong learning may not be a top priority for change, it is the only priority which systematically drives reforms that are meant to benefit learners directly.

Figure 4 shows that – except for RFIL, which is a more technical area – there is a degree of misalignment between what the previous chapter determined are policy areas/responses which count as elements of a lifelong learning system and what each country may consider to be the elements of such a system. One layer of divergence is the relative significance of policy areas in terms of mentions in reports and interviews. Here, the difference is most pronounced in the area of qualification frameworks, which are not as much at the focus of attention as they could or should be considering their role in promoting lifelong learning and in the area of inclusive education, which is much more prominent than anticipated.

There is another, deeper layer of misalignment at the level of substance and thematic scope. With regard to LLL, the declared connection between policy actions and the rationale for these actions is not always justifiable, despite statements to the opposite. For instance, in most segments which describe measures in support of opportunities for learners that are driven by an aspiration towards lifelong learning, the target is limited to initial VET and formal education more broadly.

Limitations such as this are substantial enough to bring into question the extent to which the link between policies and lifelong learning as the goal of these policies is clear and realistic enough. They also raise an important issue: there seems to be a discrepancy between expert interpretations of what lifelong learning is about (which are based on research and internationally communicated practice and experience) and the interpretations of countries, which are based on their own practice and local needs.

This diversity of interpretations also exists between and within countries, which suggests that, despite a widespread consensus about the significance of lifelong learning, no country has yet arrived at a comprehensive and convincing answer to the question of what a lifelong learning system means for them, and what its building blocks are. This is an issue that merits attention.

5 Conclusion

Our research findings suggest that the creation and promotion of opportunities for lifelong learning are starting an advance to the centre stage of the policy discussion in a number of countries – partners of the ETF, as many of them look for ways to address the learning needs of large and increasingly diverse populations and commence with the consolidation of long-term plans in this respect. The national Torino Process reports and the other evidence collected in preparation for this contribution show that lifelong learning is an area of aspiration for development which is most closely associated with people and their needs.

Still, LLL is an underdeveloped area of policy response. The narratives of countries are often dominated by referrals to decades-old legacy systems of adult education and preservation instead of change. Where they go beyond that to refer to LLL in a forward-looking manner, the link between policies and LLL as the broader goal of these policies and actions is rather weak, especially compared to other, longer-standing policy priorities.

Although ETF partner countries do not yet operationalise lifelong learning as a stand-alone area of planning and action, they do devote time and resources to other areas which are essential as the elements of building blocks of a lifelong learning system, such as recognition of prior learning or individualised support for learners. The selection of these elements is still quite

limited, and they are not necessarily well-connected and coordinated yet. This is part of a broader pattern of fragmentation of LLL as a policy domain, which may prevent the planning and coordination of actions and the viable division of responsibilities.

Addressing this fragmentation, for instance, through the development of dedicated strategies or policies, could be an important step towards acknowledging lifelong learning as a strategic yet practical policy solution and not only as one aspirational goal among many others. It is also important as a pre-condition for addressing the system dimension of skills and learning from a lifelong learning perspective. Overall, there is a need to work on accelerating the development of a coherent strategic vision for lifelong learning, which is in line with anticipated demand and country developments.

The "building blocks" approach to lifelong learning, which transpired in the course of the analysis, has some merits too. For those who wish to promote and support lifelong learning as a policy priority, each element of lifelong learning opens a possibility for engagement and action. Seeing lifelong learning as a selection of meaningful, interconnected policy areas can facilitate a well-informed, step-by-step approach to designing and supporting reforms in this domain ("one building block at a time"). The selection could connect to areas where countries are already working and engaging in system change instead of "importing" or imposing lifelong learning as one more policy commitment.

References

ETF. (2021). *Human capital development in SEMED: an imperative for vocational education and training*. Turin: European Training Foundation.

ETF. (2022). *System change for lifelong learning: a Torino Process cross-country digest of policies for lifelong learning*. Turin: European Training Foundation.

London, M. (2011). *Lifelong learning: Introduction*. In M. London (ed.), *The Oxford handbook of lifelong learning* (pp. 1-16). Oxford: Oxford University Press.

UNESCO. (2020). *Embracing a culture of lifelong learning.* Hamburg: UNESCO Institute for Lifelong Learning.

Biographical notes

Mihaylo Milovanovitch is a senior human capital development specialist and content coordinator for system change and lifelong learning with the European Training Foundation, Italy. His current research interests focus on the integrity of education policy and practice, VET and lifelong learning policy monitoring, and the application of blockchain technologies in education.

VETNET
European Research Network
Vocational Education and Training

Moso-Diez, M., Mondaca-Soto, A., Gamboa, J. P., & Albizu-Echevarria, M. (2022). VET, STEM occupational groups and interaction with the local environment in Spain. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 112–120). https://doi.org/10.5281/zenodo.6977258

VET, STEM Occupational Groups and Interaction with the Local Environment in Spain

Moso-Diez, Mónica
moso.monica@gmail.com, CaixaBank Dualiza

Mondaca-Soto, Antonio
amondacas@gmail.com, CaixaBank Dualiza

Gamboa, Juan P.
juan.gamboa@orkestra.deusto.es, Orkestra–Basque Institute of Competitiveness, University of Deusto

Albizu-Echevarria, Mikel
mikel.albizu@orkestra.deusto.es, Orkestra–Basque Institute of Competitiveness, University of Deusto

Abstract

Context: Previous research on VET systems in Spanish regions shows that these systems tend to be grouped in two different clusters, one of them with high socioeconomic performance and better VET supply indicators and the other one with low performance in this regard. Therefore, a question arises as to whether the VET supply factors are favoured in the regions exhibiting highest socioeconomic performance.
Approach: Due to the importance of STEM VET enrolment as a VET supply factor, the current study analyses the relationship between VET students' enrolment in STEM courses and a series of indicators of the regional socioeconomic environment.
Findings: Two contextual (socioeconomic) indicators mainly predict STEM VET enrolment in a positive and significant way: working population aged 16–64, by sector of industry and working population aged 16–64, with VET qualifications in the same sector. In addition, some exploratory analyses show that the general working population in the industrial sector has a higher impact on STEM VET enrolment when the working population with VET qualifications among the industrial workers is also high.
Conclusion: From a wide range of socioeconomic indicators, those related to the demand of STEM qualifications are the most relevant when explaining STEM VET enrolment. Both the relevance of the industrial sector at the local level in terms of employment and the weight of workers with VET qualifications in this sector have a key role in the demand factors influencing the enrolment in STEM VET.

Keywords: STEM, occupational groups, territory, sectoral demand, enrolment

1 Introduction

The characteristics of the education system – and, more specifically, those of the vocational education and training (VET) system – at the provincial level (supply factors) interact with the employment and socioeconomic context (demand factors) to form a broad system (Gamboa et

al., 2020, 2021) in which those supply and demand factors exert a mutual influence on one another, meaning that VET systems must be analysed from a systemic perspective.

Previous research into the Spanish context indicates that regional VET systems are grouped both according to certain aspects of the educational offering and to certain contextual features. This results in two major groups or clusters, one characterised by higher socioeconomic performance and the other by lower socioeconomic performance and certain VET supply features.

In the light of this, the question arises as to whether the VET supply factors in the regions exhibiting highest socioeconomic performance favour this outcome. The previous research referred to indicates that the Spanish regions in this high-performing cluster are characterised by, among other things, supply factors such as the percentage of the population holding a VET qualification, the percentage of VET students enrolled on STEM courses, the percentage of Higher VET students enrolled in Dual VET and the percentage of Higher VET students taking advantage of the mobility options available under the Erasmus Plus programme (Moso-Diez et al., 2022).

Among the supply indicators that characterise the high-performing regions, the percentage of VET students enrolled on STEM courses can be considered a key regional differentiator that may have implications regarding higher regional socioeconomic performance and greater interaction with demand factors. However, it also is clear that certain environmental factors may be driving this greater enrolment in courses covering STEM occupational groups, as well as influencing other elements of VET supply.

In this regard, given the developments in technology, the advance of Industry 4.0, the increase in business digitalisation, the need for the servitization of industry (Kamp & Gamboa, 2021) and the development of knowledge-intensive services (Albizu & Estensoro, 2020), the importance of student enrolment on STEM courses, and those programmes' capacity to drive regional socioeconomic development by meeting a significant part of the local environment's needs and the production base's current demands, becomes evident. This is because the STEM occupational groups identified by STEM Euskadi (2018) are groups in which the training generates high added value and contributes to the development of advanced services, covering areas of knowledge such as Building and Civil Works; Electricity and Electronics; Energy and Water; Machine Manufacture; Image and Sound; Food Industry; IT and Communications; Equipment Installation and Maintenance; Wood, Furniture and Cork; Chemistry; and Transport and Vehicle Maintenance.

Therefore, the objective of this paper was to analyse the relationship between VET students' enrolment in STEM courses and a series of indicators on the regional socioeconomic environment, such as regional GDP per capita, regional population size, the population aged 15-19, the population aged 25-64 with low educational attainment, the working population aged 16-64 in highly qualified occupations, the working population aged 16–64, by sector of industry; working population aged 16–64, by sector of industry with VET qualifications; companies with ten and more employees, the employment rate among the population aged 16-64 and the proportion of people neither in employment nor in education and training (NEET). In order to tie this analysis to local context, given that demand for VET is local in nature, this paper studied the situation at provincial level, analysing the key and specific factors of the socioeconomic context for the prediction of the enrolment in STEM VET. This analysis provides a greater depth to the understanding of the relationship between VET supply and demand.

This research is innovative, as although there have been some empirical studies into industrial occupational groups, these have focused more on the state and sectoral levels (Diaz-Chao et al., 2021a, 2021b). To the best of our knowledge, this paper offers a novel analysis at Spanish level.

5.1 Methodology

In order to analyse the key socioeconomic aspects for the prediction of the enrolment in STEM VET we built upon the systemic framework and methodology for data gathering developed by Moso-Diez et al. (2022). These authors characterized a "comprehensive pillar-based supply-demand framework" (p.127) where both skills, qualifications and VET supply and VET environment and demand are considered when analysing VET systems at the regional level. Both supply and demand factors were analysed in terms of several pillars which, in turn, were operationalised in terms of several indicators measured through secondary data sources on Spanish VET. These indicators are presented in a Web platform called Observatory on Vocational Education and Training in Spain within a wide time frame.

As mentioned before, the study published by Moso-Diez et al. (2022) found that after analysing the regional VET systems using their comprehensive framework, Spanish regional VET systems can be grouped in two main clusters where regional socioeconomic factors are key for their configuration. Therefore, regions with a better VET environment, demand and socioeconomic performance were also characterised by better performance in VET supply indicators as a higher enrolment in STEM VET.

This higher VET demand and socioeconomic performance were basically defined by a higher GDP per capita, higher size of the enterprises, higher working population by sector of industry, higher social security affiliation rate among VET graduates, lower rate of early leavers from education and training, lower NEET rate and lower unemployment rate both among the general population and among VET graduates.

In the current study, we extended the set of indicators analysed in the study by Moso-Diez et al. (2022) and modified some of them in order to get all the indicators at the provincial level. This regional level (NUTS 3) is considered more accurate for analysing the relationship between VET demand and supply factors than the autonomous community level (NUTS 2). We started using a wider list of indicators (32), that was refined after analysing how many of them showed a normal distribution and the indicators that showed some problems in terms of statistical representativeness and high correlations with other indicators included in the set.

The final set of context indicators, their definitions and the expected relationship with the STEM VET enrolment are presented in Table 1. In the present study STEM VET enrolment is defined as the percentage of students enrolled in the STEM occupational groups over the total number of students enrolled in VET at the provincial level. As we mentioned, STEM occupational groups were identified following the approach by STEM Euskadi (2018).

Table 1.
Final set of indicators included in the study to characterise the provincial context of VET and its expected impact on STEM VET enrolment.

Indicator	Definition	Expected relationship
GDP per capita (2019)	It is the amount of wealth that is created in Spain's provinces divided by the total number of inhabitants of that region.	The higher the GDP the higher STEM VET enrolment.
Regional population size (%) (2021)	People who live in each province as a percentage of the total population of the country	The higher the provincial population the higher VET and STEM VET enrolment.
Population aged 15-19 (%) (2021)	Population aged 15-19 as a percentage of the total population in the province	The higher the young population of the province at theoretical age for following VET courses the higher STEM VET enrolment
Population aged 25-64 with low educational attainment (%) (2021)	Population aged 25-64 whose educational attainment is less than primary, primary, and lower secondary education as a percentage of the total population aged 25-64	The higher the population with low educational attainment the lower STEM VET enrolment due to the low educational level in the territory

(continued on next page)

Working population aged 16-64 in highly qualified occupations (%) (2021)	Employees population aged 16-64 in highly qualified occupations (ISCO 1-3) as a percentage of the employees' population aged 16-64	The higher population in qualified occupations the higher STEM VET enrolment due to a higher demand and social recognition of STEM qualifications
Working population aged 16–64, by sector of industry (%) (2021)	Employees population aged 16-64 in the industrial sector as a percentage of total employees' population aged 16-64	The higher population working for the industrial sector the higher enrolment in STEM VET due to a higher demand of STEM qualifications highly related to the industrial activities. This situation denotes a more sophisticated economy
Working population aged 16–64, by sector of industry with VET qualifications (%) (2021)	Employees population aged 16-64 in the industrial sector with VET qualifications as a percentage of total employees' population aged 16-64 in the industrial sector	The higher population with VET qualifications working for the industrial sector the higher enrolment in STEM VET due to a higher demand of STEM VET qualifications at the industrial enterprises and a higher recognition of them at the societal level
Companies with ten and more employed people (%) (2021)	Companies with ten and more employed people as a percentage of the total amount of companies	The higher proportion of companies which employ 10 or more people the higher enrolment in STEM VET due to a higher sophistication of the enterprises and their relationship to STEM qualifications
Employment rate of the population aged 16-64 (2021)	Employed population aged 16-64 in any productive as a percentage of the total population aged 16-64	The higher employment rate in the province the higher enrolment in STEM VET mainly due to a more stimulating labour market based on value added activities where STEM occupation is demanded
Population aged 15–29 neither in employment nor in education and training (NEET) (2021)	Population aged 15-29 not employed and not involved in further education or training as a percentage of population aged 15-29	The higher NEET rate the lower enrolment in STEM VET due to the lack of motivation of young people for following training, VET courses and more concretely, STEM VET courses. The last is hypothesized because the higher complexity and demanding nature of STEM education in comparison to other fields.

2.1. Analytical approach

In order to identify the socioeconomic characteristics of the Spanish provinces (N=52) that contribute in a significant way to the explanation of the enrolment in STEM VET, a hierarchical regression analysis was conducted by means SPSS program.

Every indicator or set of indicators was introduced in the regression equation in separate steps starting with those considered more important for the explanation of STEM enrolment. This analytical approach allows us to know the amount of variance of the dependent variable which is explained by indicators introduced in every step once the "effect" of the indicators introduced in the previous steps has been "isolated". GDP per capita was introduced in the first step as a control variable because it was expected to explain an important portion of the variance. In addition, GDP per capita could predict or be predicted by the dependent variable.

Those indicators related to the population size were introduced in the second step. The educational attainment level of the province was introduced in the third step. The sophistication of the provincial activities (population performing highly qualified occupations) was introduced in the fourth step. Those indicators of the importance of industrial employment in regional employment and the importance of the VET qualifications in industrial employment were introduced in the fifth step. The proportion of enterprises that employ 10 or more people was introduced in the sixth step. The provincial employment rate was introduced in the seventh step. Finally, the NEET rate was introduced in the eighth step.

Some additional analyses were carried out to explore if the interaction between the two contextual factors that predict STEM enrolment after introducing the whole set of indicators in the regression equation, were more effective for predicting this enrolment than in a separated way. Therefore, a moderated hierarchical regression analysis was conducted to this aim.

6 Results

Table 2 presents the correlations among variables under study. The outcome variable (enrolment in STEM VET) and the independent variables (predictors presented in rows two to eleven) show a significant correlation and the expected direction except for the variable "population aged 15-19" which shows a negative and significant correlation with the outcome variable.

Table 2.
Correlations of the variables under study (N=52)

Correlations	1	2	3	4	5	6	7	8	9	10
1. Students enrolled by STEM occupational group (%)										
2. GDP per capita	.475**									
3. Regional population size (%)	-.095	.289								
4. Population aged 15-19 (%)	-.451**	-.176	.159							
5. Population aged 25-64 with low educational attainment (%)	-.558**	-.763**	-.255	.281*						
6. Working population aged 16-64 in highly qualified occupations (%)	.278*	.531**	.548**	.084	-.730**					
7. Working population aged 16–64, by sector of industry	.599**	.620**	-.153	-.307*	-.441**	.136				
8. Working population aged 16–64, by sector of industry with VET qualifications (%)	.421**	.312*	-.163	.024	-.496**	.390**	.210			
9. Companies with ten and more employees (%)	.345*	.677**	.189	.192	-.457**	.395**	.602**	.176		
10. Employment rate among population aged 16-64	.480**	.742**	.086	.,434**	-.622**	.187	.655**	.209	.356**	
11. Population aged 15–29 neither in employment nor in education and training (NEET)	-.577**	-.441**	-.004	.697**	.530**	-.156	-.593**	-.066	-.238	-.662**

Note. (**) The correlation is significant at level 0.01 (2-tailed). (*) The correlation is significant at level 0.05 (2-tailed).
Source: Compiled in-house.

Table 3 shows the adjusted Squared R, the Squared R change, and the significance of change for every model (block of variables introduced in the regression equation). Only variables included in three models make a significant contribution to the amount of explained variance of the enrolment in STEM VET, specifically those models included in step 2: variables related to the general population and young population size of the province $\Delta R^2 = .165$ ($p<.01$); step 3: variable related to the educational level of the population $\Delta R^2 = .059$ ($p<.05$); and step 5: variables related to the working population for industrial sector $\Delta R^2 = .117$ ($p<.01$).

Table 3.
Hierarchical Regression Analysis: Model summary

Model	R	Squared R	Adjusted Squared R	Standard Error	Statistics of change				
					Squared R	F	df1	df2	Sig. F change
1	.475	.226	.210	.06401	.226	14.583	1	50	.000
2	.625	.391	.353	.05793	.165	6.522	2	48	.003
3	.671	.450	.404	.05563	.059	5.050	1	47	.029
4	.673	.453	.394	.05607	.003	.258	1	46	.614
5	.755	.570	.502	.05084	.117	5.975	2	44	.005
6	.762	.580	.502	.05083	.010	1.028	1	43	.316
7	.763	.582	.493	.05129	.002	.223	1	42	.640
8	.766	.587	.487	.05161	005	.482	1	41	.491

Source: Compiled in-house.

Table 4 shows the effect of socioeconomic variables on the enrolment in STEM VET. Some of those variables show a significant effect on the criterion variable. Firstly, as mentioned before, we controlled for GDP per capita in order to know the contribution of other socioeconomic variables more closely related to the demand side of STEM VET. As expected, results show a positive and significant effect of the control variable (β = .475, p ≤.01) that explains an important portion of STEM VET enrolment.

Table 4.
Hierarchical Regression: effects of contextual factors on STEM VET enrolment (N= 52).

Step	**Model**	**Unstandardized coefficients**		**Std. Coefficient**	**t**	**Sig.**
		B	Std. Error	B		
1	(Constant)	.198	.045		4.397	.000
	GDP per capita	6.865E-06	.000	.475	3.819	.000
2	(Constante)	.391	.082		4.779	.000
	GDP per capita	6.725E-06	.000	.466	3.847	.000
	Population by regions (%)	-.499	.344	-.175	-1.449	.154
	Population aged 15-19 (%)	-3.571	1.231	-.341	-2.901	.006
3	(Constant)	.589	.118		4.994	.000
	GDP per capita	2.724E-06	.000	.189	1.113	.271
	Population by regions (%)	-.583	.333	-.205	-1.754	.086
	Population aged 15-19 (%)	-2.887	1.220	-.275	-2.366	.022
	Population aged 25-64 with low educational attainment (%)	-.346	.154	-.389	-2.247	.029
4	(Constant)	.524	.174		3.018	.004
	GDP per capita	2.972E-06	.000	.206	1.182	.243
	Population by regions (%)	-.688	.393	-.241	-1.749	.087
	Population aged 15-19 (%)	-3.148	1.333	-.300	-2.361	.022
	Population aged 25-64 with low educational attainment (%)	-.267	.219	-.301	-1.220	.229
	Working population aged 16-64 in highly qualified occupations (%)	.141	.278	.106	.508	.614
5	(Constant)	.477	.160		2.979	.005
	GDP per capita	-1.517E-06	.000	-.105	-.547	.587
	Population by regions (%)	.032	.420	.011	.076	.940
	Population aged 15-19 (%)	-3.047	1.258	-.291	-2.423	.020
	Population aged 25-64 with low educational attainment (%)	-.188	.207	-.212	-.908	.369
	Working population aged 16-64 in highly qualified occupations (%)	.055	.257	.042	.214	.831
	Working population aged 16–64, by sector of industry	.496	.167	.425	2.959	.005
	Working population aged 16–64, by sector of industry with VET qualifications (%)	.185	.096	.252	1.927	.060
6	(Constant)	.486	.160		3.029	.004
	GDP per capita	-2.600E-06	.000	-.180	-.875	.387
	Population by regions (%)n	.040	.420	.014	.095	.925
	Population aged 15-19 (%)	-3.816	1.469	-.364	-2.599	.013
	Population aged 25-64 with low educational attainment (%)	-.182	.207	-.204	-.877	.385
	Working population aged 16-64 in highly qualified occupations (%)	.032	.258	.024	.123	.903
	Working population aged 16–64, by sector of industry	.401	.191	.344	2.096	.042
	Working population aged 16–64, by sector of industry with VET qualifications (%)	.201	.097	.274	2.068	.045
	Size of companies with ten and more employed people (%)	1.739	1.715	.176	1.014	.316

(continued on next page)

7	(Constant)	.586	.266		2.201	.033
	GDP per capita	-1.810E-06	.000	-.125	-.527	.601
	Population by regions (%)	.093	.439	.033	.211	.834
	Population aged 15-19 (%)	-3.839	1.483	-.366	-2.589	.013
	Population aged 25-64 with low educational attainment (%)	-.224	.227	-.252	-.984	.331
	Working population aged 16-64 in highly qualified occupations (%)	-.032	.293	-.024	-.110	.913
	Working population aged 16–64, by sector of industry	.444	.213	.381	2.080	.044
	Working population aged 16–64, by sector of industry with VET qualifications (%)	.201	.098	.274	2.046	.047
	Size of companies with ten and more employed people (%)	1.449	1.836	.147	.789	.434
	Employment rate among population aged 16-64	-.001	.003	-.099	-.472	.640
8	(Constant)	.597	.268		2.226	.032
	GDP per capita	-8.686E-07	.000	-.060	-.234	.816
	Population by regions (%)	.061	.444	.022	.139	.890
	Population aged 15-19 (%)	-3.082	1.848	-.294	-1.668	.103
	Population aged 25-64 with low educational attainment (%)	-.182	.236	-.204	-.769	.446
	Working population aged 16-64 in highly qualified occupations (%)	-.034	.295	-.026	-.115	.909
	Working population aged 16–64, by sector of industry	.404	.222	.347	1.819	.076
	Working population aged 16–64, by sector of industry with VET qualifications (%)	.211	.100	.287	2.113	.041
	Size of companies with ten and more employed people (%)	1.137	1.902	.115	.598	.553
	Employment rate among population aged 16-64	-.002	.003	-.148	-.664	.510
	Population aged 15–29 neither in employment nor in education and training (NEET)	-.243	.351	-.141	-.695	.491

Source: Compiled in-house.

Secondly, after controlling for GDP per capita, population size variables of the province introduced in step 2 have shown to contribute to the explanation of STEM VET enrolment in a significant way. However, contrary to the expected, only the population aged 15-19 as a percentage of the provincial total population has a significant and negative effect (β = -.341, p ≤.01). Therefore, the higher the percentage of population in the theoretical way of following VET courses, the lower enrolment in STEM VET.

Thirdly, variables related to employment in the industrial sector included in the regression equation in step 5 have shown a significant contribution to the explanation of STEM VET enrolment. In this case, both variables show a positive and significant effect on the dependent variable: general working population (aged 16-64) in the industrial sector (β = .425, p ≤.01) and working population (aged 16-64) with VET qualifications in the same sector (β = .252, p ≤.10, marginally significant). Moreover, when the whole set of contextual variables were included in the equation (step 8), the only variables that remain significant were those related to the employment in the industrial sector.

Finally, a moderated hierarchical regression analysis showed a significant effect of the interaction between the amount of working population in the industrial sector and the amount of working population with VET qualifications in the same sector on the STEM VET enrolment (β = 3.0, p ≤.01).

7 Conclusions, limitations, and future research

Recent literature has shown that socioeconomic and contextual factors are key aspects in the definition of regional VET systems. For instance, Moso-Diez et al. (2022) found that Spanish regional systems tend to be grouped in two different clusters mainly differentiated by socioeconomic aspects (demand side) that are related to specific VET supply characteristics in a "bidirectional" way. Moreover, their work identifies a high-performance cluster and a low-performance cluster. The high-performance cluster is characterized by better socioeconomic indicators such as GDP per capita, mean size of companies, lower unemployment rates, and lower NEET and early leavers rates, among others. At the same time, this high-performance cluster is characterized by better VET supply-side indicators than the STEM VET enrolment. The study by Moso-Diez et al. (2022), however, raises the question of whether a better

socioeconomic performance at the regional level is responsible for a better VET supply or the other way round.

We part from the assumption that STEM VET enrolment is a key factor that is highly influenced by socioeconomic context. Therefore, the aim of the present study was to analyse which contextual factors explain a higher enrolment in STEM VET.

Our results show that, from a wide range of socioeconomic indicators, those related to the demand for STEM qualifications are the most relevant when explaining STEM VET enrolment. More precisely, we found that the higher amount of people working for the industrial sector (from the working population) and the higher amount of people with VET qualifications working for the industrial sector (from the industrial working population) are the most important factors for the explanation of the enrolment in the STEM VET. Although STEM professionals are demanded in other sectors than industry, we base our assumption on the fact that the industrial sector demands VET STEM professionals to a higher extent.

Finally, an additional outcome provided by the moderated hierarchical regression analysis showed that the "effect" of employment in the industrial sector on STEM VET enrolment is higher when the employment with VET qualification in the industrial sector is also high. That means that a higher sophistication of the industrial sector with VET qualifications exerts a higher influence on STEM VET enrolment. This confirms the high relevance of sectoral demand factors for enrolment in VET.

The present study shows some limitations. First, the small number of indicators used to characterise the demand/contextual side of STEM VET due to the lack of availability of indicators at the provincial level. Second, the way in which some indicators have been measured may be inducing non-significant relationships to STEM VET enrolment.

This research is a starting point in this field. Therefore, future research should investigate in a deeper way the contextual determinants of STEM VET enrolment. In addition, future research should enrich the analysis by introducing supply-side indicators which allow to compare the relative importance of VET demand and supply when explaining the STEM VET enrolment.

References

Albizu, M., & Estensoro, M. (2020). The role of vocational training in knowledge intensive business services. Main conclusions. Cuadernos Orkestra 7/2020. Basque Institute of Competitiveness.https://www.orkestra.deusto.es/images/investigacion/publicaciones/informes/cuadernos-orkestra/200027-Role-vocational-trainingknowledge-intensive-business-services.pdf?v=1

Diaz-Chao, A., Moso-Diez, M., & Torrent-Sellens, J. (2021a). VET, value generation and firm results: An empirical exploration from Spanish industrial firms. In M.J. Chisvert-Tarazona, M. Moso-Diez & F. Marhuenda-Fluixá (Eds.). *Apprenticeship in dual and non-dual systems. Studies in Vocational and Coninuing Education, 19*, 265-305.

Díaz-Chao, A., Torrent-Sellens, Moso-Diez, M., & Mondaca-Soto, A. (2021b). La Formación Profesional en Empresa Industrial Española: Hacia la gran transformación digital y sostenible. CaixaBank Dualiza.

Gamboa-Navarro, J.P., Moso-Díez, M., Albizu-Echevarria, M., Blanco, L., Lafuente-Alonso, A., Mondaca-Soto, A., Murciego-Alonso, A., Navarro-Arancegui, M., y Ugalde-Zabala, E. (2021). Observatorio de la Formación Profesional en España: informe 2021: La FP como clave de desarrollo y sostenibilidad. CaixaBank Dualiza.

Gamboa-Navarro, J.P., Moso-Díez, M., Albizu-Echevarria, M., Lafuente-Alonso, A., Mondaca-Soto, A. Murciego-Alonso, A. Navarro-Arancegui, M., & Ugalde-Zabala, E. (2020). Observatorio de la Formación Profesional en España: informe 2020. Madrid: Fundación Bankia por la Formación Dual. DOI: 10.13140/RG.2.2.25612.13448.

Kamp, B., & Gamboa, J. (2021). Industry 4.0 Technologies, Skills, and Training and their Influence on the Servitization of Industrial Firms. In A. Bigdeli, T. Baines, M. Rapaccini, M. Saccini, F. Adrodegari (Eds.), Servitization: A Pathway Towards a Resilient, Productive And Sustainable Future. Proceedings of the Spring Servitization Conference 2021, 10-12 May.

Moso-Diez, M., Mondaca-Soto, A., Gamboa, J. P., & Albizu-Echevarría, M. (2022). A quantitative cross-regional analysis of the Spanish VET systems from a systemic approach: from a regional comparative VET research perspective. *International Journal for Research in Vocational Education and Training (IJRVET), 9*(1), 120-145. doi:10.13152/IJRVET.9.1.6

STEAM Euskadi. (2018). *Estrategia de Educación STEAM Euskadi*. https://www.irekia.euskadi.eus/uploads/attachments/11906/STEAM_Euskadi_aurkezpena_gazt.pdf?1529248652

Biographical notes

Dr **Monica Moso-Diez** is the Head and Principal Investigator of the R&D Centre of a private non-profit foundation (CaixaBank Dualiza), Spain. Her main topics are related to VET system as an innovation ecosystem and sustainability and VET indicators (Spanish VET Observatory).

Antonio Mondaca-Soto is a Senior Researcher in the R&D unit of a private non-profit foundation in Spain. His research interests focus on quantitative methodologies and statistical analysis on VET, highlighting the Spanish VET Observatory (www.observatoriofp.com).

Dr **Juan P. Gamboa** is researcher at Orkestra-Basque Institute of Competitiveness, University of Deusto, Spain. His research focus is on Vocational Education and Training, skills, human capital and employability.

Mikel Albizu-Echevarria is researcher at Orkestra-Basque Institute of Competitiveness, University of Deusto, Spain. His research focus is on employment, knowledge intensive business services and VET and cities development.

VETNET
European Research Network
Vocational Education and Training

Mottweiler, H., Le Mouillour, I., & Annen, S. (2022). New forms of European VET governance in the interplay between the EU-ropean Labour Market and VET Policy? A governance analysis of the EU-ropean taxonomy of skills, competences, qualifications and occupations (Esco). In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 121–131). https://doi.org/10.5281/zenodo.6977267

New Forms of European VET Governance in the Interplay Between the EU-Ropean Labour Market and Vet Policy? A Governance Analysis of the EU-Ropean Taxonomy of Skills, Competences, Qualifications and Occupations (Esco)

Mottweiler, Hannelore
mottweiler@bibb.de, Federal Institute of Vocational Education and Training, Germany

Le Mouillour, Isabelle
lemouillour@bibb.de, Federal Institute of Vocational Education and Training, Germany

Annen, Silvia
silvia.annen@uni-bamberg.de, University of Bamberg, Germany

Abstract

Context: The European Taxonomy of Skills, Competences, Qualifications and Occupations (ESCO) has been developed over the last ten years, in particular with the aim of promoting worker mobility in Europe. With regard to the vocational training systems this raises the question of whether the effects of ESCO will remain limited to labour market mobility or whether the identification of skills needs as well as the definition of occupational skill profiles could also have an impact on the contents of national VET programs. This paper analyses the mechanisms of European governance in the inter-play between European labour market policy and VET policy within the ESCO development and implementation process.
Approach: Methodologically, this paper is based on (1) a document-analysis of European legal acts, resolutions and declarations in the context of the ESCO development and implementation. In order to reconstruct the ESCO governance with the respective roles, tasks and constellations of relevant actors at the national and supranational level, minutes and documents of central European bodies in the ESCO construction process are evaluated in a second step (2). These analyses are complemented by interviews conducted with actors in ESCO construction and ESCO implementation (3).
Findings: Preliminary results show a diverse interweaving of governance forms through binding legal acts, soft legislation and the financial support of implementation programs. On the one hand a rather hierarchical governance through regulations and decisions becomes visible. On the other hand, the coordination process between the European Commission and the member states also includes "soft" forms of coordination through consultation and negotiation.
Conclusion: The findings emphasize on the one hand the project logic of ESCO, on the other, a conflicting logic between education and labour market policy. Initial analyses suggest a greater depth of intervention of European education policy by linking labour market and education policy. In this respect, however, it will be important how and in which manner qualification profiles will be linked to the ESCO occupations and skills. This process has not yet been completed at the present time.

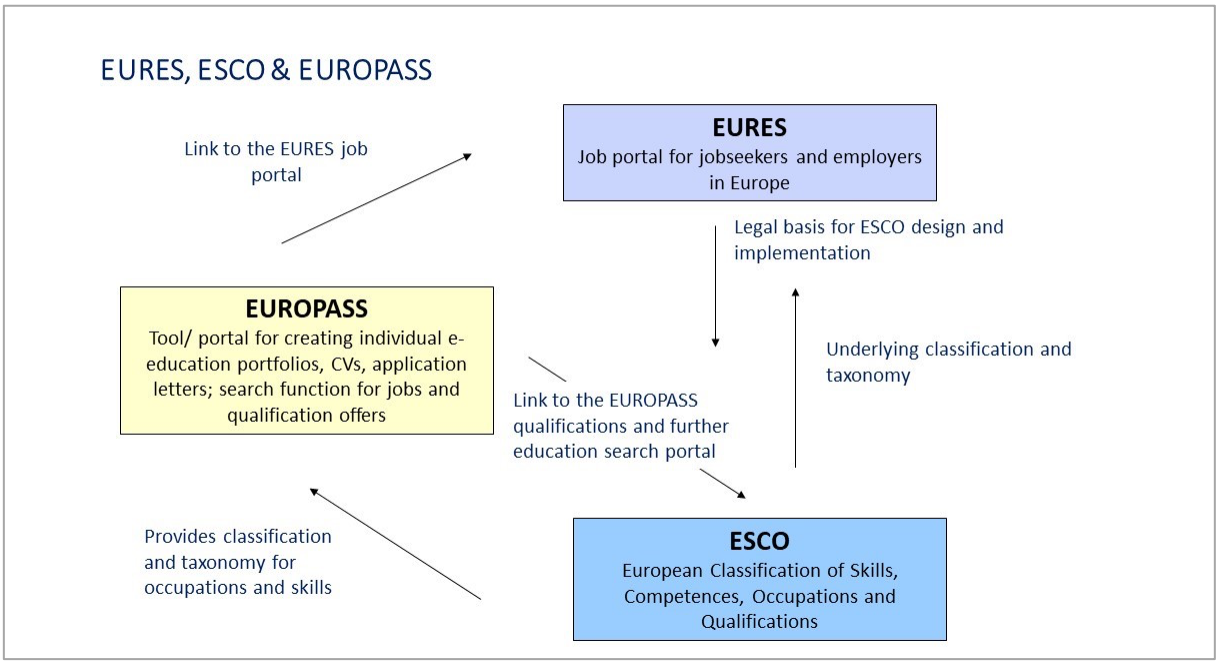
Keywords: Educational Governance, European VET Governance, ESCO

1 Introduction

The European Taxonomy of Skills, Competences, Qualifications and Occupations (ESCO) has been developed over the last ten years, in particular with the aim of promoting worker mobility in Europe (European Commission, 2017; 2018). It intends to make a decisive contribution to this goal by providing Europe-wide comparability of occupations, competences and qualifications. In the context of the "Europe 2020" strategy, ESCO is supposed to provide a classification basis for the main instruments of the European labour market, namely EURES and EUROPASS.

The target groups of ESCO are in particular companies, individuals, training providers, as well as public and private employment service agencies. The main objective is to make formally or informally acquired competences visible, support the search for employment and offer demand-oriented training opportunities (European Commission, 2017). The EURES directive serves as a legal basis for the development and implementation of ESCO as a European-wide classification of occupations, qualifications and skills (c.f. chapter 2). Conversely, ESCO provides the underlying classification for the European employment portal EURES as well as for the EUROPASS. The latter is a portal for creating individual e-portfolios CVs and application letters. Furthermore, it is linked to the EURES portal and therefore offers a search function for jobs as well as qualification offers (cf. Figure 1).

Figure 1
Overview of the Relationship and Interconnection of EURES, ESCO and EUROPASS



Referring to the aim of using ESCO for supporting the identification of relevant skills, competencies, and qualifications it could potentially become a basis for curriculum development (Europaeische Kommission, 2014; Winch, 2021). With regard to the national vocational training systems, this raises the question of whether the effects of ESCO will remain limited to labour market mobility or whether the identification of qualification and skills needs as well as the definition of occupational skill profiles could have an impact on the contents of national VET programs.

The interplay between labour market and education policy aspects, which addresses both national and supranational governance issues, is taken up in this paper. The aim of this contribution is to analyse mechanisms of European governance in the interplay between European labour market policy and VET policy. In this respect, a multi-level analysis of European VET governance is provided. This includes an analysis of which actors and which forms of coordination are relevant in the context of ESCO and how they interact with each other.
The main research questions are:

- Which forms of coordination and control are relevant for the development and implementation process of ESCO?
- To which extent does ESCO as a new transparency instrument lead to new forms of European VET governance – and in particular: Can ESCO be seen as a prototype of new European governance between "hard law" and "soft law"?

To address these questions, the theoretical frame of reference is presented in the second chapter. This is followed by a description of the methodological approach in chapter 3. Chapter 4 contains the research findings. The contribution is finalised by a conclusion in chapter 5.

2 Theoretical Framework

ESCO as a European project includes different forms of governance at the supranational level - and, beyond this, the respective networks of experts and institutions at the European and national levels. The ESCO development and implementation process addresses various governance issues in the interrelationship of national and supranational VET governance. This does not only include the question of the effects of this new transparency instrument on national VET systems on a practical level (Diekmann, 2020). Stakeholders are embedded in institutional regulatory structures, their constellation and modes of interactions evolve and within the ESCO development process committees and experts are becoming increasingly important (Lawn, 2019).

2.1 Coordination and Control

From a theoretical perspective, questions concerning relevant levels of governance as well as evolving coordination mechanisms emerge. Theoretical educational governance approaches lead our analysis of the different modes of coordination as well as the levels of control within the ESCO project.

Educational governance examines control processes in the education system with special consideration of the coordination of action within different actor constellations in complex multi-level systems (Strebel et al. 2019). In this context, diverse institutional regulatory structures and the way in which they become effective for action as well as their impact on the respective system are also considered (Kuhlee, 2017). In particular, the institutional regulatory structures, as well as the constellations of actors at the European and national level, are addressed. The main questions in this respect are which forms of coordination are significant in the context of ESCO and how they become effective.

With regard to the coordination of action as the core element of governance theory analyses, classical educational governance approaches distinguish between different concepts and modes of coordination. These include, among others, basic governance mechanisms of observation, influence and negotiation (Kussau & Brüsemeister, 2007; Schimank, 2007) as well as governance by hierarchy, market, community or network (Altrichter & Heinrich, 2007).

In the context of the ESCO development, this raises the question of the extent to which hierarchical control, e.g. through European legislation in the area of (vocational) education policy, exists or can become effective. In this regard, reference should be made to the principle of subsidiarity and the ban on harmonisation for education in general and VET in particular. VET remains in the remits of national authorities according to the relevant European legislation and

agreements; the diversity of VET systems in Europe stems from specific national or regional socio-economic and cultural factors and conditions. However, the strategic relevance of ESCO for labour market policy measures (and its possible impact on European and national labour markets) may mean that European legislation on VET gets in the long term less relevant. This would imply a shift in the mode of coordination or control of the actors.

Beyond hierarchical control, the governance concept integrates the coordination of action of state and non-state actors in the multi-level system. Since a large number of different actors and institutions at national and supranational levels have been and still are involved in the ESCO development process, this conceptual extension of governance is appropriate, going beyond the preoccupation with authoritarian-hierarchical control (Kussau & Brüsemeister, 2007). At the same time, a multi-level analysis that includes actors below as well as above the nation-state (Do Amaral, 2017) is particularly relevant for the question of the significance of supranational governance effects in the network of relationships between institutional actors and networks at the European and national level.

2.2 Multi-Level System

Educational governance theories (Schimank, 2007; Altrichter & Heinrich, 2007; Kussau & Brüsemeister, 2007) enable the identification of relevant governance levels in the context of ESCO and draw the multilevel framework. The concept of the multi-level system is to be understood as a conceptual culmination and summarising analytical reference point of institutionalised interdependent relationships between actors. (Kussau & Brüsemeister, 2007). The advantage of this concept consists in the inclusion of institutions and actors at different levels as well as their reciprocal relationships. In this regard, different dimensions or levels of multi-level systems are distinguished, for example, a subdivision according to formal levels (macro-, meso-, micro-level) (ibid.,32). For the following analyses in the ESCO construction and implementation process, the concept of "cross-border coordination" provides a better connection – addressing the division of responsibilities according to different levels and, at the same time, the need for coordination of action in the multi-level system (Benz, 2004; Kussau & Brüsemeister, 2007).

3 Methodological Approach

Methodologically, this paper is based on different methods of analysis.

In a first step, a document analysis of European legal acts, resolutions and declarations underlying the ESCO development and implementation is carried out. This analysis examines the significance of governance “qua hierarchy” through direct or indirect effects of binding legal acts (“hard law”). In addition, typical governance forms of “soft law” such as negotiation and competition systems (e.g. open method of coordination) are considered.

In order to reconstruct the ESCO governance with the respective roles, tasks and constellations of relevant actors at the national and supranational level, minutes and documents of central European bodies in the ESCO development process are evaluated in a second step. In this regard, the main actors with their respective tasks and areas of competence in the ESCO development- and implementation process are described. In order to identify relevant modes of coordination and control key actor constellations are analysed.

Additionally, for a more in-depth analysis of the governance processes in the ESCO development and implementation process, (to date) 20 qualitative semi-structured expert interviews

with ESCO Committee Members as well as national ESCO "Implementers" [1] were carried out and will be analysed in the following section[2]. This also includes a qualitative analysis of stakeholder structures.

4 Preliminary Results

4.1 ESCO development: The interplay of European VET governance between "hard-law" and "soft-law"

In contrast to other areas of European policy and influence, European VET policy is – strictly speaking - not a clearly delineated policy field. Reasons are interfaces with other policy areas such as education, economy, labour market and social policy - and especially the national responsibility for VET, to which the subsidiarity principle and the ban on harmonisation apply.

The Treaty of Rome (1957) forms the basis for the development of a European approach to vocational training. Although the Treaty of Rome was primarily aimed at removing national barriers to trade and production, from 1959 onwards, it was a question of developing a European dimension in education, which, according to Charlier and Croché (2006), was reflected in the 1960s by the deployment of information campaigns and the drafting of ten principles linking VET to the objectives of common economic development. The Lisbon Strategy and in particular the decisions of the EU Council of Education Ministers in Copenhagen (2002) have enhanced the EU's vocational education and training policy, but at the cost of increasing subordination to the aspect of job security and employability.

Despite the lack of a direct European competence for VET, many European legal acts have direct or indirect impacts on VET via interfaces to other policy areas. The European legal acts differ systematically and range from "hard law" to programmatic steering instruments that are not legal acts in the narrower sense. In the area of "soft law" in particular, there are steering instruments such as recommendations, opinions, resolutions and action programmes. Implementation by the respective EU member states takes place on a voluntary basis. However, other coordination mechanisms apply here, in particular the Open Method of Coordination (OMC) and the European Semester. The OMC is characterised by steering based on key objectives with a realisation plan including defined indicators in connection with country comparisons and monitoring processes for the implementation of the formulated objectives. In this context, steering takes place via competition and, in particular, via negotiation systems, for example in the form of best practices and benchmarks (Bohlinger, 2019).

Analysing the impact of *hierarchical forms of governance ("hard law")* in the context of ESCO development the underlying legal regulations of the ESCO development process are documented in the following part.

The fundamental principles of the ESCO development are to be found in the *Eures Regulation (EU) 2016/589* in combination with the *Implementing Decisions 2018/1020* and *2018/1021*. The *Regulation 2016/589* on a European Employment Services Network (EURES) includes the development of a European classification as a "standard terminology of occupations, skills, competences and qualifications". This European classification, in the later development process called ESCO, serves as an important basis for IT-supported employment

---

[1] In particular, committee members and ESCO implementers from the countries selected in this research project (Germany, Poland, Ireland and Latvia) were identified and recruited. In addition, further European key actors were identified. The sampling strategy was based on accessible information from the evaluated committee minutes. In addition, (contact) information from interviews already conducted was used.

[2] This paper provides an interim analysis with preliminary results. In this regard, it should be noted that the evaluations at this stage especially reflect the perspective of German committee members. Additional Expert Interviews are currently being conducted.

services and the IT platform to be set up for this purpose. It is supplemented by the *Implementing Decisions 2018/1020* and *2018/1021* establishing the technical standards and formats to ensure automatic matching and interoperability between national systems and the European classification (cf. Table 1).

Table 6
European legal bases of ESCO construction

Legal basis for ESCO implementation	Legal Act/legal form	Content/ESCO reference (direct/indirect)
Regulation (EU) 2016/589 on a European network of employment services (EURES), workers' access to mobility services and the further integration of labour markets	Regulation	▶ Organisation of the EURES network ▶ Development of common IT platform ▶ Development of European classification as standard terminology of occupations, skills, competences and qualifications to facilitate online job search within the Union ▶ Automated matching via the common IT platform.
Commission Implementing Decision (EU) 2018/1020 on the adoption and updating of the list of skills, competences and occupations of the European classification for the purpose of automated matching through the EURES common IT platform	Decision	▶ Determination of the list of skills, competences and occupations of the European Classification ▶ Definitions of terms, including knowledge, skills, competences, occupation; ESCO service platform (Article 1) ▶ Ensure, make available and update the list of skills, competences and occupations of the European classification on the ESCO service platform through EURES (Article 4)
Commission Implementing Decision (EU) 2018/1021 on the adoption of technical standards and formats necessary for the operation of the automated matching through the common IT platform using the European classification and the interoperability between national systems and the European classification	Decision	▶ Definitions (Article 2) ▶ Creation of matching tables for the comparison between national, regional and sector-specific classifications and the European classification ▶ Ensuring interoperability with the common IT platform through matching tables (Article 4) ▶ Management and updating of the technical standards and formats (Article 6)

In addition, ESCO is also the subject of non-binding resolutions, opinions and action programmes that are to be located in the *area of "soft law"*. This especially includes the "Europe 2020" action programmes and the New Skills Agenda for Europe. In this regard, ESCO is associated with the "New Skills for new Jobs" initiative within the framework of the Europe 2020 Strategy for Growth and Jobs. This was adopted in 2010 as a follow-up programme to the Lisbon Strategy for a period of ten years. Direct references exist in particular with regard to the work areas on "improving the representation and comparability of competences and qualifications" and on "improving the collection of data on competences". ESCO is also mentioned in the opinion "Action Plan for Digital Literacy" (2018/C 461/08) and in the recommendation on the European Qualifications Framework for Lifelong Learning (2018/C 307/10).

A further governance aspect at the level of implementation is located in the field of *EU-funded programme support*. An important example in this context is the "Sector Skill Alliances". The aim is to develop European skills strategies in key economic sectors, selected on the basis of policy priorities, the definition of a clear sectoral strategy for skills and jobs, the maturity of the sector's growth strategy, and stakeholder participation and engagement. This includes, inter alia, the development of a sectoral skills and competences strategy, the

development of occupational profiles, vocational training programmes and qualifications, and the design of a long-term action plan to be rolled out at national and regional levels. In addition, the use of all EU (transparency) instruments, i.e. EQF, EQAVET and ESCO, will be promoted (European Commission, 2020). ESCO acts as an important reference for the recognition of specific sectoral competences, but also of the transversal competences required for the development of the sector (ibid.). In the 2020 European recommendation on VET (2020/C 417/01) ESCO should contribute to mobility as well as to qualification recognition processes and supportive of the deployment of Europass.

Concluding, the first part of the governance analyses in the ESCO context shows the diverse interweaving of forms of governance through binding legal acts, soft legislation and the financial promotion of action programmes, which are intended to support the development and implementation of this platform. It becomes clear that in particular through the linking of labour market and education policy – in this case through the linking of ESCO and EURES - a greater degree of intervention through binding legal acts (EURES Regulation with Implementing Decisions) becomes apparent. Usually, European VET policy rather tends to move within the framework of "soft legislation". For a further analysis of the interrelationships, the different actors and institutions in the ESCO constitutional process at the national and supranational level with their respective tasks and roles will be examined in more detail in the following chapter.

4.2 ESCO-Governance: Actor constellations, tasks and coordination

Actor constellations and tasks

With regard to ESCO governance, the different actors and constellations of actors are examined. The Directorate-General for Employment, Social Affairs and Inclusion of the European Commission plays a central role in the development, implementation and updating of the ESCO classification. Initial interview results emphasize the Role of DG Employment: "*It started as an idea of DG Employment, and it continued as a project or even a tool that is coordinated, steered by DG Employment*" (Member ESCO Board, 01). In this respect, interviewees mention the subordinate role of DG Education. The EURES regulation ("hard law") is seen as an important aspect of the steering processes of ESCO: the ESCO implementation took on a legally binding character (Members ESCO Membership Working group, 07, 09; Member ESCO Maintenance Committee, 06).

In the process of ESCO development, DG Employment was supported by various stakeholders, as well as the European Centre for the Development of Vocational Training (Cedefop). A steering group was set with the ESCO Management Board, the ESCO Secretariat and four reference groups, subordinated to the European Commission. These central actors of ESCO governance are presented below and classified according to their (steering) function.

On a *strategic political level***,** the *ESCO Board* (2011 – 2017) provided advice to the Commission. It included various experts from the Member States, e.g. ministries, representatives of the EQF Advisory Board, employers' organisations, as well as observers from other Directorates General and Cedefop; after 2014, representatives from European associations for universities and VET providers were also present. Its main task was to develop a strategic framework and an overarching concept and communication strategy for ESCO.

The *ESCO Maintenance Committee* (2011-2022) is an expert group consisting (a. a.) of representatives of state employment agencies, statistical institutions, chambers of commerce and industry as well as actors with specific technical expertise. The main task of the Maintenance Committee was to advise the Commission on content and quality assurance. In contrast to the ESCO Board, the Maintenance Committee is located more on a *strategic-conceptual level.*

Initial results of the qualitative interviews emphasize the role of the *ESCO Secretariat* as a central steering body in terms of content and administration. The ESCO Secretariat consist of

various experts who cover the areas of "skills" and "taxonomies". In particular, close cooperation was envisaged with service providers commissioned with the development of the technical infrastructure of ESCO (cf. European Commission, Stakeholder Note 2010).

The ESCO Secretariat is described as "*the brain of the project*" (Member ESCO Board, 02). It is composed of experts with a high level of expertise. Important tasks of the Secretariat contain *content-related and administrative project management*. This includes support and advice to other ESCO bodies as well as the organisation of the working level, a. a. the Mapping of national classifications with the ESCO classification. The cooperation and collaboration were described as very intensive and useful by experts at the implementation level. (ESCO Implementers, 03, 05). Furthermore, the ESCO Secretariat organised the exchange of different ESCO bodies and stakeholders. Other important functions of the ESCO Secretariat are the further development and updating of the classification and platform.

Working level: Representatives with sector-specific expertise were involved in the constitutional process within the framework of *Sectoral Reference Groups (SREF)*. Members of the *Cross-Sectoral Reference Group (CSREF)* were concerned with cross-sectoral competences. This group developed a thesaurus of cross-sectoral skills and competences that can be used to develop occupational profiles (until 2015).

Since 2015 representatives of the individual member states were involved in the *Member States Working Group (MSWG).* The mandate and task of the MSWG are to disseminate and implement ESCO at the national level on the basis of the EURES Regulation. The Maintenance Committee and MSWG were coordinated by the Commission (cf. committee minutes).

Coordination

In the period from 2011 to 2013, eleven expert groups met within the framework of the Sectoral Reference Groups to develop sectoral classifications of occupations, skills, competences and knowledge. In 2015, further 16 sectors were added. This process was coordinated by the ESCO Secretariat (SEC) and the Taxonomy Expert Group (TEC). This also included the appointment of experts. Consultations on the development of occupational classifications, interoperability with national classifications and a linguistically formulated version of the ESCO skills pillar took place between 2011 and 2017.

The coordination of the sectoral reference groups established for the period 2011-2015 to develop occupational classifications, skills, competences and knowledge for their respective sectors took place on the basis of regular meetings of these expert groups in Brussels (cf. Annen et al., 2020).

The analysed documents suggest a coordination process between the European Commission and the member states including meetings of the working groups of the co-member states as well as "soft" forms of coordination through consultation and negotiation (cf. Annen et al., 2020).

Interviewed members of different ESCO committees and working groups report a regular exchange between the different ESCO bodies and working groups, especially in the first period. This also included an exchange between the conceptual ESCO steering level and the working level, for instance, members of sectors reference groups reporting in meetings of the Maintenance Committee. In the later process, one interviewee noted a rather sporadic interaction between the committees (Member ESCO Board, 02).

On a working level, there was a regular exchange between the different working groups. This was partly initiated by the groups themselves. The general flow of information was primarily mediated by the ESCO Secretariat. Due to its composition, the ESCO Secretariat also had an important function in the consultative processes.

In terms of consultation, one interviewee stressed the problem of information asymmetry in the development process. Due to the complexity of the ESCO development process,

especially in terms of technical issues, several Committee Members had a hard time trying to understand suggestions, ideas and concepts provided by technical experts. In the interview, he emphasizes the role of technical experts within the development process. He, therefore, concludes that the Maintenance Committee was not really a steering committee but rather decoration ("*Etiquette*") in a commission-driven project (Member ESCO Maintenance Committee, 03).

The steering function of the Commission in the form of the ESCO Secretariat is also described by a former member of the intersectoral working group. The flow of information with the secretariat was "*already linked to the narrative and the idea (...) that the secretariat somehow has its own policy. It has its own idea of what ESCO should actually become and how it should be dealt with. We weren't even necessarily sure whether the Board would follow the same strategy as the Secretariat*" (Member Cross-Sectoral Reference Group, 08).

The preliminary results on the one hand show the exchange, consultation and negotiation of the different ESCO actors, especially in the early development periods. At the same time, however, the central coordination and steering function of the Commission in the form of the ESCO Secretariat also becomes visible.

Change in ESCO Governance in 2015

In 2015, the reference groups were abolished with the launch of the first ESCO version V0. Instead, a broad monitoring committee was formed with the Member State Working Groups. The formal argument for this, according to one interviewee, was that the essential steps had been completed (Member ESCO Board, 02). Another committee member reports that the reference groups were dissolved "*because it was a bit too chaotic to work only with interest representatives who were supposed to build up a taxonomy. They really wanted to rely on, yes, I think, professional taxonomists from the ESCO secretariat*" (Member ESCO Maintenance Committee, 04). With the abolition of the Reference Groups, the ESCO stakeholders seem to play a more important role in the further development of ESCO's content.

In the following years, the ESCO Secretariat organised and coordinated the mapping process in which the member states matched their national classifications with the ESCO classification. The ESCO Secretariat is also in charge of the content and administrative organisation of pilot projects for the ESCO Qualifications Pillar. The project logic in ESCO governance, in which the ESCO Secretariat is responsible for project management, thus seems to have been further strengthened.

5 Conclusion

Initial results of the analyses show a diverse interweaving of governance forms through binding legal acts, soft legislation and the financial support of action programs, which are supposed to support the development and implementation of ESCO. Due to the linking of the labour market and education policy - in this case, through the linking of ESCO and EURES - a greater depth of intervention through binding legal acts (regulations, resolutions) seems to exist within the area of European vocational training policy, which usually is located within the framework of "soft law". In this respect, however, it will be important how and in which manner qualification profiles will be linked to the ESCO occupations and skills. This process has not yet been completed at the present time.

With regard to governance in the ESCO construction process, the analysed documents suggest a differentiated approach of the Commission, in which the (steering) mechanisms in the context of EURES and VET differ. While in the EURES context a rather hierarchical regulation through regulations and decisions becomes visible, the coordination process between the European Commission and the member states includes consultations and meetings of the working groups of the member states as well as "soft" forms of coordination through consultation and

negotiation. However, preliminary interview analyses also address an asymmetry of information between different actors in the construction process, which may have led to problems in the action coordination.

In the coordination process, different logics, as well as discrepancies in the understanding or interpretation of roles and missions of the different actors, become apparent: on the one hand, the project logic from the point of view of the Commission and, on the other, a conflicting logic between education and labour market policy. The increasing technicality of the ESCO project also impacted the coordination and revealed tensions in terms of policy objectives between national and European actors.

Initial results indicate a discrepancy between education policy actors, who are used to acting in the context of "soft law" and Commission actors from a labour market perspective located in the EURES context. This partly seems to lead to conflicting expectations, as the aforementioned interviews indicate. Regarding the question, if ESCO can be seen as a prototype of new European governance between "hard law" and "soft law" the results so far tend to speak against a new form of governance. Rather, the project's strong reference to EURES and the labour market shows that hierarchical forms of governance have become more relevant in this specific context.

References

Altrichter, H., & Heinrich, M. (2007). Kategorien der Governance-Analyse und Transformationen der Systemsteuerung in Österreich. In H. Altrichter, T. Brüsemeister, & Wissinger, J. (Eds.), *Educational Governance. Handlungskoordination und Steuerung im Bildungssystem* (pp. 55-103).VS Verlag für Sozialwissenschaften.

Annen, S., Mottweiler, H., & Le Mouilliour, I. (2020). ESCO als neues Instrument europäischer Berufsbildungssteuerung? Theoretische Einordnung und empirische Evidenz. In *bwp@ Berufs- und Wirtschaftspädagogik – online*, (39), 1-18. https://www.bwpat.de/ausgabe39/annen_etal_bwpat39.pdf (17.12.2020).

Benz, A. (2004). *Governance — Regieren in komplexen Regelsystemen*. VS Verlag für Sozialwissenschaften.

Bohlinger, S. (2019). Governance in der europäischen Berufsbildungspolitik. *Berufsbildung*, 178(2019), 15-17.

Charlier, J.-E., & Croché, S. (2006). How European Integration is Eroding National Control over Education Planning and Policy. *European Education* 6(37), 7–21.

Diekmann, K. (2020). ESCO und Europass – ist ein europäisches und erweitertes LinkedIn im Entstehen? *Denk-doch-Mal.de. Online-Magazin für Arbeit - Bildung - Gesellschaft*, *2020*(1), 1–7.

do Amaral, M. P. (2017). Educational Governance: International vergleichende Perspektiven auf Neue Steuerung im Bildungsbereich In A. Bolder, H. Bremer, & R. Epping, (Eds.), *Bildung für Arbeit unter neuer Steuerung* (pp. 201-221). Springer VS Verlag.

European Commission (2020). *Blueprint for sectoral cooperation on skills*. https://ec.europa.eu/social/main.jsp?catId=1415&langId=en, (15.09.2020).

European Commission (2019). *ESCO handbook. European Skills, Competences, Qualifications and Occupations*. European Commission.

European Commission (2018). ESCO Annual Report 2018. European Skills, Competences, Qualifications and Occupations. European Commission.

European Commission (2017): *ESCO handbook. European Skills, Competences, Qualifications and Occupations*. European Commission.

Europäische Kommission (2014). *Europäische Klassifizierung für Fähigkeiten/Kompetenzen, Qualifikationen und Berufe. Erste Veröffentlichung. Eine Europa-2020-Initiative*. Amt für Veröffentlichungen der Europäischen Union.

European Union (2016). Regulation (EU) 2016/589 of the European Parliament and of the Council of 13 April 2016 on a European network of employment services (EURES), workers' access to mobility services and the further integration of labour markets, and amending Regulations (EU) No 492/2011 and (EU) No 1296/2013. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0589&from=EN

European Commission. (2018a). Commission Implementing Decision (EU) 2018/1020 of 18 July 2018 on the adoption and updating of the list of skills, competences and occupations of the European classification for the purpose of automated matching through the EURES common IT platform. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1020&from=EN

European Union (2018b). Commission Implementing Decision (EU) 2018/1021 of 18 July 2018 on the adoption of technical standards and formats necessary for the operation of the automated matching through the common IT platform using the European classification and the interoperability between national systems and the

European classification. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1021&from=EN

Kussau, J., & Brüsemeister, T. (2007). Educational Governance: Zur Analyse der Handlungskoordination im Mehrebenensystem der Schule. In H. Altrichter, T. Brüsemeister, & J. Wissinger (Eds.), *Educational Governance. Handlungskoordination und Steuerung im Bildungssystem* (pp. 15-54). VS Verlag für Sozialwissenschaften.

Kuhlee, D. (2017). Steuerung, Neue Steuerung, Governance ...? Zu Leitbildern, Gestaltungsmustern und Funktionsmechanismen von Steuerungsansätzen in der beruflichen Bildung. In A. Bolder, et al (Eds.), *Bildung für Arbeit unter neuer Steuerung* (pp. 45-72). Springer VS Verlag.

Lawn, M. (2019). Governing education in the European Union: networks, data and standards. Roteiro, Joaçaba, v. 44, n. 3, p. 1-16. Vista do Governança da educação na União Europeia: redes, dados e standards (unoesc.edu.br)

Schimank, U. (2007). Elementare Mechanismen. In A. Benz, et al. (Eds.), *Handbuch Governance* (pp. 29-45). VS Verlag für Sozialwissenschaften.

Strebel, A., Engelage, S., & Baumeler, C. (2019). Der Beitrag der institutional work-Perspektive zu Educational Governance. In R. Langer, & T. Brüsemeister (Eds.), *Handbuch Educational Governance Theorien* (pp. 201-218). Springer VS Verlag.

Winch, C. (2021). Learning outcomes: The long goodbye: Vocational Qualifications in the 21st century. *European Educational Research Journal*, 1-19. https://doi.org/10.1177/14749041211043669

Biographical notes

Hannelore Mottweiler is a senior researcher at the Federal Institute for Vocational Education and Training (BIBB) in Bonn, Germany. Her main areas of research are structure, regulation and governance of VET as well as occupation related research.

Isabelle Le Mouillour is a senior researcher at the Federal Institute for Vocational Education and Training (BIBB) and head of the division International VET Comparison, Research and Monitoring. Her research topics are governance of VET systems and European VET policies (incl. qualifications frameworks, credit systems, and apprenticeship systems).

Silvia Annen is a professor for Business Education at the University of Bamberg, Germany. Her main areas of research are the recognition of competencies (national and international), educational decisions and educational trajectories, as well as the impact of the digital transformation, especially on the commercial professional sector.

VETNET
European Research Network
Vocational Education and Training

Müller, M. L., Frenz, M., Brandl, C., & Nitsch, V. (2022). Digital Competences of In-company Vocational Training Personnel - Results of a Company Survey in Germany, Spain and the UK. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 132–141). https://doi.org/10.5281/zenodo.6977522

Digital Competences of In-company Vocational Training Personnel - Results of a Company Survey in Germany, Spain and the UK

Müller, Mattia Lisa
m.mueller@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University

Frenz, Martin
m.frenz@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University

Brandl, Christopher
c.brandl@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University; christopher.brandl@fkie.fraunhofer.de, Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE

Nitsch, Verena
v.nitsch@iaw.rwth-aachen.de, Institute of Industrial Engineering and Ergonomics at the RWTH Aachen University; verena.nitsch@fkie.fraunhofer.de, Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE

Abstract

Context: In the course of digitalisation, work and business processes in companies are changing worldwide. Currently, only a few studies explicitly deal with the consequences of the digital transformation for vocational training personnel in companies.
Approach: This paper presents the results of a country-specific comparison of the assessed degree of digitalisation of vocational training personnel in Germany, Spain, and Great Britain from the perspective of company representatives (n = 482). Furthermore, possible influencing factors, such as the assessment of the degree of digitalisation, the number of employees, and the number of apprentices in the companies, were examined with the use of regression analysis.
Findings: The results show that the predictors number of employees, country, number of apprentices, and degree of digitalisation predict the criterion digital competence of the vocational training personnel statistically significantly. Furthermore, the assessed degree of digitalisation, the country, and the number of apprentices have a significant influence on the assessed digital competence of the vocational training personnel. Also, the number of apprentices correlates stronger with the assessed digital competence of vocational training personnel than the number of employees in a company. The comparison of the countries Germany, Spain, and the United Kingdom shows that company representatives asses the digital competence of vocational training personnel in the United Kingdom significantly better than in Germany.
Conclusion: In summary, based on the present results, it can be argued that a high degree of digitalisation, several apprentices between 11 and 30 as well as the location of the company in the UK are more likely (compared to the other factors examined) to result in high digital competence of the vocational training personnel.

Keywords: country-specific comparison, digital competence, vocational training personnel, VET, digital transformation

1 Digital Transformation and its Implications for Vocational Education and Training

As a consequence of digitalisation, work and business processes in companies are changing worldwide. The networking structures inside and outside companies, the overall proceeding of a digitalised corporate world, and the concrete work processes of skilled workers are affected at different levels (Bourne, 2021; Hammermann & Stettes, 2015; Mütze-Niewöhner & Nitsch, 2020). From an international perspective on the topic of digital transformation, it is visible that the level of digitalisation of companies is increasing worldwide but differs from country to country. Germany (DE) is in the middle of the field in both international and European comparisons and is, e.g. behind the United Kingdom (UK) and ahead of Spain (ESP) (European Commission, 2017).

These changes caused by digitalisation lead to changing competence requirements for employees (Becker et al., 2017; Hammermann & Stettes, 2015). The precise effects on the qualification requirements of skilled workers are not yet conclusively foreseeable. It can be assumed that the tasks of human labour will shift towards more complex tasks with increasing qualification requirements, as these cannot be automated shortly (Bonin et al., 2015). Dengler and Matthes (2021) state that increasingly more complex tasks (especially in manufacturing occupations) could also have substitutability potential through new technologies. However, the developments will look like, humans and their competencies will continue to be a decisive factor in the working environment. Besides this, many policies and economics experts assume that skilled workers will play a crucial role in the implementation of Industry 4.0 (Bundesministerium für Bildung und Forschung [BMBF], 2016; Windelband & Spöttl, 2017). The relevance of qualifications in the context of Industry 4.0 becomes evident in the meta-studies by Demary et al. (2016) or BSP Business School Berlin (2017). They identify a lack of knowledge among employees as one of the relevant digitalisation barriers in small and medium-sized enterprises (SMEs). Various studies examine the degree of digitalisation of companies and possible related factors (e.g. Demary et al., 2016; Werning et al., 2017). The framework of Industry-4.0-readiness, for example, surveys the degree of digitalisation of companies. Looking at the results differentiated by company size, it is noticeable that the highest proportion of companies that have reached level three or four (from levels 0-5) comes from the category with 20 to 99 employees. Thus, some companies in this class are already better prepared for Industry 4.0 than the large companies. They take on the role of innovators. If the mean value is considered, larger companies are, on average, better prepared for Industry 4.0 than SMEs (Institut der deutschen Wirtschaft [IW], 2016). These findings match those of Gössling & Emmler, 2019, who conducted a qualitative study in which they found that small companies are more flexible due to their size and can therefore take advantage of new technologies in their training conditions more quickly than some established large companies. The studies on the digital competences of employees are less comprehensive. There are many concepts of digital competences (Spante et al., 2018). Though simultaneously, there is no comprehensive overview of the level of digital competences from the perspective of the company representatives. This group of people decides about the use of digital technologies, especially in SMEs.

Vocational education and training (VET) and the vocational training personnel working in it form an important basis for the competence development of future skilled workers (Zlatkin-Troitschanskaia et al., 2009). In this context, there are extensive challenges for VET. In-company vocational training, in particular, must respond to changing demands on skilled workers to meet the goal of promoting occupational competences. First, the VET system must react to the increasing complexity in work for all employees, especially for medium and highly qualified personnel. In addition, supervisory activities with decision-making, coordination, and

control functions are increasing in networked production processes (Frenz et al., 2016; Gerholz & Neubauer, 2021). It is expected that current job profiles will change, and the importance of basic information technology knowledge and understanding will increase (IW, 2016). For in-company vocational training personnel, this results in a modification of roles that goes hand in hand with new competence requirements (Windelband, 2018). The changes described above are accompanied by extensive demands on the company's ability to change. Apprentices are a catalyst for change processes in companies. Since they usually come from a different generation than the core workforce, they can decisively influence change processes in companies through their perspective and socialisation (Dietzen & Weißmann, 2007; Fauler & Geiersberger, 2014).

Currently, only a few studies explicitly deal with the consequences of the digital transformation for vocational training personnel in companies. For example, the studies by Gerholz and Neubauer (2021) showed on the basis of problem-centred interviews with eight vocational trainers that the use of digital media to support learning processes in vocational training is increasing, but that there is a lack of didactic concepts. Gössling and Emmler (2019) found in their qualitative study that adaptations in vocational training by training personnel in the context of Industry 4.0 are either reactive to the demands of the digitalised world of work or proactive and enable learners to shape the implementation of digital technology. Other previous studies mainly focus on the target group of skilled workers (Spöttl et al., 2016).

2 Research Questions and Hypotheses

In this context, a cross-sectional study in DE, ESP and the UK was carried out to record the digital competencies of employees in general and those involved in in-company vocational training from the perspective of company representatives. A first analysis revealed significant differences between the countries in terms of the overall digital literacy of employees. In addition, the company representatives rated the digital competence of VET employee groups lower than that of other employees or managers (Müller et al., in print).

Following on from this and against the background of the importance of in-company vocational training personnel in the promotion of digital competences of future skilled workers, the following research questions arise:

1. What factors influence the assessment of the digital competences of the vocational training personnel?
   H 1.1. The degree of digitalisation has a positive influence on the assessed digital competence of vocational training personnel.
   H 1.2. The number of employees in the companies has a positive influence on the assessed digital competence of the vocational training personnel.
   H 1.3. The number of apprentices in the companies has a positive influence on the assessed digital competence of the vocational training personnel.
   H 1.4. The assessed digital competence of vocational training personnel differs between DE, ESP, and the UK.
2. How are the digital competences of vocational training personnel assessed from the perspective of company representatives in Germany, Spain, and the UK?
   H 2.1. The assessed digital competence of vocational training personnel in the UK is higher than in DE.
   H 2.2. The assessed digital competence of vocational training personnel in ESP is lower than in DE.
   H 2.3. The assessed digital competence of vocational training personnel in ESP is lower than in the UK.

3 Methods and Research Instruments Used

The data collection took place in May 2021 at the Institute of Industrial Engineering and Ergonomics at RWTH Aachen University. The target group of the survey consists of managers at different levels, employees from strategy departments, and vocational training managers. This group of people is assumed to have an overarching knowledge of digitisation processes and digital competencies in different functional areas in the company. The online questionnaire comprises 38 items, most of which have to be answered quantitatively and based on various assessment scales. For the survey of digital competence, the respondents reported their subjective assessment of the digital competence of vocational training personnel (scale from 1-100) within their company.

To address the aspect of intrinsic data quality, which is considered critical in the context of online surveys, the raw data were cleaned concerning selected criteria according to Treiblmaier (2011) and Leiner (2019). After the adjustment and the elimination of incomplete data sets regarding the applied variables, the number of respondents in the present sample for the following analysis is N = 481.

To examine the first research question, a multiple regression analysis is carried out and interpreted. The assessment of the digital competence of the training staff is the dependent variable. The extent to which the independent variables (estimated degree of digitisation; the number of employees; the number of apprentices; country) influence the dependent variable is analysed. To conduct the analysis, some of the ordinal scaled variables were recoded into dummy variables. In the presentation of the coefficients of the multiple regression, the category with the lowest value is set as the reference category. The B-values of the dummy variable can be interpreted in relation to this reference category. To answer the second research question, an ANOVA is carried out.

The evaluation of the data and the calculation of the regression were carried out using the programme IBM SPSS Statistics (version 28).

4 Results

This chapter begins with an outline of the descriptive statistics of the sample and the variables used. Then, the requirements of the multiple regression analysis are examined before the results are described. In the next step, corresponding post-hoc tests are carried out for the independent variables with a significant influence on the assessed digital competence of company in-company vocational training personnel.

4.1 Sample Description

The sample consisted of 170 female respondents (35.3 %), 308 male respondents (64 %), one non-binary person (0.2 %), and two people who did not indicate their gender. The mean age was 41.98 years (SD = 10.261) and had a range from 20 to 70 years. Two respondents (0.4 %) had no vocational qualification, 35 respondents (7.3 %) had vocational school education, 85 respondents (17.7 %) had vocational training or dual training, 9 respondents (1.9 %) had civil servant training, 56 respondents (11.6 %) had a degree from a vocational academy or dual university, 62 respondents (12.9 %) had a degree from an administrative or technical college, and 230 respondents (47.8 %) had a degree from a university or other institution of higher education. Two respondents did not provide an answer regarding the highest level of education.

4.2 Descriptive Statistics of the Variables Applied

Two hundred and sixty-three (54.7 %) respondents from the present sample worked in Germany, 129 (26.8 %) respondents worked in Spain and 89 respondents (18.5 %) in the UK.

The number of apprentices in the companies was 1 to 5 apprentices for 128 respondents (26.6 %), 6 to 10 apprentices for 75 respondents (15.6 %), 11 to 30 apprentices for another 152 respondents (31.6 %) and more than 30 apprentices for the remaining 126 participants (26.2 %).

The number of employees in the company was 1 to 10 for 22 respondents (4.6 %), 11 to 50 for 64 respondents (13.3 %), 51 to 250 for another 124 respondents (25.8 %) and more than 250 to 1000 for 120 respondents (24.9 %), 1001 to 5000 for 85 respondents (17.7 %), 5001 to 10000 for 271 respondents (56,3 %).

The assessment of the degree of digitalisation was on average 71.53 (SD = 21.131) with a range from one to 100, while the assessment of digital competence with a range from one to 100 was on average 67.97 (SD = 20.552).

4.3 Testing the Requirements for Calculating the Multiple Regression Analysis

The linear relationship test shows a small negative linear relationship between the dependent variable and the independent variables, indicating linearity between the digital competence of vocational training personnel and the predictors number of employees, country, number of apprentices, and degree of digitalisation.

Since the value of the Durbin-Watson statistic of 1.926 is within the accepted range between 1.5 and 2.5, the residuals do not exhibit autocorrelations (Urban & Mayerl, 2018).

The histogram of the dependent variable shows that the residuals are approximately normally distributed. Furthermore, the calculation of the correlation according to Pearson shows that there is no multicollinearity, as no correlations exceed the threshold value of 0.8 (Urban & Mayerl, 2018). This is also confirmed by the examination of the VIF values, which, with a range of Min = 1.144 to Max = 2.369, lie below the limit value of four.

The value of 1.926 of the Durbin-Watson statistic suggests the presence of homoscedasticity. However, the visual residual analysis does not provide a clear picture but instead suggests heteroscedasticity. To avoid the resulting distortions of homoscedasticity, the multiple regression was carried out using bootstrapping procedures (Urban & Mayerl, 2018).

4.4 Results of the Multiple Regression Analysis

The model has a medium goodness-of-fit with an adjusted R Square = .16 (Cohen, 1988), whereby 16 % of the variance in the digital competence of vocational training personnel is explained by the variables number of employees, the country, the number of apprentices, and the degree of digitalisation. The predictors number of employees, country, number of apprentices, and degree of digitisation predict statistically significantly the criterion digital competence of vocational training personnel ($F (9, 471) = 10.1$, $p < .001$). Table 1 gives an overview of the summary of the statistical parameters of the model. The analysis of the regression coefficients shows significance in the coefficients for the number of apprentices 11-30 ($\beta = .226$; $t (471) = 2.060$; $p = .040$), and the country UK ($\beta = .209$; $t (471) = 2.061$; $p = .040$) as well as the degree of digitisation ($\beta = .013$; $t (471) = 7.204$; $p < .001$). The other coefficients show no significant influence.

Table 1
Model summary of the multiple regression

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.402[a]	.162	.146	.77316	1.926

Note. a. Predictors: (Constant), number of apprentices more than 30, Spain, assessment of the degree of digitalisation; number of employees medium-sized company, number of apprentices 6-10, number of employees small company, the United Kingdom, number of apprentices 11-

30, number of employees large company
b. Dependent variable: Assessed digital competence of vocational training personnel

Table 2
Coefficients of the multiple regression

	Unstandardized Coefficients		Standardized Coeff.		
	B	Std. Error	Beta	t	Sig.
(Constant)	2.810	.211		13.309	<.001
Assessment of the degree of digitalisation	**.013**	**.002**	**.328**	**7.204**	**<.001**
Spain	.121	.085	.064	1.421	.156
United Kingdom	**.209**	**.101**	**.097**	**2.061**	**.040**
Number of employees: small company	.187	.195	.076	.961	.337
Number of employees: medium-sized company	.084	.184	.044	.455	.649
Number of employees: large company	.062	.187	.037	.333	.740
Number of apprentices 6-10	.165	.118	.072	1.394	.164
Number of apprentices 11-30	**.226**	**.109**	**.125**	**2.060**	**.040**
Number of apprentices > 30	.221	.123	.117	1.794	.073

Note. Depend Variable: Assessed digital competence of vocational training personnel

If the standardised values for the beta are considered (cf. table 2) independently of their significance level, it can be seen that, concerning the predictors, the assessed degree of digitalisation has the greatest influence on the assessed digital competence. The number of apprentices has the second-largest impact in relation to the other predictors, and the number of employees has the smallest impact.

Based on the significant results, H 1.1., H 1.3. and H 1.4. can be accepted, while H1.2 can be rejected.

4.5 Results of ANOVA and Post-Hoc-Tests

As assessed by the Shapiro-Wilk test ($\alpha = .05$), the data was not distributed normally in all three groups. Since single factor ANOVA has been shown to be relatively robust to violations of the normal distribution assumption (Blanca et al., 2017), this method is still used. Homogeneity of variances was asserted using Levene's Test, which showed that equal variances could be assumed ($p = .398$). There were no extreme outliers, according to inspection with a boxplot. The assessed digital competence of vocational training personnel decreased in comparison of Germany ($M = 3.92$, $SD = 0.85$), Spain ($M = 4.12$, $SD = 0.77$), and the UK ($M = 4.33$, $SD = 0.81$). As also shown in the analysis of the multiple regression model, the assessed digital competence of vocational training personnel differed statistically significant for the different countries ($F(2, 478)= 8.982$, $p < .00$; $\eta^2 = .036$).

Table 3
Values of the Turkey post hoc test

		Mean Difference	Std. Error	95 % Confidence Interval		
				Sig.	Lower Bound	Upper Bound
DE	UK	-.40981	.10097	<.001	-.6472	-.1724
	ES	-.20705	.08829	.051	-.4146	.0005
UK	DE	.40981	.10097	<.001	.1724	.6472
	ES	.20277	.11322	.174	-.0634	.4690
ES	DE	.20705	.08829	.051	-.0005	.4146
	UK	-.20277	.11322	.174	-.4690	.0634

Note. Dependent Variable: Assessed digital competence of vocational training personnel

Tukey's post-hoc analysis revealed a significant difference ($p < .001$) between the assessed digital competence of vocational training personnel of the countries DE and the UK (-.41, 95 %-CI [-.65, -.17]). Between the other countries, the analysis shows no significant differences regarding the assessed digital competence of vocational training personnel (cf. table 3).

Based on the results, H 2.1. can be accepted while H 2.2. and H 2.3. can be rejected.

5 Discussion and Limitations

In this section, limitations of the present data generation and interpretation are discussed before a brief summary of the results and an outlook on further possible research projects follow.

Regarding data quality, the intrinsic data quality in the context of online surveys is particularly critical (Treiblmaier, 2011). To optimise this, various measures were implemented to ensure data quality (cf. Chapter 3). Furthermore, the anonymity of the online survey can contribute to the fact that no interviewer effects occur in the course of data collection, and fewer responses are distorted by social desirability (Scholl, 2018). In addition, online surveys raise the question of the representativeness of the sample. First, all potential respondents without internet access are excluded from the survey. Since on the one hand, the respondents in the present sample are company representatives and, according to the Federal Statistical Office, 98 % of the companies in Germany have internet access in 2020 (Statistisches Bundesamt, 2020) (in Spain, the proportion is 98.4 % (Statista, 2021a). In the UK, it is 96.1 % (Statista, 2021b); this disadvantage is only of limited relevance for the present study. On the other hand, the sampling could be controlled by using the panel provider. Further, the survey of the variables, assessed degree of digitalisation and assessed digital competence, is a subjective assessment of the company representatives surveyed and not a measurement of the degree of digitalisation, resp. competences.

Concerning the correlation between the degree of digitalisation and the assessed digital competence of vocational training personnel (H1.1), the results of the present data correspond to the findings based on the literature (BSP Business School Berlin, 2017; Demary et al., 2016). The significant influence of the degree of digitalisation on digital literacy seems logical and raises further questions. It would be interesting to investigate the causality of the relationship. Is the digital competence of the vocational training personnel more relevant for introducing new technologies in training, or do new technologies rather lead to an increase in the digital competence of the vocational training personnel?

In contrast to previous studies on the degree of digitalisation as a function of the number of employees in a company, the influence on the estimated digital competence of vocational training personnel could not be confirmed in the data presented here (H1.2.). However, the assumed influence of the number of apprentices on the estimated digital competence of vocational training personnel could be confirmed (H1.3.). If these results are considered in combination with each other, a possible explanation would be that the results available in the literature refer to the degree of digitalisation and not to digital competence (Gössling & Emmler, 2019; IW, 2016). The digital competence of vocational training personnel, in particular, may not depend significantly on the number of employees in the company as a whole but on the size of the respective training department. In addition, the effect of apprentices as a catalyst for change processes, as mentioned in the literature (Dietzen & Weißmann, 2007; Fauler & Geiersberger, 2014), can be another relevant explanatory factor.

The results regarding the assessed digital competence of vocational training personnel in the different countries DE, ESP, and the UK (H1.4., H2.1, H2.2., and H2.3.) are mostly in line with the previous results based on the available data (Müller et al., in print) as well as with the results regarding the degree of digitisation of the three countries (European Commission, 2017).

In future studies, it would be interesting to examine the extent to which possible cultural differences could have influenced the respondents' assessments. In addition, there is the question of an investigation of the economic and political framework (e.g. the VET System) conditions in the three countries, which may promote or hinder the promotion of digital competences of vocational training personnel.

In summary, based on the present results, it can be concluded that a high degree of digitalisation, a number of apprentices between 11 and 30, as well as the location of the company in the UK, correlates with a (compared to the other factors examined) higher assessed digital competence of the vocational training personnel.

6 Conclusion

The results provide an initial overview of how company representatives asses the digital competence of vocational training staff and how it differs between the three European countries, Germany, the UK, and Spain. With the study of the factors influencing the assessed digital competence, initial explanations for possible differences or similarities between Germany, Spain, and the UK could be identified. Following this, framework conditions that lead to a high or low level of the assessed digital competence of vocational training personnel are derived.

The findings on the current state of digital competencies of vocational training staff within the framework of a cross-sectional study can contribute to the targeted promotion of digital competencies of vocational training staff.

References

Becker, M., Spöttl, G., & Windelband, L. (2017). Berufsprofile für Industrie 4.0 weiterentwickeln. *Berufsbildung in Wissenschaft und Praxis*, *46*(2), 14–18.

Blanca, M. J., Alarcón, R., Arnau, J., Bono, R., & Bendayan, R. (2017). Non-normal data: Is ANOVA still a valid option? *Psicothema*, *29*(4), 552–557.

Bonin, H., Gregory, T., & Zierrahn, U. (2015). *Übertragung der Studie von Frey/Osborne (2013) auf Deutschland*. Mannheim. Zentrum für Europäische Wirtschaftsforschung GmbH.

Bourne, V. (2021). *Digital Transformation Index 2020*. https://www.delltechnologies.com/asset/fr-mg/solutions/business-solutions/briefs-summaries/dt-index-2020-full-findings-report.pdf

BSP Business School Berlin (Ed.). (2017). *Digitalisierung im deutschen Mittelstand: Was sagt die Forschung? Eine Metaanalyse ausgewählter Studien*. http://kommunikation-mittelstand.digital/content/uploads/2017/06/Studie-Metaanalyse-Digitalisierung-Mittelstand.pdf?utm_source=wysija&utm_medium=email&utm_campaign=April+2016+Newsletter

Bundesministerium für Bildung und Forschung. (2016). *Zukunft der Arbeit: Innovationen für die Arbeit von morgen.* Bundesministerium für Bildung und Forschung (BMBF).

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2. ed.). Erlbaum.

Demary, V., Engels, B., Röhl, K.-H., & Rusche, C. (2016). *Digitalisierung und Mittelstand: Eine Metastudie* (IW-Analysen). Köln.

Dengler, K., & Matthes, B. (2021). *Folgen des technologischen Wandels für den Arbeitsmarkt: Auch komplexere Tätigkeiten könnten zunehmend automatisiert werden* (IAB-Kurzbericht). Institut für Arbeitsmarkt- und Berufsforschung.

Dietzen, A., & Weißmann, M. (2007). Zur Bedeutung der betrieblichen Ausbildung bei Unternehmen in Veränderungsprozessen: ein Fallstudienbeispiel. *Sozialwissenschaften und Berufspraxis*, *30*(2), 319–332.

European Commission. (2017). *Digital Economy and Society Index (DESI) 2017 - Deutschland.*

Fauler, S., & Geiersberger, R. (2014). Die Rolle der Ausbildung als Katalysator von Veränderungen. In G. Zimmermann (Ed.), *Change Management in Versicherungsunternehmen: Die Zukunft der Assekuranz erfolgreich gestalten* (1st ed., pp. 231–244). Springer Gabler.

Frenz, M., Heinen, S., & Zinke, G. (2016). Industrie 4.0 und sich ändernde Berufskonzepte in den Berufsfeldern Metalltechnik und Mechatronik-Elektrotechnik. In M. Frenz, C. M. Schlick, & T. D. Unger (Eds.), *Bildung und Arbeitswelt: Band 32. Wandel der Erwerbsarbeit: Berufsbildgestaltung und Konzepte für die gewerblich-technischen Didaktiken* (pp. 32–44). Lit. https://d-nb.info/112258833X/04

Gerholz, K.-H., & Neubauer, J. (2021). Digitale Didaktik für die betriebliche Ausbildung: Empirische Ergebnisse einer Befragung von Ausbildungsverantwortlichen und ein didaktisches Modell zur Ausbildungsarbeit. In M. Kohl, A. Diettrich, & U. Faßhauer (Eds.), *Berichte zur beruflichen Bildung. „Neue Normalität“*

betrieblichen Lernens gestalten: Konsequenzen von Digitalisierung und neuen Arbeitsformen für das Bildungspersonal (1st ed., pp. 221–238). Verlag Barbara Budrich.

Gössling, B., & Emmler, T. (2019). *Adapting Apprenticeships to the Digital Transformation of Education and Work from the Perspective of In-company Trainers*. Paderborn. VETNET.

Hammermann, A., & Stettes, O. (2015). Beschäftigungseffekte der Digitalisierung: Erste Eindrücke aus dem IW-Personalpanel. *Vierteljahresschrift Zur Empirischen Wirtschaftsforschung*, *42*(3), 1–94. https://www.iwkoeln.de/fileadmin/publikationen/2015/243049/IW-Trends_2015-03-05_Hammermann_Stettes.pdf

Institut der deutschen Wirtschaft. (2016). *Arbeitswelt und Arbeitsmarktordnung der Zukunft. Welche Schlüsse können aus der vorliegenden empirischen Evidenz bereits geschlossen werden?* Köln.

Leiner, D. J. (2019). Too fast, too straight, too Weird: Non-reactive indicators for meaningless data in internet surveys. *Survey Resarch Methods*, *13*(3), 229–248.

Müller, M. L., Pascoe, C., Frenz, M., Brandl, C., & Nitsch, V. (in print). *Anforderungen durch Digitalisierung in KMU – Ergebnisse einer Unternehmensbefragung in Deutschland, Spanien und Großbritannien mit dem Fokus betriebliche Bildung*. wbv Bertelsmann.

Mütze-Niewöhner, S., & Nitsch, V. (2020). Arbeitswelt 4.0. In Walter Frenz (Ed.), *Handbuch Industrie 4.0: Recht, Technik, Gesellschaft* (pp. 1187–1217). Springer Vieweg.

Scholl, A. (2018). *Die Befragung* (4., bearbeitete Auflage). *UTB Sozialwissenschaften, Wirtschaftswissenschaften: Vol. 2413*. UVK Verlagsgesellschaft mbH.

Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education*, 5(1).

Spöttl, G., Gorldt, C., Windelband, L., Grantz, T., & Richter, T. (2016). *Industrie 4.0 - Auswirkungen auf Aus- und Weiterbildung in der M+E Industrie*. München.

Statista. (2021a). *Penetration of internet access among companies in Spain from 2014 to 2019, by service type.* https://www.statista.com/statistics/452467/internet-access-penetration-companies-spain-service-type/

Statista. (2021b). *Proportion of businesses with internet access in the United Kingdom (UK) from 2006 to 2019*. https://www.statista.com/statistics/282233/proportion-of-businesses-with-internet-access-in-the-uk/

Statistisches Bundesamt. (2020). *Anteil der Unternehmen mit Internetzugang in Deutschland in den Jahren 2005 bis 2020*. https://de.statista.com/statistik/daten/studie/151763/umfrage/anteil-der-unternehmen-mit-internetzugang-in-deutschland/

Treiblmaier, H. (2011). Datenqualität und Validität bei Online-Befragungen. *Der Markt Journal für Marketing, 50*, 3–18.

Urban, D., & Mayerl, J. (2018). *Angewandte Regressionsanalyse: Theorie, Technik und Praxis* (5., überarbeitete Auflage). *SpringerLink Bücher*. Springer VS.

Werning, E., Lentz, P., Wittberg, V., Sandoval, C., Lupp, N., & Fechner, S. (2017). *Studie Digitalisierungsindex bei KMU in NRW Ergebnisse des Digitalisierungsstands in den Branchen Industrie, Handwerk und industrienahe Leistungen*. Bielefeld. https://www.fh-mittelstand.de/fileadmin/pdf/Projekte/FHM_Digitalisierungsindex_NRW_Digital.pdf

Windelband, L. (2018). *Was bedeutet ‚prozessbezogen ausbilden' in der beruflichen Bildung im Zeitalter der Digitalisierung?* Nürnberg. https://www.agbfn.de/dokumente/pdf/AGBFN_betrieblichesLernen_Praesentation_Windelband.pdf

Windelband, L., & Spöttl, G. (2017). Einleitung. In G. Spöttl & L. Windelband (Eds.), *Berufsbildung, Arbeit und Innovation: Band 44. Industrie 4.0: Risiken und Chancen für die Berufsbildung* (pp. 7–20). W. Bertelsmann Verlag.

Zlatkin-Troitschanskaia, O., Beck, K., Sembill, D., Nickolaus, R., & Mulder, R. H. (2009). Perspektiven auf „Lehrprofessionalität" - Einleitung und Überblick. In O. Zlatkin-Troitschanskaia (Ed.), *Beltz-Bibliothek. Lehrprofessionalität: Bedingungen, Genese, Wirkungen und ihre Messung* (pp. 13–32). Beltz Juventa.

Acknowledgements

The online survey has been conducted within the project WorkingAge, funded by the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement N. 826232. The analysis presented in this study has been funded by the Bundesministerium für Bildung und Forschung (BMBF, Federal Ministry of Education and Research) and the European Social Fund (ESF) in the project WissProKMU under the Grant Agreement N. 02L17C000 in the programme "Innovations for tomorrow's production, services and work" and supervised by the Projektträger Karlsruhe (PTKA, Project Management Agency Karlsruhe). The responsibility for the content of this publication remains with the authors.

Biographical notes

Mattia Lisa Müller, M.A. is a research associate at RWTH Aachen University in the TVET department at the institute for industrial engineering and ergonomics. Her research scope includes qualitative and quantitative research on digital competencies in TVET and the integration of results in learning concepts for TVET.

Prof. Dr Phil. Dipl.-Ing. **Martin Frenz** is a professor at RWTH Aachen University and head of the TVET department at the institute for industrial engineering and ergonomics. His research scope focuses on workplace learning, teacher education for technical vocational schools as well as education of apprenticeship trainers.

Dr.-Ing. **Christopher Brandl** is a postdoc at RWTH Aachen University and head of the Ergonomics and Human-Machine Systems department at the Institute for Industrial Engineering and Ergonomics. His research scope focuses on ergonomics and ergonomic work design.

Univ.-Prof. Dr.-Ing. **Verena Nitsch** is a professor at RWTH Aachen University and head of the Institute of Industrial Engineering and Ergonomics. Her research scope focuses on human-centred work design and human-friendly digitalisation.

VETNET
European Research Network
Vocational Education and Training

Nägele, C, Stalder, B. E., Hoffelner, C., & Düggeli, A. (2022). Irritations in the career choice process and transformative learning. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 142–149). https://doi.org/10.5281/zenodo.6977532

Irritations in the Career Choice Process and Transformative Learning

Nägele, Christof
christof.naegle@fhnw.ch, University of Applied Sciences and Arts Northwestern Switzerland

Stalder, Barbara E.
Barbara.staldergphbern.ch, Bern University of Teacher Education, Switzerland

Hoffelner, Christine
christine.hoffelner@fhnw.ch, University of Applied Sciences and Arts Northwestern Switzerland

Düggeli, Albert
University of Teacher Education of the Grisons, PHGR, Chur, Switzerland

Abstract

Context: Vocational education and training (VET) plays an important role in Switzerland and has a high standing. Students' access to initial vocational education and training (iVET) at the upper secondary school level is prepared at the lower secondary. Many initiatives support them, and school has a crucial role in that process. *digibe*, which stands for "digital support in the career choice process and the impact of a systematic, digitally based reflection on career orientation", aims at strengthening reflective capabilities in career planning. Often, this is not given enough attention, as the focus of the support is on finding a follow-up solution. The development of career-oriented competencies, as they are asked for in research and the curriculum in career orientation at school, often is not considered so important. Reflection helps to better understand and, if necessary, also transform perspectives on one own's career planning.
Approach: *digibe* is a longitudinal intervention study running for four years (2021 – 2025). Participants are students from grades 9 to 11 in the German-speaking part of Switzerland. The intervention groups differ in the frequency students are asked to report irritating experiences during the career choice process and the frequency they are asked to work on tasks aiming to trigger reflection. The development is measured regularly by means of a questionnaire.
Findings: The baseline survey of *digibe* was carried out in September–October 2021, N = 2'848 (as of July 2022), and all school levels (tracks with basic vs extended requirements). Results show that N = 773, 27 % of the students reported irritating experiences and situations directly related to the vocational choice process. We find small, statistically significant mean differences in the readiness to reflect, but the effect sizes are very small. Only students in grade 11 who tell us that they have no irritating experiences are very low in their readiness to reflect. They do not need to reflect, as most of them will have their apprenticeship contract signed. The main findings are that students describe irritating experiences, they describe themselves as open to reflection, and that irritating experiences can trigger an in-depth reflection
Conclusion: The vocational choice process confronts students with irritating experiences which offer a possibility to reflect. Students tell us that they are generally willing to reflect on their career orientation process and integrate new information into their career planning. How this relates to the development of the career choice process must be shown in further analyses.

Keywords: career planning, career choice, initial vocational education and training, school

1 Focus of the Paper

In this paper, we outline the theoretical underpinning and the design of our intervention study *digibe* and present results about irritating situations during career planning as reported by students. *digibe* stands for "digital support in the career choice process and the impact of a systematic, digitally based reflection on career orientation". *digibe* aims at allowing students to take a self-determined and self-reflected career decisions.

This paper reports on results of the project *digibe.* We give some background information on how vocational orientation is realised at the lower secondary level to show the problem we address with *digibe*. We then make the point that irritating events during vocational orientation can be a point of departure to develop further career planning, including the transformations of previously unreflected positions. We then describe naturally occurring and ask whether these events can trigger reflection.

1.1 digibe[1]

digibe is an intervention study running for four years (2021 – 2025). Participants are students from grades 9 to 11 at lower secondary schools. We recruited classes in several cantons of the German-speaking part of Switzerland. A single intervention consists of reflecting on the career choice with the support of the *digibe* tool and, some days later, filling in a short questionnaire to keep up with the changes in the vocational choice process. The classes were assigned to different intervention groups: *plus i* with three interventions per semester, *plus s* with two interventions, *flexible* with the number of interventions chosen by the teacher, and *base* where only the questionnaire is filled in.

2 Vocational Orientation at the Lower Secondary Level

In Switzerland, significant career decisions are taken at the lower secondary level, as the students must decide to either follow a vocational track or school track at the upper secondary level.[2] The share of students in iVET on the upper secondary level is 59 % (FSO, 2022). It is traditionally higher in German-speaking Switzerland than in French- or Italian-speaking Switzerland and higher outside the large urban centres. Vocational orientation at lower secondary school is an important issue, which is proven by many initiatives from cantonal education offices, vocational career guidance, and companies as well as the Universities of Teacher Education (Nägele & Schneitter, 2016).

Within these activities, school plays an important role. In the national curricula for compulsory school (F-CH: CIIP, 2010; D-CH: D-EDK, 2016; I-CH: Divisione della scuola, 2016), vocational orientation at school is first described as an independent subject with an allocation of hours. Second, it is a transversal subject linked to other subjects, like language.

According to the curricula, schools initiate the vocational choice process, aiming at supporting their students in developing career-related competencies, for example, the competence to describe and develop the personality, to take complex decisions or the competence to find and integrate information on career opportunities.

In the Swiss collective skills formation system (Busemeyer & Trampusch, 2012), with its competitive and selective apprenticeship market and an education system that opens up for higher and further education for everybody (Stalder & Lüthi, 2020), young people should think about their career prospects as early as possible.

---

1 www.digibe.ch

2 https://www.edk.ch/en/education-system/diagram?set_language=en

To our knowledge, only little is systematically known about how teachers in Switzerland design their lessons in vocational orientation and how they define their role and mission in vocational orientation. For example, let's take the curricula as a point of reference. Teachers are expected to support their students develop career-related competencies and to shift from instructing to coaching in interacting with their students. Switching between the two "modes of operation" is often difficult, as the tasks differ significantly. Teachers are experts in their subject area; they know the goals and are familiar with didactical concepts in teaching a specific subject. The teacher as a coach needs to shift his/her mindset. There is, for example, no right or wrong in career planning as it is in Maths or Grammar. By contrast, the goals of career orientation are not defined by a curriculum and a teacher, as the students themselves need to develop the goals of their career planning, and the parents are much more involved to point to some differences. The Erasmus+ project VETteach has clearly shown that this effort to switch from instructing to coaching should not be underestimated (Nägele & Stalder, 2022).

We know from interviews conducted by student teachers with teachers and workplace trainers that the requirements formulated in the curricula are often hard to meet in practice. Teachers are expected to support their students individually in the development of their careers. This individualisation is often challenging to implement due to a lack of resources. Teachers also report that they are heavily under pressure to find an educational solution for every student, at the latest when students leave school at the end of lower secondary. This pressure is set up by school authorities, cantons, or parents. This pressure has a rational cause. There is a large consensus that every student should find a direct continuation of his/her education and training at the upper secondary level (EDK et al., 2015). This favours a process of searching for the right profession based on the student's grades and characteristics. The rationale is that young people without a certifying diploma in the upper secondary have almost no chance to survive in the labour market and that the risk increases if they drop out of education and training in transition from lower to upper secondary (Stalder & Schmid, 2016). The backlash is that there is much pressure imposed on students and teachers to continue with education and training after compulsory school or with a maximum delay of one year (interim solutions). These initiatives contribute to 77 % of the students making a direct transition from lower to upper secondary education, which increases within three years to 96 %.[3]

Such matching-attempts are broadly rooted in the tradition established by Holland and his RIASEC-model (1997). This model assumes that vocational interests emerge early, are stable and are realised in a fitting job. The RIASEC model was already criticised by Super (1994), in particular, because it neglects development issues. Savickas et al. (2009) later posit career planning and development as a lifelong design process. Following this approach, *digibe* sees career planning as a lifelong process where interests can develop and change, for example, through learning experiences (Lent & Brown, 2019).

Based on interviews with teachers, we know that many of them make first a triage. For example, they identify students heading towards general education on the upper secondary level as early as possible. These students are then exempted from classes in vocational orientation. This is, first, in contradiction to the demands formulated in the curriculum, which asks all students to develop career competencies. Second, vocational orientation then often becomes a matching game as described above: results of interest tests, lower secondary school types (i.e. more or less demanding tracks), and school grades are taken together to find the best fitting solution for the student. In doing this, the school starts taking on the responsibility for the student's decision, which is not at all a goal formulated in the curriculum.

[3] https://www.bfs.admin.ch/bfs/de/home/statistiken/bildung-wissenschaft/bildungsindikatoren/themen/uebergange/uebergang-sekii.html

So, we see two contradictory positions. On the one hand, the primary goal is the development of career competencies through reflection and work experiences, leaving the decisions on how to proceed with the career to the students and their parents. On the other hand, there are strong initiatives to guide students in finding the best fitting apprenticeship as an outcome of vocational orientation at school.

Some projects try to induce reflection to develop competencies supporting self-directed career management (Hirschi & Koen, 2021), or there are teaching materials focussing on reflection (Schmid, 2015). However, given a lack of resources and time constraints, for many teachers, the "matching approach" might be more attractive, and in consequence, the use of teaching material and instruments which are based on the principles of testing the personality, taking the grades into account, and matching both with job profiles.

Thus, we are in a situation where we have an established practice where the schools have – to put it in a nutshell – the role of matchmakers. Developing career-related competencies and the ability to reflect to evaluate, question and strengthen career planning has often a hard stand in practice. And here is where *digibe* steps in.

3 Irritating Experiences, Reflection and Transformations

Reflection is essential, as career orientation confronts young people with the challenge of designing multiple options for action, identifying numerous and often fast-moving changes in the world of work whilst productively shaping the future. It helps one become self-conscious about thoughts, emotions, and actions (Silvia, 2021). Reflection can start if the student is ready to engage in and deal intensively with the career choice process. The readiness to reflect depends on situational (for example, time) and individual factors (for example, open-mindedness, wholeheartedness, and responsibility, according to Dewey, 1933). An initial irritation or disorientation can lead to a struggle for clarity (Bromberg, 2017).

Ideally, these reflections result in new insights. This happens when students transform their perspectives (Mezirow, 2009). Transformations comprise the consolidation of insights or the emergence of new insights. Transformative learning refers to the qualitative change of an individual's perspective, which allows an individual to think and act differently, transforming their perspectives on their career in general and on a VET career in particular.

3.1 Inducing Reflection

In *digibe*, we invite students to engage in a broader and profound reflection through reflection-related and thought-provoking impulses. These impulses can either occur naturally, such as during work experience days (Schnupperlehre), in discussions with their peers or parents or in any other event related to the career choice process. Students are regularly asked to describe events that made them reflect or talk to others. Additionally, they are confronted with tasks covering essential aspects of career orientation (family, culture, gender, peers, available options, life-long perspectives, decisions etc.). These tasks are meant to stimulate reflection about the career choice process in the absence of or parallel to events that occur in young people's lives. Ideally, reflection results in learning and the transformation of perspectives.

There is no expectation that *all* students will start reflecting, and it might be that some students will resist reflecting, even after irritating experiences. It is part of the project to show whether, in which situations and to what extent students reflect.

As a precondition, there must be an openness and readiness to reflect. The theory of transformative learning describes this process in ten steps of a systematic reflection (Mezirow, 2009). Reflection starts with thinking about the situation and the own behaviour in it. Reflection then opens to include a perspective on how others would handle that situation. Next, options are elaborated on how to react to the situation differently. For example, a student could conclude that he/she was too shy in presenting him-/herself in a job interview and that he/she wants to

change that. Then the focus of reflection shifts to comparing the reaction one showed and the reaction one would have liked to show. The student concludes then, for example, that it was totally normal that he/she was shy, as all his/her colleagues had the same experience. The reflection could stop here or deepen by asking how to become less shy in future job interviews. Further, options are developed, mentally tested, and discussed with others to form ideas on how to react differently in similar situations in the future. The student has then learned to be less shy in future job interviews.

3.2 Irritating Experiences and Situations

Based on the theory of transformative learning (Mezirow, 2009), reflecting on irritating experiences and situations can be a chance to question and develop opinions or perspectives on how the world is seen. This can impact career choice processes. In transformative learning theory, it is typically an adult that is meant to start reflecting on his/her perspective and eventually changes his/her career. The experiences that young people can reflect on in the vocational choice process come from their school environment, families, or work experience days.

Reflection is only triggered if there is a positive or negative irritation. But do the young people experiences situations in their career planning that irritate them and become a nucleus for reflection and transformations? We think that their experiences from school, work experience days, or the family can be a starting point of reflection. The family, for example, has a significant effect on a student's career decision (Billett et al., 2022). Parents have a say in their children's career choices through their parental authority and must legally sign the apprenticeship contract or school application forms. They also shape their children's careers through implicit or explicit norms and expectations. *digibe* aims to make the influence of the family visible and bring it to a conscious discussion. Herby, students are expected to develop their position, which can align with the family's position but also deviate from it.

4 Results

4.1 The Occurrence of Irritating Situations

The baseline survey of *digibe* was carried out in September–October 2021, N = 2'848 (as of July 2022), grades 9 to 11, and all school levels (tracks with basic vs extended requirements).

We asked the students whether they had an irritating experience in their vocational choice process. These were experiences that they thought about afterwards or talked about with other people. First results show that N = 773, 27 % of the students reported irritating experiences and situations directly related to the vocational choice process. Many also reported irritating experiences unrelated to the vocational choice process. Such experiences were not considered in this analysis.

First, we coded the situation that triggered reflection. The students reported (a) irritating experiences without naming a specific situation (N = 504) and irritations due to specific situations such as (b) work experience days (N= 151), (c) discussions with other people (N = 61), (d) applications for an apprenticeship or school (N 58), and (e) information events or tests (N= 28).

(a) Irritating experiences can lead to reflections that i) change the perception of a specific job, ii) an evaluation of the own performance skills, iii) changes in vocational interests, or iv) questioning a decision.

i) *Changes in the perception of specific jobs*. Exemplary statements were: "I have another picture of the job" (MUDOY) or "I have learnt that there is no apprenticeship to become a schoolteacher" (HNMIV). Some students develop a more differentiated but negative perception of the job. Examples are: "I am shocked that you earn very little in certain occupations" (HTUCB) or "That you have to work very long hours and that you have to do

everything you are told to do" (AANYK). Or the students got new information about a job and extended their initial picture. Examples are: "I am amazed at how many new occupations there are" (FMYAH) or "That there are so many different possibilities" (JLQQO).

(ii) An *evaluation of the own performance skills* is shown in comments like "I forgot what I wanted to say when I had to speak in front of people" (VBOQR) or "I have said things I did not mean" (PZQIG).

iii) *Changes in vocational interests* can lead to new career orientation, "I suddenly had a new career aspiration" (YBJDC) or even confusion, "When I no longer knew what I wanted" (RLGDN).

iv) Some students question their decisions. They become insecure, "That I was suddenly unsure about my career planning" (CVXFN) or blocked, "Not being able to make a decision" (NIUPW).

(b) A work experience period can lead to manifold reflections. Examples of statements are: "During my work experience days, no one paid any attention to me (QTHMX), "I expected something different from an occupation, but it was completely different from what I had imagined" (DDDNW), "Boring, tedious" (EWJCU). Most reports are negative, but there are also positive reports on the work experience days. Examples of positive experiences are: "It was cool" (NMAZW) or "People were much more relaxed than expected (SKFWD).

(c) It can irritate students if they receive too much or contradictory information on occupations. Examples are: "When I was at the career fair and saw so many occupations, but almost none of them appealed to me" (KKDZA) or "I got to know occupations that might suit me that I didn't even know about" (RHNBX).

(d) Discussion with other people on the vocational choice process can be irritating. Examples of statements are: "Everyone asks me what I want to be and that irritates me. Because I'm not sure yet what I want to be. And that makes me anxious" (YTZLR) or "My parents wanted me to become a medical doctor, but I don't like the profession of doctor at all" (JUOWJ) or "My father told me I needed more than two ideas of what I wanted to do" (NYIOT).

(e) If it comes to applications for jobs or schools, the irritating events are, for example: "I got many rejections" (ILTMB) or "I have called many companies, but no one has answered" (VIWAR) or "Cancellation after the work experience despite good feedback" (QCNOK).

These quotes show that some students have puzzling and irritating experiences during the vocational choice process. The results also show that students report mainly negative experiences but also some positive experiences. The results present a snapshot at the beginning of the school year in grades 9, 10 or 11.

4.2 Reflection Triggered by Irritating Events

We asked students whether they were generally ready to reflect critically on aspects of their vocational choice process. The scale is built with three items, for example, "I am ready to accept new ideas, even if I reject them at first", measured on a scale from 1 "not at all" to 5 "completely", N = 2'835, M = 3.71, SD = .71, Cronbach's Alpha = .725.

We find that those students that reported irritating situations, M = 3.78, SD = .70, are more ready to reflect critically than the other students, M = 3.68, SD =.71, the mean difference is statistically significant, t (2833) = -.304, $p < .01$, but the effect size is small, Cohen's d = .13. We also tested for gender differences in the readiness to reflect, and found no significant mean difference, t (2825) = 2.49, p = .19. The readiness to reflect increases from grade 9 to grade 11 for all students but is lower for those in grade 9 that did not experience irritating situations. Again, the effect size is relatively small. Only in grade 11, students reporting on irritating experiences are more ready to reflect, M = 3.49, SD = .82, than the other students, M = 3.89, SD = .76, t (190) = -2.990. $p < .01$, Cohen's d = -.49, which is still a small to medium effect. This

data shows that the students in grades 9 to 11 see themselves as relatively open to critically reflecting on career-related experiences and accepting new ideas. As mentioned, this is data from the beginning of the study, collected at the beginning of the school year. Further analyses will show how students' readiness to reflect develops longitudinally and whether this general openness towards new ideas corresponds to what and how the young people plan their careers.

According to the theory of transformative learning, reflection has different foci or steps (Mezirow, 2009). We asked those students who reported on irritating experiences whether this triggered an in-depth reflection. In N = 1'012, 73 % of the students, the irritating experience triggered an in-depth reflection about themselves and initiated the development of new strategies and implementation. N = 113, 8 %, students stopped after reflecting on themselves. The others, N = 86, 19 % showed different patterns as, for example, thinking about implementing new strategies without prior reflection on themselves or developing new strategies. We see that irritating events during the vocational choice process can trigger an in-depth reflection about the experience, how others act in similar situations and look for new strategies and the formation of an intention to change oneself.

5 Discussion

The vocational choice process confronts students with irritating experiences which offer a possibility to reflect. Work experience days (Schnupperlehre), the discussion with other people, for example, the parents, and experiences with job applications positively or negatively challenge career planning. Students are generally willing to reflect on their career orientation process and integrate new information into their career planning. Many students with irritating experiences take them as a chance for an in-depth reflection. In this paper, we described irritating experiences and situations of students and showed that they can trigger reflection. Whether this leads to transformative learning by either change in the career planning or better-founded reasoning on their career planning is subject to further analysis.

Acknowledgements

The project *digibe* – digital support in the career choice process/the impact of a systematic, digitally based reflection on the career orientation digibe digital support in the career choice process project, which runs from 2021 to 2024, is co-financed by the State Secretariat for Education, Research, and Innovation SERI.

References

Billett, S., Stalder, B. E., Aarkrog, V., Choy, S., Hodge, S., & Le, A. H. (2022). *The standing of vocational education and the occupations it serves*. Springer Natur. https://doi.org/https://doi.org/10.1007/978-3-030-96237-1

Bromberg, K. (2017). Fostering transformative learning through dialogical writing. In A. Laros, T. Fuhr, & E. W. Taylor (Eds.), *Transformative learning meets Bildung* (pp. 305–316). Sense Publishers. https://doi.org/10.1007/978-94-6300-797-9_25

Busemeyer, M. R., & Trampusch, C. (2012). The comparative political economy of collective skill formation. In M. R. Busemeyer & C. Trampusch (Eds.), *The political economy of collective skill formation* (pp. 3–38). Oxford University Press.

CIIP. (2010). *Plan d'études romand*. Conférence intercantonale de l'instruction publique de la Suisse romande et du Tessin (CIIP). https://www.plandetudes.ch/

D-EDK. (2016). *Lehrplan 21: Gesamtausgabe*. Deutschschweizer Erziehungsdirektoren-Konferenz (D-EDK). https://www.lehrplan21.ch/

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*.

Divisione della scuola. (2016). *Piano di studio della scuola dell'obbligo ticinese*. Repubblica e Cantone Ticino Dipartimento dell'educazione, della cultura e dello sport. www.ti.ch/pianodistudio

EDK, SAV, SGB, SER, SBFI, SER, sgv, travail.suisse, & LCH. (2015). *Übergang Obligatorische Schule – Sekundarstufe II. Programmatische Erklärung der Kantone, des Bundes, der Organisationen der Arbeitswelt,*

der Lehrerorganisationen. Schweizerische Konferenz der kantonalen Erziehungsdirektoren (EDK); Schweizer Arbeitgebervereinigung (SAV); Schweizerischer Gewerkschaftsbund (SGB); Syndicat des enseignantes et des enseignants de Suisse romande (SER); Staatsekretariat für Bildung Forschung und Innovation (SBFI); Schweizerischer Gewerbeverband (sgv); Dachverband der Arbeitnehmenden Travail.Suisse; Dachverband Lehrerinnen und Lehrer Schweiz (LCH).

FSO. (2022). *Education statistics 2021*. Swiss Confederation, Federal Statistical Office FSO.

Hirschi, A., & Koen, J. (2021). Contemporary career orientations and career self-management: A review and integration. *Journal of Vocational Behavior*, *126*, 103505. https://doi.org/10.1016/j.jvb.2020.103505

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments*. Psychological Assessment Resources.

Lent, R. W., & Brown, S. D. (2019). Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models. *Journal of Vocational Behavior*, *115*, 103316. https://doi.org/10.1016/j.jvb.2019.06.004

Mezirow, J. (2009). An overview on transformative learning. In K. Illeris (Ed.), *Contemporary theories of learning: Learning theorists ... In their own words* (pp. 90–105). Routledge.

Nägele, C., & Schneitter, J. (2016). *Schul- und Berufsorientierung in den Kantonen. Schlussbericht zuhanden der Schweizerischen Konferenz der kantonalen Erziehungsdirektoren EDK*. Pädagogische Hochschule FHNW, Institut Forschung und Entwicklung.

Nägele, C., & Stalder, B. E. (2022, June 17). *Teachers' roles in supporting careers of students* [Presentation, final project meeting Erasmus+ project VETteach].

Savickas, M. L., Nota, L., Rossier, J., Dauwalder, J.-P., Duarte, M. E., Guichard, J., Soresi, S., Van Esbroeck, R., & van Vianen, A. E. M. (2009). Life designing: A paradigm for career construction in the 21st century. *Journal of Vocational Behavior*, *75*(3), 239–250. https://doi.org/10.1016/j.jvb.2009.04.004

Schmid, R. (2015). *Wegweiser zur Berufswahl*. S&B Institut für Berufs- und Lebensgestaltung AG.

Silvia, P. J. (2021). The self-reflection and insight scale: Applying item response theory to craft an efficient short form. *Current Psychology*. https://doi.org/10.1007/s12144-020-01299-7

Stalder, B. E., & Lüthi, F. (2020). Job resources and career success of IVET graduates in Switzerland: A different approach to exploring the standing of VET. *Journal of Vocational Education & Training*, *72*(2), 189–208. https://doi.org/10.1080/13636820.2020.1721735

Stalder, B. E., & Schmid, E. (2016). *Lehrvertragsauflösung und Ausbildungserfolg—Kein Widerspruch. Wege und Umwege zum Berufsabschluss*. hep verlag.

Super, D. E. (1994). Der Lebenszeit-, Lebensraumansatz der Laufbahnentwicklung. In D. Brown & L. Brooks (Eds.), *Karriere Entwicklung* (pp. 211–280). J.G. Cotta'sche Buchhandlung Nachfolger GmbH.

Biographical Notes

Dr **Christof Nägele** is a senior lecturer and researcher at the University of Applied Sciences and Arts Northwestern Switzerland, School of Education. He is co-chair of the European researchers VETNET. His research interests focus on VET, vocational choice, adjustment processes, social and group processes in VET, and transferable skills.

Dr **Barbara E. Stalder** is a full professor in educational and social science at the Institute of Upper Secondary Education at the Bern University of Teacher Education, Switzerland. She is co-chair of the European researchers VETNET. Her research interests focus on learning in the workplace and school, student engagement, and career development in and after vocational education.

Christine Hoffelner is a doctoral student at the University of Basel, a research assistant and lecturer at the University of Applied Sciences and Arts Northwestern Switzerland, School of Education. Her research interests focus on media and game pedagogy and its added value for vocational orientation.

Dr **Albert Düggeli** is a professor and Vice-Rector Research and Development at the University of Teacher Education of the Grisons. His research focuses on educational processes, resilience development and youth in the transition to adulthood.

VETNET
European Research Network
Vocational Education and Training

Papić-Blagojević, N., Tomašević, S., Račić, Ž, & Savić, M. (2022). Challenges and examples of apparent good practice developed in the PRO-VET project in VET teacher education in the Republic of Serbia. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 150–161). https://doi.org/10.5281/zenodo.6977540

Challenges and Examples of Apparent Good Practice Developed in the PRO-VET Project in VET Teacher Education in the Republic of Serbia

Papić-Blagojević, Nataša
npapic.blagojevic@gmail.com, Novi Sad School of Business, Serbia

Tomašević, Stevan
tomasevic.vps@gmail.com, Novi Sad School of Business, Serbia

Račić, Željko
raciczeljko@gmail.com, Novi Sad School of Business, Serbia

Savić, Mirko
savicmirko@ef.uns.ac.rs, University of Novi Sad, Faculty of Economics, Serbia

Abstract

Context: This study is part of an Erasmus+ KA2 CBHE project, „Professional Development of Vocational Education Teachers with European Practices/Pro-VET “, and it represents one of the final results of the conducted research and delivered courses among VET teachers in the Republic of Serbia.
Approach: The research is based on three iterations of VOOC titled „Effective team working for VET teachers according to EU practice“developed during the project life and the evaluation results of that process. All participants, 192 in total, have had an opportunity to fill out the questionnaire about using group and team working in their everyday teaching activities and express their knowledge about these topics before the iteration starts. The results are summarised and presented through descriptive statistics, and logistic regression was used to measure the level of significance of the selected variables.
Findings: Empirical research was conducted by collecting and analysing primary data using a survey method. To meet the needs of VET teachers in the Republic of Serbia, an online survey was designed, which referred to teachers' attitudes on team working in VET institutions. The research results are based on the sample, which included 192 respondents. Statistical analyses of all collected data (descriptive statistics, linear correlation, logistic regression analysis) were used to draw conclusions about the relationships between the observed variables.
Conclusion: Logistic regression analysis confirmed that the strongest and statistically significant predictor of the answer that teachers use teamwork is synergy. Other factors do not have a statistically significant effect on the use of teamwork. This research has shown several conclusions: communication in teams is open but not practical; despite adequate leadership, the roles in the teams are not clearly defined; and as a result, the team members do not have a strong sense of belonging to the team. It reduces the synergistic effect.

Keywords: professional development, vet teachers, online training, team working skills

1 Introduction

The professional development of teachers in the Republic of Serbia is regulated by appropriate national acts and defined legal frameworks which prescribe the need and necessity of continuous training as a legal obligation. The importance of the professional development of educational professionals is universal (Seuneke et al., 2021). In Serbia, the reform of the professional development of teachers began in 2002. After that, the legal obligation of continuous professional development of employees in education was introduced by the national authorities (Papić-Blagojević et al., 2020). The teacher training process was further developed and improved through policy definition and creating a system of professional development of teachers at the national level.

Teacher competencies are defined within the Rulebook on Competence Standards for the teaching profession and their professional development (2011), which explains the socially expected roles of teachers that are the basis for defining the training content. The Rulebook on the Continuing Professional Development of Teachers (2021) defines professional development as a complex process aimed at the constant review and development of employees' competencies in the education system. Concurrently, a vital goal of the Strategy for the Development of Education in the Republic of Serbia until 2030 (2021) is the professional development of employees in education to raise the capacity and quality of teaching staff. The Action Plan from 2021 to 2023 for the Strategy's implementation (2021) defines the priorities for systematically implementing specific measures and activities to improve education development. One of the main goals is the professional development of teachers at all levels, and one of the particular actions is related to improving teacher competencies in vocational studies (Burns et al., 2020). In this way, Serbia has announced and launched various reforms to address a growing demand for a better and more equitable education system (Maghnouj et al., 2020).

In Serbia, the importance of continuing professional development (CPD) for VET teachers is not in question (Maksimović, 2016). Still, research conducted in 2016 has shown that most respondents (75 %) think it is primarily their responsibility to identify their own CPD needs. Regarding the respondents' current needs, 65 % claim a moderate or high level of demand for implementing new technologies in the workplace, for ICT skills, 56 %, and for teaching cross-curricular skills 53 % (Maksimović, 2016). Some findings of the research conducted in 2016 by the European Training Foundation underline the need for further improvement, especially in the VET teachers' education field in Serbia, considering it as a separate component of the CPD system (Burns et al., 2020).

Rulebook on the Continuing Professional Development of Teachers, Pre-School Teachers and Professional Associates (2016) was introduced in 2016 to overcome the lack of needed skills, recognising and regulating online training delivery. To encourage teachers to use online platforms and digital tools in teaching, the national Ministry of Education, Science and Technological Development published the Digital Competence Framework – Digital Age Teacher in 2017 to support teachers from the education system in Serbia in integrating digital content into everyday practice. The document lists and defines the skills, goals and expected outcomes that form a corpus of digital competencies of the teaching profession. Since then, online training has become an increasingly popular form of professional development and is also frequently organised by education authorities (Progress report, 2018).

Guided by national priorities on the professional development of VET teachers, Pro-VET project team members from the University of Novi Sad and the Novi Sad School of Business have developed an online training course to develop team-working skills of VET teachers. The course is designed under the supervision of EU project partners, JAMK University of Applied Sciences, Finland, Universität Bremen, Institut Technik und Bildung, Warnborough College, Ireland, and Aeres University of Applied Sciences Wageningen, Netherlands.

Creating a high-quality online course should have grounds in researching teachers' needs, and it should cover some of the specific demands of VET teachers' development (Burns et al., 2020). The need for developing team-working teachers' skills arises from two research conducted in 2019 as a part of the Pro-VET project. In the first research, the Serbian project team surveyed 125 teachers of different professions (Papić-Blagojević et al., 2020). It included an assessment of the level of teacher competencies, soft skills and the need for additional pedagogical and psychological, as well as methodological education necessary for the successful implementation of teaching.

The research results showed that, out of the total number of respondents, as many as 31.5 % of VET teachers in their previous formal or non-formal education had not had the opportunity to acquire knowledge and develop competencies in this area. Also, 31.4 % of respondents received knowledge on their initiative by studying professional literature without attending formal training programmes. The results also indicate that a tiny percentage (2.4 %) of teachers participated in some form of online training and professional development program, which implies that most teachers if they opt for some training, focus on programmes that take place in actual circumstances (Lungulov et al., 2021). The research has also shown an interest in further training and professional development. Some of the proposed training topics focus on acquiring pedagogical and psychological knowledge, for example, new learning methods, cooperative learning, group work in teaching, etc. Also, the respondents have shown interest in getting additional computer knowledge such as applying new technologies in education, using educational platforms, etc. There was also an interest in developing soft skills like teamwork, conflict resolution, student motivation, etc.

The second research was conducted to develop the course content that would best meet the needs of teachers in VET schools in Serbia (Papić-Blagojević et al., 2021). The „Attitudes of VET teachers on group and team working in educational institutions" questionnaire was delivered to 138 teachers in different VET institutions. The results have shown that even 39.9 % of teachers answered that they were not motivated to use group work in class. Also, 67.4 % of surveyed teachers do not use the learner-centred approach. At the same time, in part about teamworking skills, 46.4 % of respondents state that there is no effective communication among the team members in the teams where they belong, and 48.6 % do not feel like important team members. These results encouraged Pro-VET project members from Serbia to develop an online course, „Effective team working for VET teachers according to EU practice ".

2 Team Working and its Role in the Professional Development of Teachers

Teamwork can be analysed, observed and used from different aspects and for different meanings. Teamwork is a generic and transversal skill characterised by its relational dimension. It is defined as the capacity to integrate into and interact with work groups, striving toward achieving common goals (Romero-Díaz de la Guardia et al., 2022; Anderson-Butcher et al., 2014; Barraycoa-Martínez & Lasaga-Millet, 2010; González & Wagenaar, 2003). When we talk about teamwork and its more frequent use in teaching, it is one way to ensure interdisciplinary education, overcome the isolation of certain teaching subjects, and ensure rational use of teaching staff and school space (Papić-Blagojević et al., 2021; Španović & Đukić, 2006). Teamwork is usually represented in teachers' organisational, advisory, and administrative work, primarily within projects, while in teaching activities, it occurs rarely and sporadically (Vasiljević et al., 2017).

The literature usually defines teachers' teamwork as the joint and cooperative work of two or more teachers of the same or different professions based on cooperation, exchanging ideas and opinions. Teamwork, defined like this, aims to achieve the goals defined by the teaching process, improve the quality of teaching and learning and, finally, contribute to teachers' professional development. Erb and Dickinson (1997) consider that the team is most often expressed

through the work of two or more teachers with shared responsibility for teaching the same group of students. Forming a team of teachers is a process. In order to create a good, cooperative team, it is necessary to slowly and carefully develop a climate of trust among team members to recognise, engage and evaluate the abilities and skills of each teacher (Đukić & Španović, 2008). Teamwork in education should be supported by understanding its theoretical foundations and appropriate skills and training for its planning and implementation (Main, 2010).

3 Empirical Research About the Use of Teamwork in Teaching Practice

3.1 General Notes and Frequency Analysis

Empirical research started with expanding the primary research conducted in 2019 to develop the course content that would best meet the needs of teachers in VET schools in Serbia. Based on a literature review about teamwork, selected findings were adapted and included in the questionnaire „Attitudes of VET teachers on group and team working in educational institutions ". Empirical research was conducted using a survey method. To meet the needs of teachers in VET institutions in the Republic of Serbia, the authors conducted an online survey, which referred to teachers' attitudes on team working in VET institutions. The research results are based on the sample, which included 192 respondents.

The survey was structured in several parts. The first part of the research provides general data from the sample (gender, age, work experience). The second part of the survey, „Use of teamwork in teaching", aimed to assess whether and how VET teachers in Serbia use teamwork in everyday teaching. The third part of the survey includes 25 statements and seeks to estimate the level of teamwork efficiency across the VET institutions in the Republic of Serbia. This part analysed three crucial aspects of teamwork efficiency: synergy in teams, encouraging innovation and development of team skills. The degree of agreement with the statements was measured using the Likert five-point scale, where one (1) indicates that the respondent absolutely disagrees and five (5) completely agrees with the statement.

SPSS (The Statistical Package for the Social Sciences) is used to analyse the collected data. Statistical methods of analysing data in this study were implemented as follows: descriptive statistical analysis, correlation, and logistic regression analysis. The first step applied descriptive statistical analysis to the whole sample. Arithmetic means and standard deviations were calculated for each variable to determine the homogeneity/heterogeneity of teachers' attitudes. The reliability of the obtained variables and the internal consistency of the accompanying findings were measured based on values of the alpha coefficient (Cronbach's alpha). Before performing the regression analysis, correlation analysis is presented, i.e. the degree of linearity was checked dependencies (correlations) between variables. Finally, logistic regression analysis determined the statistical significance of the influences identified by variables on the use of teamwork.

Table 1 is shown that of 192 respondents, 77.6 % are female, while 22.4 % are male. Most respondents (79.2 %) are between the ages of 30 and 55, while only 4.7 % are under 30. Finally, 62.5 % of respondents have between 11 and 30 years of work experience, while those with more than 31 years of teaching experience are 14.6 %. Based on the previous information, it was concluded that the sample consists mainly of younger and middle-aged female persons with work experience of over ten years.

Over 81 % of respondents answered that they use teamwork primarily within professional bodies at the institution, and 88 % do it often within the teaching classes. It is essential to emphasise that among VET teachers, there is a lack of motivation regarding using groups or teamwork. According to survey results, more than 36 % of respondents are not motivated to be part of the teams. Thus, it can be said that creating and implementing an online course about teamwork

can be very useful for raising the competencies of VET teachers in Serbia and bringing the quality of the teaching process closer to European best practices.

Table 1
General data - Frequency

	Frequency	%
Gender		
Female	149	77,6
Male	43	22,4
Age		
Less than 30 years	9	4.7
Between 30 and 55 years	152	79.2
More than 55 years	31	16.1
Work experience		
Less than 10 years	44	22.9 62.5
Between 11 and 30 years	120	14.6
More than 30 years	28	
Use teamwork within professional bodies at the institution		
Yes	156	81.3
No	36	18.7
Use teamwork within the teaching classes		
Yes	169	88
No	23	12

Note. Author's calculation.

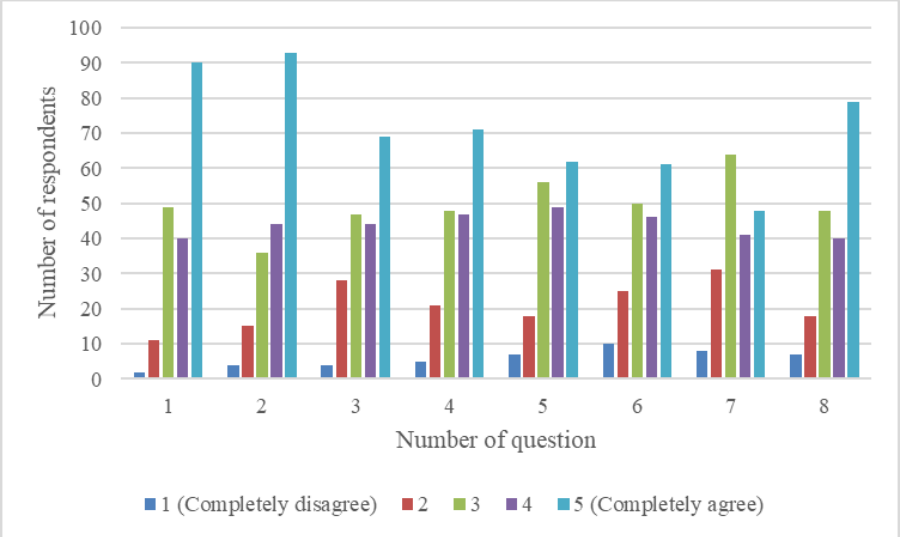
Over 81 % of respondents answered that they use teamwork primarily within professional bodies at the institution, and 88 % do it often within the teaching classes. It is essential to emphasise that among VET teachers, there is a lack of motivation regarding using groups or teamwork. According to survey results, more than 36 % of respondents are not motivated to be part of the teams. Thus, it can be said that creating and implementing an online course about teamwork can be very useful for raising the competencies of VET teachers in Serbia and bringing the quality of the teaching process closer to European best practices.

Sinergy as the combined power of a group and more significant than the total power achieved by each working separately presents one of the essential effects of teamwork. Consequently, the authors wanted to investigate respondents' attitudes related to issues, significantly determining the power of the synergistic impact within teamwork. The obtained answers are presented in Figure 1.

Using a Likert scale from 1 (completely disagree) to 5 (completely agree), respondents expressed a degree of personal agreement on the following questions: (1) Belonging to each team is clearly defined; (2) The goal of the team I belong to is clearly defined; (3) Every member of the team is clear about their role in the team; (4) Team communication is efficient; (5) I feel like an important member of the team; (6) I am proud to belong to my team; (7) Each team member strives to the maximum during the team's work and (8) Team leadership is efficient and adequate.

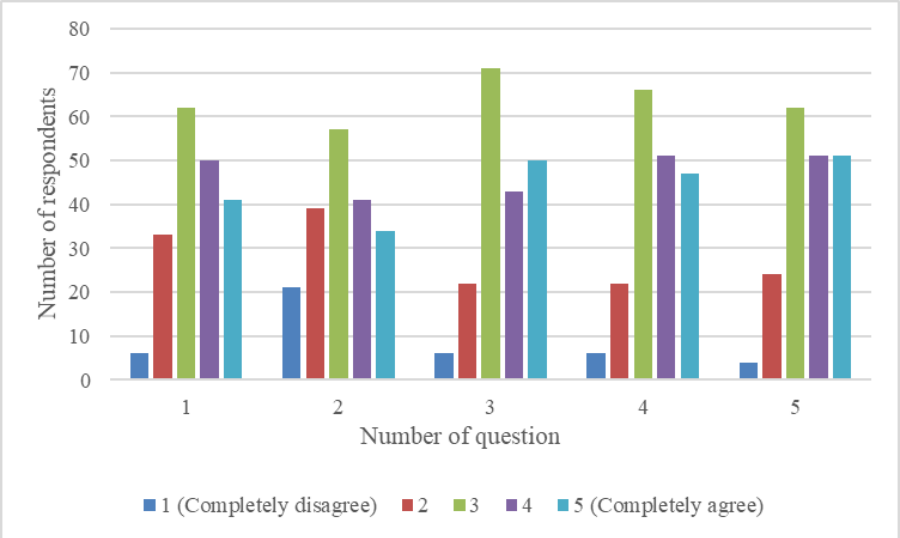
Based on the obtained answers, it can be concluded that the aims of teamwork and leadership are clearly defined. On the other hand, the respondents assessed that they do not have a strong sense of belonging to the teams. In addition, they showed a lower degree of agreement with the claims that roles in teams are assigned precisely, and that communication in teams is effective.

Figure 1
Estimation of synergy effect in teamwork



The second important aspect of teamwork efficiency is innovation, i.e. encouraging team members to use innovative approaches in teamwork and problem-solving. Innovations commonly involve changes to an array of processes and are rarely the result of one individual's activity. Thus, teamwork and cooperation are essential to implement innovation effectively. To assess the use of teamwork to encourage innovation, respondents provided answers to the following questions: (1) Team members are encouraged to try new teaching methods; (2) Every innovation in the work of the team is appreciated and rewarded; (3) Problems in the work of the team are quickly detected; (4) Issues in the work of the team are solved rapidly, and (5) Problem-solving is perceived as team learning and team development. The obtained results are presented in Figure 2.

Figure 2
Estimation of innovation support

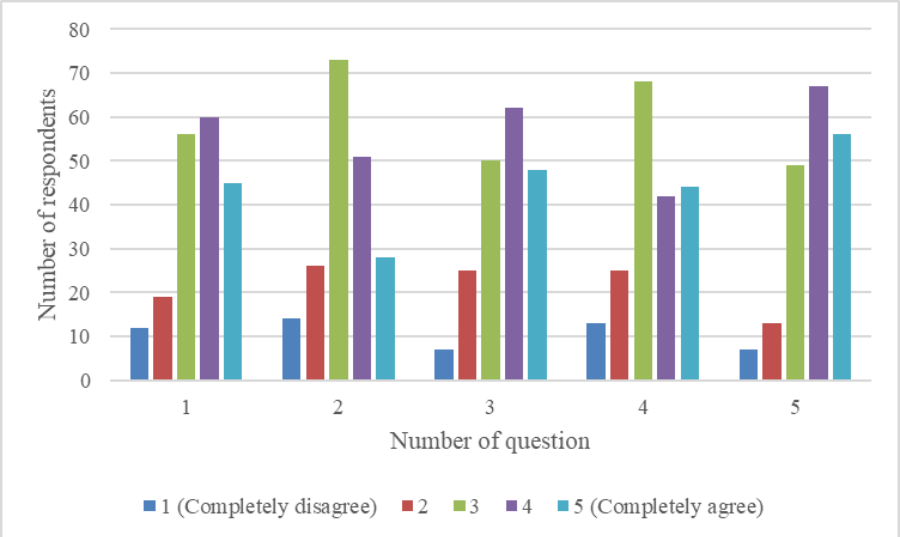


The primary impression gained from the responses is that innovation within teamwork is not appreciated and rewarded enough. Therefore, team members are not encouraged to apply innovative learning methods. Weaker encouragement of an innovative approach to teamwork

reduces the dynamic of spotting and solving problems, despite respondents understanding that an innovative approach to problem-solving is an excellent opportunity for team learning and development.

Improving teamwork to harmonise the work of VET teachers with the best EU practice is conditioned by acquiring new knowledge and skills. Therefore, the authors estimated the respondents' attitudes regarding employers' support in providing additional training related to the development of teamwork. Also, in this part of the research, the goal was to assess whether there is a need to organise such training. Using the same measurement scale, respondents expressed their degree of agreement with some of the following statements: (1) All team members are well trained and competent for their job; (2) Employees are provided with additional training following the analysed needs; (3) The team members' team role is clearly defined; (4) There is an effective mechanism for resolving conflicts within the team and (5) Communication in the team is open. The obtained results are presented in Figure 3.

Figure 3
Estimation skills development support



Based on the obtained answers, it can be concluded that more than 40 % of respondents believe that there is a need for additional training to raise the competencies of VET teachers in the field of teamwork. The assessment supports that more than half of the respondents have not participated in the training of this type so far. Finally, the results assess that there is the greatest need for organising training in the field of responsibilities diversification within teams (assigning team roles), as well as in resolving conflicts within teams.

There are several significant conclusions of the research. First, communication in teams is open but not practical. Second, despite adequate leadership, the roles in the teams are not clearly defined, and as a result, the team members do not have a strong sense of belonging to the team. It reduces the synergistic effect. In addition, innovation in teams is not sufficiently supported, slowing down the process of adjusting VET practice in Serbia to European best practices. Based on all the above, the conclusion is that the organisation of additional training in acquiring the skills of teamwork of VET teachers is necessary, with which the participants in the research agree.

3.2 Research Results and Discussion

Using descriptive statistical analysis, the arithmetic means and standard deviation values were calculated based on 25 selected statements that were grouped into three independent variables

(synergy, innovation, and skills). The results of the descriptive statistical analysis indicate that the most favourable attitude of the teacher is expressed in the first two statements. These statements indicate that the affiliation to a particular team is clearly defined and that the meaning/goal of the team to which the teacher belongs is clearly defined (the mean value is 4.10). The lowest average grade was obtained for the statement that every innovation in the team's work is appreciated and rewarded (the mean value is 3.15). The given statement also shows the most considerable heterogeneity of responses among respondents, which means that with this claim, there is the highest degree of disagreement among respondents because the value of the standard deviation is 1.25. The lowest standard deviation value (1.022) was obtained when stating that the affiliation to a particular team is clearly defined. This statement has the highest degree of agreement among respondents.

The reliability and consistency of the findings were measured via Cronbach's alpha coefficient. The values of this coefficient are shown in Table 2.

Table 2
Cronbach's alpha coefficients

Variables	Values of Cronbach's alpha coefficients
Synergy	0.937
Innovation	0.932
Skills	0.956

Note. Authors' calculation by SPSS.

Cronbach's alpha coefficient values range from 0 to 1, with coefficient values preferably greater than 0.7, indicating adequate reliability and consistency of claims (Nunnally, 1978). Robinson et al. (1991) consider values greater than 0.6 acceptable. The Cronbach's alpha coefficient values for all three independent variables are over 0.9 and indicate adequate reliability and internal consistency. Cronbach's alpha for the whole model is 0.975.

Before performing the regression analysis, it is necessary to perform a correlation test (correlation analysis), i.e. to check the degree of dependence between the three independent model variables. There are numerous linear correlation measures, but the most frequently used measure, i.e. the Pearson coefficient, will be used in this paper.

Table 3
Correlation analysis/Pearson correlation

	SYNERGY	INNOVATION	SKILLS
SYNERGY	1		
INNOVATION	.772**	1	
SKILLS	.817**	.869**	1

Note. N = 192, ** correlation is significant at the 0.01 level (2-tailed).

The intercorrelation matrix testifies to the significant values of the Pearson coefficient. There is a statistically significant correlation between all variables included in the model (Table 3). The results of the correlation analysis show a high degree of correlation between all independent variables (0.772-0.869).

Logistic regression analysis is used to determine which variables significantly impact the use of teamwork in teaching. Through this analysis, the influence of independent variables (synergy, innovation, skills) on the use of teamwork as dependent variables was tested. In this

regard, the category variable will be used as a dependent variable, i.e. the statement „Do you use teamwork in working with students?".

Before interpreting the regression model results, it is necessary to examine whether all the assumptions about the adequacy of the model are met. In other words, it is required to explore the model's performance and determine how well it predicts the results. The test that confirms this assumption is the Hasmer and Lemeshow test. Based on the results, the Hasmer and Lemeshow test ($\chi 2 = 9.955$; $p = 0.268$) shows that the result is not statistically significant, and the model is satisfactory, so the basic assumption is met, and further analysis can be continued.

The following assumption is to examine the model's utility through the value of the coefficient of determination (pseudo r^2), which shows which part of the variance of the dependent variable (the use of teamwork) explains the model. However, the stated value of the pseudo coefficient of determination should be interpreted with caution. Most authors believe there are no clear guidelines on how this coefficient should be used and interpreted (Pituch & Stevens, 2016). As most researchers recommend the Nagelkerke coefficient of determination, the authors concluded that the set of independent predictors explains 11.8 % of the variance of the dependent variable.

When analysing the final model, it is concluded that the statistical significance of only one of the three defined independent variables was determined. The variable synergy has proven to be a statistically significant explanatory variable. The obtained result shows that it is likely that there will be an increase in the use of teamwork if some of the elements of synergies are raised to a higher level (Table 4).

Table 4
Variables in the Equation

							95 % C.I.for EXP(B)	
	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**Lower**	**Upper**
SYNERGY	1.244	.491	6.430	1	.011	3.470	1.326	9.080
INNOVATION	.370	.490	.571	1	.450	1.448	.554	3.787
SKILLS	-1.011	.580	3.039	1	.081	.364	.117	1.134
Constant	-.269	.866	.096	1	.756	.764		

Note. Author's calculation by SPSS.

As shown in Table 4, only one independent variable makes a statistically significant contribution to the model (synergy). The strongest predictor of the answer that teachers use teamwork was synergy, whose probability quotient is 3,470. It shows that respondents who support synergies in a team more often answer that they are ready to use teamwork than those who are not prepared to use the same. The remaining two independent variables, innovation and skills, are not statistically significant predictors.

4 Conclusion

The research that was conducted as a part of an Erasmus+ KA2 CBHE project, „Professional Development of Vocational Education Teachers with European Practices/Pro-VET ", has shown the need for further professional development of VET teachers in the Republic of Serbia. The research has also demonstrated that teamwork in everyday teaching activities is necessary for creating an efficient working environment that will provide achieving the goals defined by the teaching process and improve the quality of teaching and learning.

Particularly, logistic regression analysis confirmed that the strongest and statistically significant predictor of the answer that teachers use teamwork is synergy. Other factors do not have a statistically significant effect on the use of teamwork. The obtained result showed that it is likely that there will be an increase in the use of teamwork if some of the elements of synergies are raised to a higher level.

This research also points out several conclusions: communication in teams is open but not practical; despite adequate leadership, the roles in the teams are not clearly defined; and as a result, the team members do not have a strong sense of belonging to the team; it reduces the synergistic effect. In addition, innovation in teams is not sufficiently supported, slowing down the process of adjusting VET practice in Serbia to European best practices. Based on all the above, the conclusion is that the organisation of additional training in acquiring the skills of teamwork of VET teachers is necessary, with which the participants in the research have agreed.

Based on the needs analysis and the research conclusions, an online course, „Effective team working for VET teachers following EU practice", was designed. The course is designed for teachers who want to develop skills and competencies in teamwork. It offers theoretical and practical knowledge about teams and raises awareness of the importance of teamwork for 21st-century teachers. The first part of the course includes introducing students to the benefits of teamwork, the differences between teams and groups, the essential elements of the team, the stages in team development, and roles and responsibilities in the team. The second part of the course emphasises the importance and role of communication in decision-making and resolving conflict situations in teamwork. The course also analyses the various decision-making pitfalls that teams may fall into and how to develop better decision-making practices. The third part is dedicated to introducing modern digital technologies to improve teachers' teamwork skills and performance.

Three iterations of the developed course were successfully implemented. As a result of participants' positive reactions to the three-course iterations, an official request was submitted to the Institute for the Advancement of Education (the regulatory body approving teacher professional development programmes) to accredit the course „Development and application of teamwork in everyday teaching practice". Meanwhile, the authors have received a formal confirmation for the course accreditation. The course will be a part of the catalogue of approved programmes for Continuous professional development of teachers, educators and professional associates for the academic year 2022/2023, 2023/2024 and 2024/2025.

Acknowledgement

This paper is written as a result of the Erasmus+ KA2 project Capacity Building in Higher Education „Professional Development of Vocational Education Teachers with European Practices Pro-VET", EACEA 598698-EPP-1-2018-1-FI-EPPKA2-CBHE-JP, funded and supported by the Erasmus+ programme of the European Union and co-financed by the Provincial Secretariat for Finance of the Autonomous Province of Vojvodina, Republic of Serbia.

References

Anderson-Butcher, D., Amorose, T., Lower, L., Riley, A., Gibson, A., & Ruch, D. (2014). The case for the perceived social competence scale-II. *Research on social work practice*, *26*(4), 419–428. https://doi.org/10.1177/1049731514557362

Barraycoa-Martínez, J., & Lasaga-Millet, O. (2010). The teamwork competency: Beyond the cut and paste. *Vivat Academia*, *111*, 65–69. https://doi.org/10.15178/va.2010.111.65-69

Burns, E., Silvennoinen, E., Kopnov, V. A., Shchipanova, D. E., Papić-Blagojević, N., & Tomašević, S. (2020). Supporting the development of digitally competent VET teachers in Serbia and Russia. *The Education and Science Journal*, *22*(9), 174–203. https://doi.org/10.17853/1994-5639-2020-9-174-203

Đukić, M., & Španović, M. (2008). Efektivno partnerstvo nastavnika kao činilac kvaliteta timske nastave. *Nastava i vaspitanje*, *57*(3), 259-272.

Erb, T. O., & Dickinson, T. S. (1997). The future of teaming. In T. S. Dickinson & T. O. Erb (Eds.), *We gain more than we give. Teaming in middle schools* (pp. 525-540). Columbus: National Middle Association.

González, J., & Wagenaar, R. (2003). *Tuning educational structures in Europe*. *Informe final, fase I*. University of Deusto. http://tuningacademy.org/wp-content/uploads/2014/02/TuningEUI_Final-Report_SP.pdf

Lungulov, B., Papić-Blagojević, N., & Savić, M. (2021). On-line courses in higher education as an opportunity for lifelong teacher education. In V. Katić (Ed.), *XXVII Skup Trendovi razvoja: On-line nastava na univerzitetima* (pp. 265-268). Novi Sad: Faculty of Science.

Maghnouj, S., Salinas, D., Kitchen, H., Guthrie, C., Bethell, G., & Fordham, E. (2020). *OECD Reviews of Evaluation and Assessment in Education: Serbia*. https://doi.org/10.1787/225350d9-en

Main, K. (2010). Teamwork – Teach me, teach me not: A case study of three Australian preservice teachers. *The Australian Educational Researcher*, *37*(3), 77-93.

Maksimović, I. (2016). *Continuing professional development for vocational teachers and trainers in Serbia.* European Training Foundation. https://www.etf.europa.eu/sites/default/files/m/A87A22FCE871D3C2C1257FCD005F8D23_CPD %20Serbia.pdf

Ministry of Education, Science and Technological Development of the Republic of Serbia. (2021). *Action plan from 2021 to 2023 for the implementation of the strategy for the development of education until 2030*. https://www.mpn.gov.rs/wp-content/uploads/2021/02/AP-Strategija.docx.pdf

Ministry of Education, Science and Technological Development of the Republic of Serbia. (2017). *Digital competence framework – Digital age teacher*. https://www.mpn.gov.rs/wp-content/uploads/2017/04/Okvir-digitalnih-kompetencija-Final-2.pdf

Ministry of Education, Science and Technological Development of the Republic of Serbia. (2018). *Progress report on the action plan for the implementation of the strategy for education development in Serbia by 2020*. http://www.mpn.gov.rs/wp-content/uploads/2018/08/AP-SROS-IZVESTAJ-15jun-Eng.pdf

Ministry of Education, Science and Technological Development of the Republic of Serbia. (2021). *Strategy of education development in the republic of Serbia until 2030*. https://www.mpn.gov.rs/wp-content/uploads/2021/02/1-SROVRS-2030_MASTER_0402_V1.pdf

Nunnally, J. C. (1978). *Introduction to psychological measurement*. New York: McGraw-Hill.

Official Gazette of the Republic of Serbia. (2021). *Rulebook on the continuing professional development of teachers, pre-school teachers and professional associates*. Official gazette of the Republic of Serbia, No. 109/2021. https://www.paragraf.rs/propisi/pravilnik-strucnom-usavrsavanju-napredovanju-zvanja-nastavnika-vaspitaca-strucnih.html

Official Gazette of the Republic of Serbia. (2016). *Rulebook on the continuing professional development of teachers, pre-school teachers and professional associates*. Official Gazette of the Republic of Serbia, No. 109/2021.86/2015, 3/2016, 73/2016. https://www.zuov.gov.rs/starisajt/ostali-propisi/index.html

Official Gazette of the Republic of Serbia. (2011). *Rulebook on standards of competences for the teaching profession and their professional development*. Official Gazette of the Republic of Serbia, No. 5/2011. Available on: https://zuov.gov.rs/download/pravilnik-o-standardima-kompetencija-za-profesiju-nastavnika-i-njihovog-profesionalnog-razvoja/

Papić-Blagojević, N., Lungulov, B., & Milišić, N. (2020). Professional development of vocational teachers-developmental possibilities through projects of capacity building. In V. Katić (Ed.), *XXVI Skup Trendovi razvoja:*: *Inovacije u modernom obrazovanju* (pp. 450-453). Novi Sad: Faculty of Science.

Papić-Blagojević, N., Račić, Ž., & Tomašević, S. (2021). Team working skills as an important part of the professional development of vet teachers. In R.K. Gilmeeva & L.A. Shibankova (Ed.), *Pedagogical readings 2021: Humanitarian vector of education in the era of digitalisation* (pp. 237-242). Kazan: Federal State Budget Scientific Institution Institute of Pedagogy, Psychology and Social Problems.

Pituch, K.A., Stevens, J.A. (2016). Applied multivariate statistics for the social science (6th edition). New York: Routledge.

Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). Criteria for scale selection and evaluation. *Measures of personality and social psychological attitudes*, *1*, 1-16.

Romero-Díaz de la Guardia, J. J., García-Garnica, M., Chacón-Cuberos, R., & Expósito-López, J. (2022). *Psychometric validation of a teamwork skills scale in a vocational training* context. SAGE Open. https://doi.org/10.1177/21582440221103256

Seuneke, P., Papić-Blagojević, N., & Belotserkovsky, A. (2021). International cooperative development of VOOCS for VET teacher professionalisation: Lessons learned. In M. Willemse (ed.), *15th annual EAPRIL Conference for Practitioner Research on Improving Learning: Learning in the Age of Industry 4.0*. Leuven.

Španović, S., & Đukić, M. (2006). Nastavnička percepcija timske nastave. In O. Gajić (Ed.), *Evropske dimenzije promena obrazovnog sistema u Srbiji*, *I deo* (pp. 289-311). Novi Sad: Filozofski fakultet Univerziteta u Novom Sadu.

Vasiljević, D., Stepić, G., & Ilić, M. (2017). Elementary school teachers' attitudes to teamwork. *Nastava i vaspitanje*, *66*(1), 99-114.

Biographical notes

Dr **Nataša Papić-Blagojević** is a professor of applied studies in quantitative analysis and deputy director for projects at Novi Sad School of Business, Serbia, since 2005. Her research experience is presented by writing over 60 scientific papers in applied statistics and researching VET and HE.

Dr **Stevan Tomašević** is a lecturer and coordinator for projects at the Novi Sad School of Business, Serbia. He gained teaching experience by performing lectures and exercises in accounting, auditing, business analysis, business statistics and applied statistics.

Dr **Željko Račić** is a professor of applied studies and head of an office for international cooperation at Novi Sad School of Business, Serbia. He has more than 13 years of experience teaching undergraduate and master's courses in finance, international and national banking, and risk management.

Dr Mirko Savić is a full professor, and coordinator of the project centre at the faculty of the economics university of Novi Sad. Prof. Savić is a former member of the Commission for Accreditation and Quality Assurance in Serbia, HERE team (Higher Education Reform Expert) in Serbia, and Statistical Council of Republic of Serbia, ENQA expert.

VETNET
European Research Network
Vocational Education and Training

Reimann, D., Busse, J., Langemeyer, I., & Teichmann, M. (2022). Designing a virtual 3D environment for learning near the workplace in SME. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 162–169). https://doi.org/10.5281/zenodo.6977554

Designing a Virtual 3D Environment for Learning near the Workplace in SME

Reimann, Daniela
daniela.reimann@kit.edu, Karlsruhe Institute of Technology KIT, Institute of Vocational and General Education

Busse, Jana
jana.busse@kit.edu, Karlsruhe Institute of Technology KIT, Institute of Vocational and General Education

Langemeyer, Ines,
ines.langemeyer@kit.edu, Karlsruhe Institute of Technology KIT, Institute of Vocational and General Education

Teichmann, Malte
malte.teichmann@wi.uni-potsdam.de, University of Potsdam, LSWI/Chair of Business Informatics, Processes & Systems

Abstract

Context: The paper is based on the BMBF and ESF-funded research project 'Ageing-appropriate, process-oriented and interactive further training in SME (API-KMU)', which is a collaboration between LSWI at the University of Potsdam, the Karlsruhe Institute of Technology KIT's Institute of Vocational and General Pedagogy, the media design and VR-development company *rooom* as well as two SMEs to apply the learning environment in the companies. The project aims to develop a virtual learning environment for novices in the job to benefit from the experiences and knowledge of skilled workers. In the paper, we look at research undertaken in one case: a company in natural stone processing (SPP).
Approach/methodology: The research approach is based on the analysis of the work tasks (BAG); two main tasks for learning modules were identified. Semi-structured interviews with staff were done, and the observation of the workplace was both video-recorded. The didactic approach is subject-oriented, referring to self-directed and constructivist learning and shaping principles. These form the basis for the development of a virtual learning environment and training concept, including learning modules for use in SMEs. The learning environment is developed to support the SME's needs in the onboarding process.
Findings: The analysis of the work process of mitre gluing was followed by the development of a so-called 'competence spider', a tool to support both self-reflection and external assessment in the context of employee interviews. It supports an open dialogue structured along the competences identified and required for the job and how those are perceived by the employee him/herself (internally) and by the supervisor (externally).
Conclusion: The analysis of the work tasks (BAG) is a helpful instrument for both identifying skills and competences required and for developing criteria for a training concept. Complex work processes can be broken down into single activities to be used for self- and external assessment in an employee interview. The design process of a pedagogically shaped virtual learning environment is a complex and challenging process, which needs to be designed carefully

with regard to the didactic approach and its requirements. The learning contents can be mediated and supported through animation videos.

Keywords: VR learning, SME, near the workplace, professional training, situated learning

1 Introduction: From the Analysis of Work Tasks Towards the Educational Design of a Responsive Virtual Learning Environment

The overall objective of the project is to develop an age-appropriate, process-oriented and interactive continuing education approach including a toolbox for SMEs as well as an approach to secure and transfer tacit knowledge by means of a VR-supported learning and tutoring system based on didactic principles by the SMEs themselves.

In the following, we discuss the process starting from the analysis of work tasks towards the derived design of a responsive virtual learning environment consisting of a 3D space and online learning platform. The paper is based on the BMBF-funded project API-KMU (acronym) which looks at 'Ageing-appropriate, process-oriented and interactive further training in SME". The aim of the joint project API-KMU is to develop an age-appropriate, process-oriented and media-based continuing education program in small and medium-sized enterprises SMEs based on didactic considerations for a 3D learning environment. The target group are employees of small and medium-sized enterprises who are to be enabled to develop new competencies and to actively shape and master the challenges of digitalization and demographic change. The concrete results of the joint project are a virtual 3D- learning environment with a Web portal, which serves as an initial orientation during the induction of new employees to support, among other things, the onboarding process of an SME. New employees are given visual opportunities to acquire company knowledge in the virtual learning environment. The transfer of knowledge from experienced employees as well as the transfer of experiential knowledge is to be supported by the digital possibilities of the learning environment. It addresses the target group of employees new to the company, mainly career changers age 30 and older. The learning environment is aimed to support an SME in natural stone processing in the onboarding process.

In the paper, the development process is discussed based on the analysis of work tasks and identified competences required derived from it in the context of mitre glueing in windowsill production. The latter is a complex process including a variety of work process knowledge and work experiences to be applied by the worker. How can this process as well as other learning contents related to the work environment such as machines and tools, materials and aids be facilitated when new staff is to be trained and needs to get an appropriate introduction to the company's most common areas, tasks, and tools in the manufacturing process?

2 Work Task Analysis and Competence Requirements Derived

Competencies only show in action and accordingly can only be observed in action. In order to identify the skills required to carry out the work tasks, the work analysis was selected. The research approach combines the results of the work analysis with video recording and the didactic framework based on subject-oriented, self-directed constructivist elements to be applied in the virtual learning environment.

The analysis of work tasks undertaken in the project was based on the BAG instrument by Haasler (2003) and extended by video records of the work processes and staff interviews at the management and employee level. BAG is an analysis procedure for the identification of work and learning content for the design of vocational training. It includes observation categories such as the workplace and its interfaces in the overall manufacturing process. Further, it contains the categories of business and work process for 'on-site analysis' and activity descriptions as well as the work contents, tools, methods and requirements of the skilled work.

As a first step, a typical work situation was recorded on video. In this way, insights into the work process were gained that are difficult to observe. In a second step, the survey team conducted an interview with the respective employee, in which the video-based material serves as a basis for discussion. This way, the work task could be described in detail by the employee and reflection processes about the activity were stimulated. The video observation of the workplace, the documentation of the work process and the analysis of activities aimed to identify the employee's tacit knowledge and level of competence.

The learning modules were then derived from the results of the work task analysis. Different work tasks were identified through the observation of work. Two work processes were defined to be the content of the learning environment. The manual polishing in windowsill production and mitre gluing. From the BAG analysis, however, it has also emerged that another module is relevant for the learning environment and on-boarding process, which generally has to do with knowledge of the machines, production material and tools.

In the paper, we look at the process of mitre glueing which is described in the following, in order to give an overview to estimate the complexity of work tasks to be done. Mitre glueing is a complex process which requires a variety of cognitive, haptic, and visual skills and work experience with the materials are required. The precise perception of the employee is of high importance: Visual and haptic checks of the material, care and precision are required to undertake the work well.

After having carried out 19 different activities related to the work preparation, the actual mitre glueing begins with the application and joining of the mitre surfaces. To do this, the aluminium rail is folded down to the marked position; the adhesive is applied to the mitre surfaces, and the block edge is folded up against the worktop and fixed to the aluminium rail with the existing pieces of adhesive tape. Another 10 steps are to be carried out to finish the process: Those relate to checking, removing and roughening, sanding and cleaning, fixing and turning the product.

After having carried out all the above activities, the final product is ready for storage.

In order to describe the competences to be trained and tested in the virtual environment, the 'competence spider' was developed. It was derived from the work task analysis related to "implementation expertise". It includes the competences required for the planning and implementation of mitre gluing as shown in the Figure 1 and Figure 2 below.

Figure 1

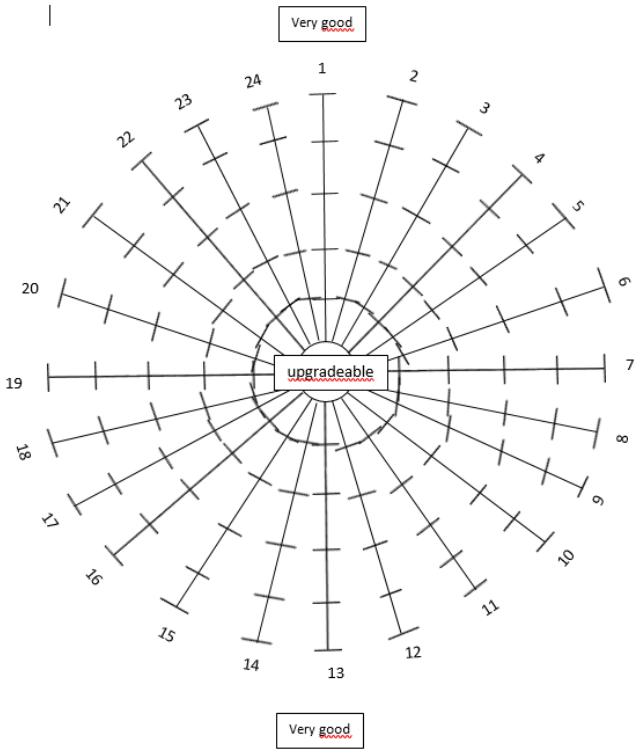
Competence requirements or the planning and implementing of mitre gluing

How well do I fulfil each skill requirement? How well can I carry out the tasks?
I Work preparation
1 Read construction plan - check feasibility of the order
2 Knowledge of stock check
3 Work flow planning (sequences, sequences etc.)
4 Knowing the transport conditions (free paths, carrying technique) & transporting the production material
5 Know the required work equipment and health & safety regulations
II Specific preparatory work and preliminary considerations regarding the manufacturing product
6 Knowledge about material properties (robustness, stability, temperature resistance)
7 Checking worktop & block edge for integrity & dimensions.
8 Cleaning the pre-product
9 Pre-assembly, positioning & accurate fixing of the production object
II Preparation of bonding process
10 Knowing the adhesive properties (e. g. discoloration, curing conditions)
11 Positioning timing and positioning implementation (support system)

(continued on next page)

12 Correct application of the adhesive tape & knowing its functionality
13 Processing (cutting, roughening, deburring) of the aluminium rails & positioning of the aluminium rails
14 Adhesive production
III Carrying out mitre gluing
15 Exposing the mitre edge
16 Gluing the aluminium rails using silicone
17 Mitre gluing using mixed adhesive
18 Checking the alignment of the aluminium rails
19 Knowing the curing process & its conditions
IV Work process completion
20 Remove final fabricated product from tape pieces
21 Sanding of bottom side & visible side of mitre
22 cleaning of the finished product
23 optical embellishments by means of aluminium tape
24 Prepare finished product for collection

Figure 2
Twenty-four work tasks are shown in the competence spider for self- reflection and assessment in employee interviews



For the learning environment, the ‘competence spider’ serves as a tool for accessing the learning process in form of an interview, so that self-reflection/evaluation and external assessment can be matched and discussed. The employee is to answer the question of how well his/her competences are already acquired, related to each skill identified.

3 The Didactic Framework

Learning is an active and complex social process. The educational goal to aspire to in the project is the virtual learning environment to facilitate the company’s onboarding process

including the support of new employees' orientation in the company and work environment. The aims and observations resulted in a kind of triad that had to be taken into account in the development of a virtual learning environment: The technical development, work design, and the existing or desired competencies of the employees (cp. Baron et al, 2019, p. 6)

The development of a didactic framework for continuous learning was realized according to adult pedagogical principles/guidelines. It includes theoretical approaches such as subject-oriented didactics, constructivist, self-directed, and situated learning near the workplace.

The core of the didactic framework is the support of the employees to cope with daily work and to reflect on the work processes and his/her meaning and competences required in the overall work process. It takes into account the meso- (company) level, including the company's and as well as the micro-level of learning, individual prerequisites in terms of skills, participation and design aspects.

The didactic concept includes learning modules and subordinated learning units based on the identification of knowledge fields, as described in the following:

- Knowledge field 1 deals with Work equipment and production material such as machinery, production material, tools, protective equipment and auxiliary material
- Knowledge field 2 deals with manual polishing of window sills: It addresses an overview of the production process, production certificate, production of the preliminary product, preparation of the "manual polishing" work step
- Knowledge field 3 deals with the complex process of mitre gluing including an overview of the manufacturing process, CAD design and planning

In terms of the didactic concept, the claim was that the learner him/herself becomes a part of the surrounding space, navigating self-directed through it, benefitting from the added value of visual simulations e.g. of different qualities of physical work materials and tools and in-world video streams, rather than being restricted to traditional text-based seminaristic learning arrangements. The aim was not to subordinate the didactic concept to the technical conditions and limitations which came along with in the development phase.

4 The Virtual Learning Environment

VR environments can offer sensory immersion, remote presence, and teleoperations (cp. Laurel, 1993,188). According to Turkle (2009) simulation aims for immersion. The learner him/herself is part of the surrounding, immersive learning space, navigating self-directed through the space, including the added value of visual simulations, e.g. the simulation of different qualities of the physical work materials and tools so that the learner is rather not restricted to traditional text-based seminaristic learning arrangements. However, the educational goal to aspire to in the API-KMU project is a 3D learning space to facilitate new employees' orientation in the company and work environment. As one navigates around these imaginary spaces with different 3D objects, the exploration of the workplace might become an experience for the learner rather than a theoretical perception of the workspace as known from text-based platforms.

From the company's perspective, the 3D learning environment is aimed to facilitate the onboarding processes and the transfer of tacit knowledge and work experience. Tacit knowledge is acquired through active action processes in a lived practice. The development from work experience to work process knowledge has been examined in the context of computer-supported skilled work and vocational learning by Fischer (2000) among others.

The virtual learning environment consists of a Web portal and a 3D world visualizing the SME's main areas such as machines, tools as well as the two work processes identified as learning content. Videos are available, explaining complex processes through animation and moving

images. The Web portal was developed to extend the virtual world and make available materials for learning, printing and storing in one's personal learning space.
The conceptual basis of the 3D models is based on:

- o the elaborated detailed concept of the learning offer at SPP
- o the concrete conceptual plan, which provides information on the learning objective and content, the individual development tasks and the actors involved per knowledge field and the associated learning units.

The Definition of general requirements and functions of the VR environment modelled were to allow for

- an independent, free movement of the user through the VR space.
- Pause function with storage of the intermediate status
- There is no need for a 1:1 faithful reproduction of the SPP production hall.
- Machine systems do not have to be modelled to scale
- Integration of different file formats
- Objects (e.g. machinery) can be provided with annotations (further information) that can be called up by mouse click
- Joint identification of objects relevant for the VR-based learning system together with the project partner SPP (machinery, tools, auxiliary materials, protective equipment and production material, production of the preliminary product, preparation of the work step "gluing in practice")

- Determination of the number of VR rooms required in the learning system:
  - Room 1: Machine plant room
  - Room 2: Material storage room
  - Room 3: Storage room for tools, aids & protective equipment
  - Room 4: Production room for mitre gluing
- Definition of room-specific requirements (e.g. objects, application conditions etc.) in each case for the individual rooms

The development of a storyboard for the VR environment was done by transferring the identified activities and objects into a VR scenario by means of a storyboard for navigation.

5 Evaluation and Methodology

The research design represents a combination of different survey methods (method mix), combining both qualitative and quantitative methods. Quantitative data will be collected especially in the area of media system-related ergonomic usability research in the Lab of the LSWI.

The concept of the interface emerged from the idea of human-computer interaction and evolved towards the inclusion of the cognitive and the emotional aspects of the user experience (cp. Laurel, 2009, xi). The aim here is to investigate whether the 3D learning environment with the associated website has been implemented in accordance with ergonomic quality criteria (usability) and human-machine-interaction and last not least whether it can be used in a way that promotes learning. E.g. the System Usability Scale (SUS), a method for the quantitative analysis of usability, might be used for this purpose. Since interface problems often are obvious and solutions are usually less obvious, a variety of target groups to test the pilot are included (students, staff, researchers).

The perspective refers to subject-oriented, self-directed, constructivist approaches. The results of the methodological considerations illustrate the necessity of a mix of methods to generate a deeper insight into the work processes (cp. Langemeyer et al 2021, p. 1). The target group – end users of the learning environment – are skilled workers, machine operators,

newcomers to the company, career changers and other company employees who have to take over work tasks or who should perform a similar work activity.

1st quantitative data will be collected in particular in the area of the 3D prototype, the system-related ergonomic usability research at the LSWI Lab.

2nd the qualitative data will be collected at the level of the companies' staff related to the support of learning, the learning effects and the achievement of the learning objectives.

The research questions include the following:

- Has the learning content been appropriately implemented in a way that promotes learning?
- Were the learning objectives achieved?
- How can this be determined? What indications are there for this?

For the latter, the instrument 'competence spider' can be used at SPP. The instrument can also be used in the context of an observed appraisal interview at SPP. For this purpose, an observation sheet is prepared. Subsequently, self-perception and external perception can be triangulated.

The evaluation aims to help us analyse if and when we can observe that the learners' interaction in the simulated 3-D world is able to produce meaning to the learner, which in other words means educational processes, that is, from the interaction in and with these virtual environments and objects. (cp. Reimann & Biazus, 2007, p.531)

Target groups:

- Newcomers to the company who are not yet familiar with the work processes and the operation of the machines required
- Target group skilled workers and machine operators who are familiar with the learning content

6 Research Methods

The quantitative research data will be collected through user surveys to be undertaken by students, staff and researchers.

The qualitative research methods include semi-structured interviews along the learning modules with the target groups of staff, preferably when using a learning environment. The instrument 'competence spider' will be used in a dialogue between employee and employer.

7 Conclusion

As the learner navigates around these imaginary spaces with different 3D objects, the exploration of the workplace becomes an experience for the learner rather than a theoretical perception of the workspace.

From the company's perspective, the 3D learning environment aims to support the onboarding processes and the reactivation of tacit knowledge transferable and work experience of staff. Last but not least the support of change and innovation processes inside of the organization is facilitated. However, the evaluation of the prototype will show whether the digital environment supports the learning process of newcomers in the company.

Potentially less tech-savvy people benefit from easy-to-learn handling of the devices, which enables their use in ageing-appropriate human-machine interaction design as well as process-related safeguarding and transfer of experiential knowledge. The latter has to be confirmed by the still outstanding evaluation of the pilot prototype. However, the didactic concept was challenged to a huge extent by technical limitations caused by low-cost solutions related to the budget of the research project in the development phase (focusing on 3D-modelling rather than AR).

References

Baron, S., Fischer, M., Gidion, G., Pantke, D., Reifschneider, O., & Reimann, D. (2019). Prospektive Weiterbildung für Industrie 4.0. Beschäftigte frühzeitig auf die sich durch Industrie 4.0 verändernden Arbeitsanforderungen qualifizieren. Leitfaden für die betriebliche Praxis. Agentur Q.

Fischer, M. (2000). Von der Arbeitserfahrung zum Arbeitsprozesswissen: Rechnergestützte Facharbeit im Kontext beruflichen Lernens. Leske + Budrich

Haasler, B. (2003). »BAG-Analyse« - Analyseverfahren zur Identifikation von Arbeits- und Lerninhalten für die Gestaltung beruflicher Bildung (*ITB-Forschungsberichte No. 10*). Institut Technik und Bildung.

Laurel, B. (2001). The art of human computer interface design. Addison Wesley.

Laurel, B. (1993). Computers as theatre. Addison-Wesley Longman.

Langemeyer, I. (2019). Digitalisierung als Herausforderung für Personalentwicklung und Mitbestimmung. Unternehmensstrategien der IT-Branche und ihre Bedeutung für Weiterbildung. Verlag Barbara Budrich.

Langemeyer, I., Gronau, N., Schmid-Walz, S., Kotarski, D., Reimann, D., & Teichmann, M. (2021). From employee to expert - Towards a Corona-sensitive approach for data collection. C. Nägele, B.E. Stalder, & M. Weich (Eds.) Pathways in Vocational Education and Training and Lifelong Learning. Proceedings of the 4th Crossing Boundaries Conference in Vocational Education and Training (pp. 226–231). https://doi.org/10.5281/zenodo.4590196

Reimann, D., & Biazus, M. (2007). Augmented virtual 3D-Community spaces as an intercultural interface for higher media art education. Koschke, R., Otthein, H., Rödiger, K.-H., & Ronthaler, M. (ed. 2007). Informatik 2007, Informatik trifft Logistik, Beiträge der 37. Jahrestagung der Gesellschaft für Informatik e.V. (GI), Bd. 1. (S. 528–534). GI.

Teichmann, M., Ullrich & A. Gronau, N. (2019). Subject-oriented learning – A new perspective for vocational training in learning factories. *Science direct*. *Procedia Manufacturing 31* (pp. 72–78).

Turkle, S. (ed., 2009). Simulation and its discontents. MIT Press.

Biographical notes

Dr **Ines Langemeyer** is a professor of teaching and learning research at the Karlsruhe Institute of Technology, KIT's Institute of Vocational and General Education.

Dr **Daniela Reimann** is a researcher at the Karlsruhe Institute of Technology, KIT's Institute of Vocational and General Education. Research focus on digital media in vocational education, media pedagogy and creative processes, digital transformation and VET.

Jana Busse, MA, is a researcher at the Karlsruhe Institute of Technology, KIT's Institute of Vocational and General Education.

Malte Teichmann, M.A. develops learning modules and -tasks for vocational training and examines the potentials of Tablets, Smartphones, and AR-Glasses for adult learning. He is a researcher at LSWI - the Chair of Business Informatics, Processes & Systems at the University of Potsdam.

VETNET
European Research Network
Vocational Education and Training

Struck, P. (2022). Peer learning in vocational education and training – effects and changes of person relations in learning groups. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 170–177). https://doi.org/10.5281/zenodo.6977560

Peer Learning in Vocational Education and Training – Effects and Changes of Person Relations in Learning Groups

Struck, Philipp
philipp.struck@kh-mz.de, Catholic University of Applied Sciences, Mainz, Germany

Abstract

Context: The article focuses on the use of different approaches to peer learning in Vocational Education and Training in Germany.
Approach: Based on a multi-method research study, the question *"How does peer learning influence collaborative learning and social relationships and interactions within classes in the vocational education and training system?"* is researched by using social network analysis and guided interviews.
Findings: The research results show that peer learning, among other things, establishes a positive feedback culture in the learning groups, creates new friendships and makes apprentices want to work more cooperatively with each other in the future. In addition, peer learning was able to promote social integration and solidarity.
Conclusion: These findings make peer learning a potentially meaningful and usable learning approach in Vocational Education and Training.

Keywords: peer learning, person relations, solidarity, feedback culture

1 Introduction

Central criteria for peer learning setting in Vocational Education and Training (VET) are communication at eye level and the reciprocal confidence of the peers. This can facilitate the transfer of skills, competencies and knowledge from peer to peer so that both sides can benefit in the learning process. Therefore, peer learning approaches can be suitable learning methods in VET to increase the learning motivation and learning success of the apprentices. Moreover, it is expected that peer learning, as noted by Topping (1996) and Haag and Streber (2011), among others, improves social learning, contributes to social inclusion and reduces the social isolation of individuals. Peer learning is intended to enable apprentices in VET to become aware that they can achieve more together respectively as a group or a team. Learning together should strengthen the sense of community and promote social integration.

Furthermore, peer learning should help to increase the exchange and feedback among apprentices. Empirical studies such as Kutscha et al. (2012), Gebhardt et al. (2009) and the Training Report of the Federation of German Trade Unions (DGB, 2016) make clear that apprentices would like to receive more feedback and more collegial support as well as more respect and a greater appreciation during their apprenticeship. Moreover, they are sometimes afraid of doing mistakes. There is also the fact that apprenticeship positions remain unfilled in Germany. Maybe because young graduates may prefer a university degree to an apprenticeship so that apprenticeships seem to have potentially decreased in attractiveness in comparison (Struck, 2020).

To overcome these challenges, peer learning can be a useful pedagogical method. This is because peer learning aims to promote mutual feedback as well as praise and appreciation among each other. In practical implementation, apprentices are encouraged, for instance, to ask each other for advice also to address their own uncertainties and their lack of knowledge with other peers. This is supported by the fact that the importance of peer learning for the development of social skills in VET has already been elaborated in an earlier study and the different aspects have been empirically confirmed in the *"Dimensional Model of Social Skills - DMSS"* (Struck & Franz, 2020). In addition, the study by Leijten and Chan (2012) shows that peer learning in VET increases feedback quality and can promote peer feedback strategies as well as increasing interactions between peers. Furthermore, Leijten and Chan (2012) have shown that socially competent behaviour is promoted and that the variety and scope of peer interactions during learning activities have increased.

Nevertheless, there are currently various research desiderata on peer learning, for example, there are only a few empirical studies on informal learning in peer relationships (Krüger & Hoffmann, 2016) as well as on peer relationships in the workplace (Köhler, 2016).

Accordingly, this paper will try to reduce the existing research gap of peer learning in the context of VET. Here will be the focus on the following research question: *"How does peer learning influence collaborative learning and social relationships and interactions within classes in the vocational education and training system?"*

Finally, practical suggestions and hints for the design of learning processes in companies and in VET schools will be formulated.

8 Implementation of the Peer Learning in the Project

At this point, it should be noted that the research question presented and investigated here is part of a larger research project, using some more research methods and focusing on different research questions, which are considered in this article only in part.

In the project, three different forms of peer learning were used: Peer tutoring, peer mentoring and peer education. In peer tutoring, peers are supposed to teach each other. Young learners from the same classes or years (with the same level of information and knowledge) learn and work in tandem in order to repeat, deepen and review vocational or school knowledge together. One person assumes the role of the teacher (or tutor) during the implementation, and the second person the role of the learner. The teacher imparts the knowledge, checks the learner's answers and corrects them if necessary. The other person acts like a learner, which means answering questions, working on given tasks and explaining their own solution.

The two approaches peer education and peer mentoring will be presented together due to numerous similarities in their practical implementation. In both approaches is a group of apprentices, which will be supported by a (different) group of peer educators (from the same apprenticeship year/class) or by peer mentors (from the next higher apprenticeship year/class). The aim is to repeat and consolidate the knowledge that has already been learned. Moreover, the learners are available to answer questions about the content and subject matter (with a low inhibition barrier). In the peer learning approaches, no new content should be covered or learned; rather the (common) goal was an effective and successful preparation for the exams.

9 Theoretical Background

For the theoretical foundation of peer learning, the preliminary considerations of Vygotsky (1929, 1978, 1986) on the internalization of knowledge through social interaction and reciprocal exchange and the considerations of Piaget (1932, 1986) on the importance of the symmetrical peer relationship can take into account. Likewise, the social learning theory of Bandura (1979, 1986) with the idea of learning through model observation and imitation is useful to explain the success of a peer learning approach.

Haag and Streber (2011) point out that peer tutoring enhances prior knowledge and learning strategies, as higher prior knowledge leads to more effective use of learning strategies (Haag & Streber, 2011). In addition, peer tutoring is expected to promote (inter-)active and participatory learning, which facilitates reciprocal feedback and increases responsibility for (one's own) learning process. Moreover, it can and should reduce the social isolation of individuals and (can) have a positive impact on dimensions such as self-esteem, self-confidence and empathy (Topping, 1996).

10 Methods and Results

The effects of peer learning for learning settings in the learning institutions like companies and VET schools in industrial-technical apprenticeships as well as apprenticeships in the healthcare sector in Germany will be analysed by two different research methodological approaches: Social network analysis and guideline-based interviews with apprentices as well as with teachers and instructors. The research setting comprises six schools or companies with a total of 11 classes (243 apprentices). In addition, 39 interviews with apprentices and 15 interviews with teachers and instructors are available for the analysis.

Through such an approach of mixed methods research, the weaknesses of the individual methods should be balanced reciprocally. Thus, as clarified by Steckler et al. (1992), qualitative and quantitative methods are used equally and in parallel in order to be able to analyse the results of each method separately and to verify in a second step whether the results from all methods allow the same (or similar) conclusions. If successful, this approach strengthens the confidence (in the robustness) of the results and conclusions. Furthermore, (single) selected results from the quantitative surveys (results from the social network analysis on the group level) were integrated and validated in the interviews with the apprentices and the teachers/instructors (qualitative methods). Thereby, qualitatively collected data can additionally contribute to an understanding, explanation and interpretation of the quantitative findings (Steckler et al., 1992; Kelle, 2014).

Social network analysis is particularly suitable for illustrating personal relationships in school classes. In this way, both one-way and two-way social relationships can be modelled, and their changes in the networks can be made visible. Following Zander (2014), the working networks and the friendship networks are illustrated and analysed. The surveys are conducted before and after the intervention of peer learning. The algorithm ForceAtlas 2 (Jacomy et al., 2014) was used for the analysis.

Figures 1 and 2 show the results for the question about the working network in a VET school class. The illustration in figure 2 shows an increase in the number of nominations compared to the first measurement. The apprentices in this class named more apprentices they would like to work collaboratively after the peer learning. Thus, new working networks of small groups have (newly) formed; this is made clear by the fact that the apprentices named each other reciprocally.

The illustration in Figures 3 and 4 shows the two measurements for the friendship network question in a VET school class. The modifications between the first and second measurement show an increase in the nominations of other apprentices in the sense of the friendship network. Thus, it can be noted that new friendships have been formed in the VET school class, particularly as a result of apprentices reciprocally nominating each other. It appears that the group as a whole has become closer together during the peer learning project. Likewise, individuals who were previously named less as friends now seem to be more integral part of the class community.

Figure 1 & 2
Results of the Social Network Analysis: Working network - *"Whom do you like to work with?"*, t0 & t1

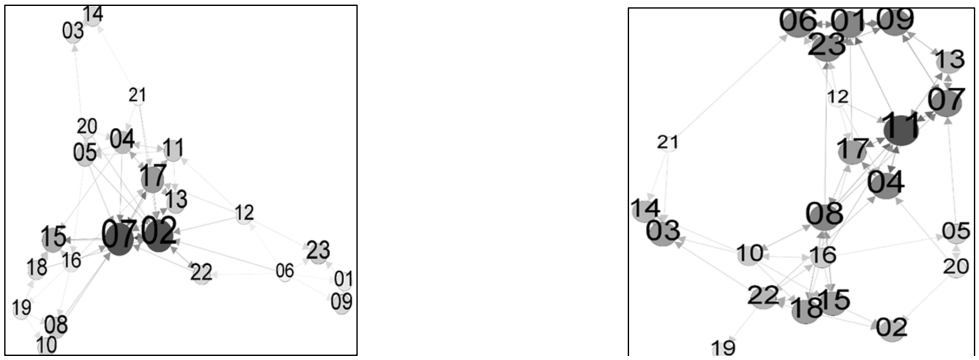
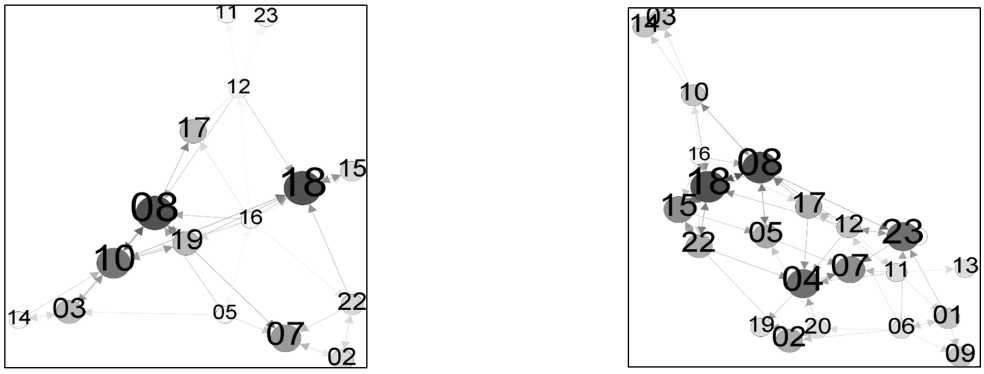


Figure 3 & 4
Results of the Social Network Analysis: Friendship network - *"Who are your best friends?"*, t0 & t1



The guided interviews with the apprentices are based on Witzel (2000) for a problem-centred interview (PZI) and the analysis was conducted according to a content-structuring qualitative analysis by Kuckartz (2016). The interviews with the teachers and instructors are based on the guidelines of Meuser and Nagel (2002) and Helfferich (2014). The analysis takes into account the suggestions of Meuser and Nagel (2009) and Gläser and Laudel (2010). The analysis of the transcripts was done with the analysis program MAXQDA.

The focus is particularly on perspectives and content-related information on peer learning. The category system was developed both deductively and inductively on the text material. This means that if a (new) text passage does not fit the categories already formed (in terms of content or theme), a new category is formed inductively from the material (Kuckartz, 2016). For further analysis, the coded text passages were also partially paraphrased.

Different aspects were addressed in the interviews, and some statements were coded to the code "reciprocal help of the apprentices", such as: *"The other person is happy, you are also happy with yourself, ok he got it now, I have helped him, is great."* (male; Original-Speech: *„Der andere sich freut, man freut sich auch selber, ok der hats jetzt verstanden, ich hab ihm geholfen, is super."*). Furthermore, statements were identified that suggest that a „positive feedback culture" has been created, like *"Maybe you can add that to the things that I find really positive, that somehow barriers are broken down. The inhibition level drops to ask questions because maybe it's not unpleasant or embarrassing or anything like that. Or you don't have to be ashamed or anything."* (female; Original-Speech: *„Das kann man vielleicht noch hinzufügen*

zu den Sachen, die ich wirklich positiv finde, (.) das halt irgendwie auch so Barrieren abgebaut werden. Halt die Hemmschwelle sinkt, (.) mal Fragen zu stellen, weils einem vielleicht auch nicht unangenehm is (.) oder peinlich (.) oder so ne. Oder man sich nicht da irgendwie schämen muss oder so.“). Although aspects such as „solidarity" were also clearly addressed, *“So really, we said, "We will do it all together! And if something comes up, we'll help each other." So nobody gets left behind anymore.”* (male; Original-Speech: *„Also wirklich, wir haben gesagt: „Wir schaffen das alle! Und wenn was ist, helfen wir uns auch mal gegenseitig." Also es wurde halt keiner mehr zurückgelassen.“*).

11 Classification of the Results

While the results of the social network analysis illustrate the strengthening or increase in the friendship networks as well as the working networks through peer learning, the results from the interviews with the apprentices and the teaching and instructing staff were able to clarify and exemplify these findings once again. For example, it is possible to see that peer learning creates or can create a positive feedback culture in the classes and learning groups. The apprentices recognize that it can be meaningful and valuable for them to help each other even after the end of the project and to support each other with (appreciative) feedback. Through learning together, they notice that they can trust each other and ask each other for advice. This also explains why they are interested in increased working cooperation (in the future).

Solidarity was also positively experienced and described within peer learning. According to this, peer learning (at least for some apprentices) encourages reflection in a sense of solidarity, recognizing one's own advantages and possibilities. In the interviews, the apprentices describe situations and events from which it becomes clear that they show consideration for lower-performing apprentices, consciously support them in working together as well as in learning together, and thus integrate them into the social community of the class. Accordingly, peer learning (and especially peer tutoring) can contribute to social integration, as previously described by Topping (1996) as well as by Haag and Streber (2011).

The integration of (all) classmates and colleagues into the social (class) community, i.e. the promotion of social integration. The sharing or the renunciation of (one's own) advantage for the benefit of others are also central characteristics of social coexistence, which accordingly (can) also improve the everyday professional working life in teams. VET should also communicate these "values" or perspectives and skills to apprentices, as they are relevant for their later professional behaviour. If it is or can be possible to promote such dimensions in VET, e.g. through peer learning, these pedagogical approaches should be implemented accordingly in the learning locations of the companies and the VET schools.

12 Discussion

Overall, it should be noted that peer learning creates new forms and possibilities of communicative exchange for the apprentices without having to fear sanctions or assessments by the teaching or instructing staff. This creates a protected communicative space in which the feedback culture referred by the apprentices could be developed. The results of the social network analysis, according to which friendship networks and working networks, in particular, have become stronger. Peer learning creates an additional exchange in learning, and the apprentices learn to perceive and understand each other better. From the interviews, it is also clear that the apprentices were able to strengthen their trust among themselves and therefore the networks became closer. As a result, several apprentices experienced themselves effectively and showed solidarity behaviour.

On the other hand, the overall evaluation (in the larger research project) also shows that peer learning does not have an equally or uniformly positive effect on all apprentices. This can be explained by site-specific conditions in the different learning settings. The special features

of the respective learning locations, the six different institutions and the different occupations must be taken into account accordingly when interpreting the results.

However, peer learning in VET must not be "exploited" economically in the future, e.g. in the sense that peer learning must not be used to justify savings in personnel capacity among teaching and instructing staff. Peer learning does not seek to replace teaching or instructing staff, nor should peer learning in VET schools be the answer to teaching shortages. Peer learning should always be seen as a useful addition and used to offer apprentices additional stimulation and learning opportunities so that they can develop and learn together in a trustful setting. In this way, it should be underlined that the learning group can be strengthened from within and that the apprentices (can) recognize that they can achieve more through solidarity, mutual trust and learning together (than without).

13 Limitations

With regard to the research methodological approach, it should be noted for the interpretation of the results that the sample and the learning locations in the company and VET school have a strong regional concentration. All institutions are regionally limited to one location in Germany. Consequently, it remains unclear whether or to what extent the findings generated here can be transferred to the European context. It is therefore not possible to generalize the findings.

It should also be noted that the results generated do not apply to all individuals or were identified equally in all investigation groups. Although a large part of the participants could benefit from peer learning, not all apprentices could benefit to the same degree. Another limitation is the lack of a follow-up survey; therefore, no long-term results can be reported.

For the interpretation, it is also limiting to consider that there are further factors that can influence or explain the learning as well as the development of the dimensions measured here. Peer learning itself is only one influencing factor; in addition, other aspects of the private, company and school environment have an impact on the apprentices, which can potentially strengthen or reduce their learning and working behaviour.

Furthermore, the results of both the quantitative and qualitative surveys should be interpreted with caution, as they are based on self-reporting or self-assessment. Accordingly, effects or patterns of social desirability in response behaviour cannot be ruled out, and the same applies to the risk of apprentices overestimating themselves (in a positive sense) in the interviews.

In addition to these aspects, self-activation to participate in the interviews must also be mentioned, as there is the disadvantage of a selective sample (Reinders, 2005). While voluntariness can be assumed, at the same time there is a risk of disproportionately generating the more satisfied apprentices to participate in the interviews. Taking this idea further, negative or critical arguments about peer learning may be underrepresented. The same is likely to be evident in the interviews with teaching and instructing staff. Likewise, it should be noted that the six institutions also participated in the project voluntarily. This allows the thought that this could be a positive selection or relatively well-structured companies or VET schools.

14 Advice for the Practice in VET and Prospects

Based on the empirical data of the scientific analysis, practical implementation recommendations can and should be formulated. This includes how and under which conditions and requirements peer learning can be implemented in VET, in the learning locations company and VET school.

An important result of the interviews is the central importance of the temporal and structural organization because the framework conditions were described and evaluated very differently in the institutions. Fixed planned times and rooms are essential for the implementation of peer learning. Especially the temporal (annual) planning seemed to be particularly challenging

for some companies and schools. Consequently, early and long-term appointments are needed to determine in which time slots (or days) peer learning can be implemented. In such cases, (early) coordination with other departments (in the company) or class grades or year groups (in the VET schools) are key aspects.

In addition, it should be considered whether it might be useful, especially in larger groups or school classes, to start with peer tutoring and then carry out peer education. Peer tutoring allows for collaboration with varying partners from the class group and can contribute to social integration and awareness of collaborative learning through the changing constellations of people. Peer tutoring would allow all group members and all apprentices to experience the role of a teacher through the tandem constellation. Thus, this role (or task) can potentially be better understood, and the subsequent implementation of peer education can maybe better realise.

15 Conclusion and Prospects

The presented project contributes to the knowledge about the effects of cooperative learning activities of apprentices in VET. The results indicate an increasing interest of the apprentices in working together with other apprentices, and they reported new friendships. Furthermore, they express the intention to ask each other for advice in the future and to support each other with positive feedback. It was also reported in the interviews that peer learning could contribute to the development of a new feedback culture in the classes and learning groups. In addition, peer learning was able to promote social integration and solidarity.

Nevertheless, it remains unclear for which group of people peer learning is particularly suitable and how peer learning can be effectively designed for all. The analysis shows that peer learning enables positive effects and developments for a part of the apprentices but not for the whole group. Accordingly, with regard to the practical implementation of peer learning, it should be determined once again how the interventions can be designed in a more individualized and subject-oriented way so that a larger part of the group (or preferably all) can be addressed and can benefit in their development through peer learning. Initial considerations for further individualization are associated with the use of peer tutoring since this peer approach is carried out in the entire class group, all group members are actively involved, and the learning pace in the tandems can be set individually in each case.

In summary, it can be concluded that the use of peer learning for the design of learning situations (especially in the repetition and consolidation of previously taught content and topics) in VET should be examined on a situational basis and implemented accordingly. Teachers and instructors could potentially be relieved of time, and the learning processes could be made more active, attractive and varied.

In conclusion, it should be noted that there is still a need for research, so with regard to a scientific perspective, the findings generated here should first be reviewed in a further study. Moreover, potentially relevant (new) findings could be generated by subgroup comparisons that include personal characteristics, such as a comparison of genders, ages, school-leaving certification, learning institutions or professions. In addition to the research desiderata listed, an adaptation of the approaches to other professions (e.g. commercial-administrative) should be focussed.

References

Bandura, A. (1979). *Sozial-kognitive Lerntheorie.* Klett-Cotta.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Prentice-Hall.

DGB (Federation of German Trade Unions) (2016). *Ausbildungsreport 2016.* DGB-Bundesvorstand, Abteilung Jugend und Jugendpolitik (Eds.).

Gebhardt, A., Martínez Zaugg, Y., & Nüesch, C. (2009). Förderung von Lernkompetenzen im betrieblichen Teil der Berufsausbildung. *bwp@ Berufs- und Wirtschaftspädagogik - online, 17*, 1-35. http://www.bwpat.de/ausgabe17/gebhardt_etal_bwpat17.pdf.

Gläser, J., & Laudel, G. (2010). *Experteninterviews und qualitative Inhaltsanalyse.* VS Verlag für Sozialwissenschaften.

Haag, L., & Streber, D. (2011). Tutorielles Lernen. *Empirische Pädagogik, 25*(3), 358-369.

Helfferich, C. (2014). Leitfaden- und Experteninterviews. In N. Baur & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 559-574). Springer VS.

Jacomy, M., Heymann, S., Venturini, T., & Bastian, M. (2014). ForceAtlas2, a Continuous Graph Layout Algorithm for Handy Network Visualization Designed for the Gephi Software. *PLOS ONE, 9*(6), 1-12.

Kelle, U. (2014). Mixed Methods. In N. Bauer & J. Blasius (Eds.), *Handbuch Methoden der empirischen Sozialforschung* (pp. 153-166). Springer VS.

Köhler, S.-M. (2016). Die sozialisationstheoretische Perspektive: Der Wandel der Peer- und Freundschaftsbeziehungen im Lebenslauf. In S.-M. Köhler, H.-H. Krüger & N. Pfaff (Eds.), *Handbuch Peerforschung* (pp. 89-119). Budrich.

Krüger, H.-H., & Hoffmann, N. F. (2016). Peers und informelles Lernen. In M. Harring, M. D. Witte & T. Burger (Eds.), *Handbuch informelles Lernen. Interdisziplinäre und internationale Perspektiven* (pp. 381-397). Beltz.

Kuckartz, U. (2016). *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung.* Beltz.

Kutscha, G., Besener, A., & Debie, S. O. (2012). Einstieg in die Berufsausbildung – Probleme der Auszubildenden und Handlungsbedarf in den Kernberufen des Einzelhandels. *Zeitschrift für Berufs- und Wirtschaftspädagogik, 108*(3), 394-419.

Leijten, F., & Chan, S. (2012). *The effectiveness of peer learning in a vocational education setting.* CPIT. Ako Aotearoa Southern Hub project.

Meuser, M., & Nagel, U. (2002). ExpertInneninterviews – vielfach erprobt, wenig bedacht. Ein Beitrag zur qualitativen Methodendiskussion. In A. Bogner, B. Littig & W. Menz (Eds.), *Das Experteninterviews. Theorie, Methode, Anwendung* (pp. 71-93). Leske + Budrich.

Meuser, M., & Nagel, U. (2009). Das Experteninterview - konzeptionelle Grundlagen und methodische Anlage. In S. Pickel, G. Pickel, H.-J. Lauth & D. Jahn (Eds.), *Methoden der vergleichenden Politik- und Sozialwissenschaft. Neue Entwicklungen und Anwendungen* (pp. 465-479). VS Verlag für Sozialwissenschaften.

Piaget, J. (1932). *Le jugement moral chez l'enfant.* Presses Universitaires de France.

Piaget, J. (1986). *Das moralische Urteil beim Kinde.* Klett-Cotta.

Reinders, H. (2005). *Qualitative Interviews mit Jugendlichen führen. Ein Leitfaden.* Oldenbourg.

Steckler, A., McLeroy, K. R., Goodman, R. M., Bird, S. T., & McCormick, L. (1992). Toward Integrating Qualitative and Quantitative Methods: An Introduction. *Health Education Quarterly, 19*(1), 1-8.

Struck, P., & Franz, P. (2020). Importance of Peer Projects in Vocational Education and Training for the Development of Social Skills. In L. M. Herrera, M. Teräs & P. Gougoulakis (Eds.), *Teaching, Learning and Teacher Education. Emerging Issues in Research on Vocational Education & Training Vol. 5* (pp. 86-120). Premiss förlag.

Struck, P. (2020). How to support young adults individually in career choice? - The model of knowledge in the career choice process (KCCP). In C. Nägele, B. E. Stalder & N. Kersh (Eds.), *Trends in vocational education and training research, Vol. III. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 285-291). doi.org/10.5281/zenodo.4007690.

Topping, K. J. (1996). The Effectiveness of Peer Tutoring in Further and Higher Education: A Typology and Review of the Literature. *Higher Education, 32*(3), 321-345.

Vygotsky, L. (1929). The problem of the cultural development of the child. *Journal of Genetic Psychology, 36,* 415-434.

Vygotsky, L. (1978). *Mind in society. The development of higher psychological processes.* Harvard University Press.

Vygotsky, L. (1986). *Thought and language.* MIT Press.

Witzel, A. (2000). Das problemzentrierte Interview. *Forum qualitative Sozialforschung, 1*(1), 1-13.

Zander, L. (2014). *„Sage mir, mit wem du umgehst...". Reziproke Zusammenhänge zwischen Selbstwahrnehmung, Merkmalen Anderer und Beziehungen zu Anderen in Lernkontexten.* Freie Universität Berlin.

Biographical notes

Dr **Philipp Struck** is a professor at the Catholic University of Applied Sciences in Mainz, Germany. His lectures and research interests focus on VET teacher education, career choice and career guidance, special education and social education in VET.

VETNET
European Research Network
Vocational Education and Training

Van Vlokhoven, H., & Hoeve, A. (2022). Educating for dynamic vocations: A guidepost for responsive SVET. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 178–186). https://doi.org/10.5281/zenodo.6977564

Educating for Dynamic Vocations: A Guidepost for Responsive SVET[1]

Van Vlokhoven, Haske
haske.vanvlokhoven@han.nl, HAN University of Applied Sciences, The Netherlands

Hoeve, Aimée
aimee.hoeve@han.nl, HAN University of Applied Sciences, The Netherlands

Abstract

Context: A major challenge for contemporary Secondary Vocational Education and Training (SVET)is to enhance its responsiveness. Responsiveness can be defined as the ability of (teams of) educational professionals to interpret socio-economic and technological developments for curriculum development in terms of content and pedagogical approach. In the Netherlands, SVET-qualifications are developed on a national level by tripartite stakeholders (employers, union representatives and education). Based on these national qualifications, teacher teams in the SVET-colleges have to develop curricula. Research in Dutch SVET shows that the development of SVET-curricula is often a school-internal process with a focus on planning in terms of time and sequence (Hoeve & Van Vlokhoven, 2019). Actual co-makership with business partners is still a rare phenomenon.
Approach: A consortium of six SVET-colleges and three research institutes started a collaborative interactive research project (Ellström, 2010). Interactive research is about the joint learning processes of practitioners and researchers which results in knowledge creation through co-development. The aim of the project was to develop a more interactive approach in which schools and enterprises are both actively involved in curriculum development. The central research question to be answered was: What are the characteristics of a responsive protocol that SVET teacher teams, in co-makership with their business partners, can effectively be used in the development of adaptive, vocation-oriented curricula? Representatives of 10 teacher teams participated in an inter-organisational professional learning community (iPLG). In the iPLG practitioners and researchers worked together on the design of a responsive protocol for curriculum development.
Findings: The iPLG designed a tool (guidepost) for SVET-teams to organize for responsive SVET. In the tool, two agendas are combined: an explorative agenda and a developmental agenda. The explorative agenda comprises the trends 'outside': the developments at the labour market and in the professional field. The developmental agenda contains the necessary curriculum components. The agendas are interrelated since developments at the occupational level should resonate in the educational programs of the SVET-college.
Conclusion: In the design of the guidepost, the significant characteristics of a responsive protocol are included. The guidepost can be used either as an analytical tool (e.g. which agenda elements are solid, which ones are we proud of; which ones need further elaboration) or as a tool to improve particular agenda items in order to increase the responsiveness of the

[1] This research was funded by The Netherlands Initiative for Education Research (NRO) project: 405-17-623

curriculum. By implementing the tool in a team routine, SVET-teams will be able to monitor the quality of the responsiveness of their curriculum and make (small) adjustments on regular basis.

Keywords: responsiveness, vocational education, co-makership, curriculum development

1 Introduction

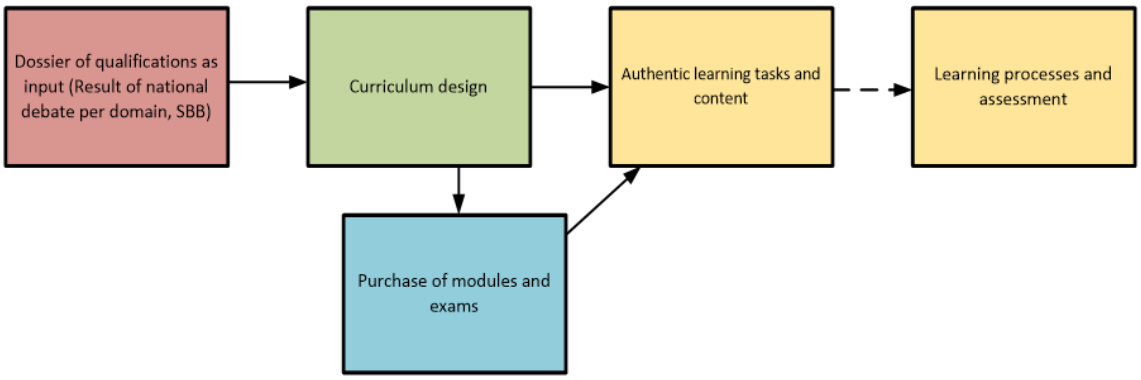
The connection between vocational education and the professional field is under pressure due to the pace of social and technological developments (see, for example, Van der Meer, 2014). Given these dynamics, there is a need for a greater degree of adaptivity in vocational education (Bussemaker, 2015; WRR, 2013; Palonen, Boshuizen, & Lehtinen, 2014). The SCP (2017) uses the term responsiveness, referring to the extent to which vocational education is able to respond adequately to changes in the labour market and to equip MBO students for a good start and permanent employability in that labour market. This requires collaboration with professionals in the field in order to be able to adapt the curricula in an adaptive way (OECD, 2014, Education Council, 2014).

Research shows that local partnership with businesses is not optimally exploited and that curriculum development is a strong school-internal process and is mainly a matter of planning in time and sequence (Hermanussen, Verheijen & Visser, 2013; Cedefop, 2012). Structural involvement of the professional field – for example through professional field committees – is not commonplace. However, there are considerable differences between domains. For example, in the Economy domain, the business community is less often involved than in the technology or care domains. Critical signals are also received from the professional field involved in local partnerships. Research into professional field committees in the construction sector shows that a majority of professional partners feel that they can contribute more by 'providing input for the program as a whole', or 'providing guest lecturers' (Kans & Van der Aa, 2013).

The need to strengthen local partnerships is recognized in a regional consortium, named the GPA, in which 6 SVET institutions and the School of Education of HAN University participate. This consortium is organized around the issue of organizing good quality and future-oriented vocational education. Research at these institutions shows that teams only make limited use of the professional field in curriculum development. It is significant to note that "…it is not organized [within the study programmes] to do anything with information from the professional field. Teachers have not been taught to deal with this: we have been in survival mode for a long time due to rigid pressure from the ministry and inspectorate," said an Economics teacher. "We haven't asked ourselves these kinds of questions in 10 years."

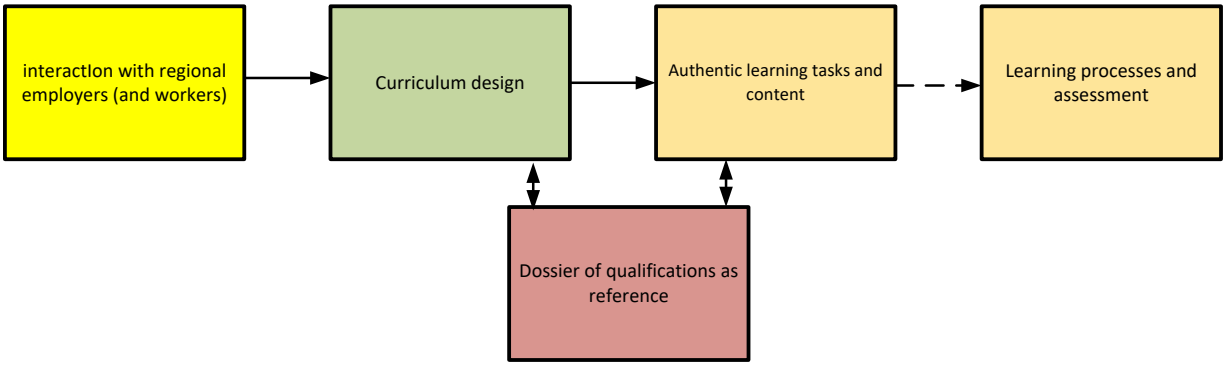
The inventory gives rise to a picture of a linear approach to curriculum development (see figure 1), which is confirmed by the research by Hermanussen et al. (2013). An internal school procedure for allocating competencies into learning units, in which didactic methods from external publishers are purchased in 30 % of the cases. Efficiency considerations play an important role, but the linear model leads to a connectivity problem: there is time gap between the determination of the Qualification Dossiers (QDs) and the moment students graduate. In other words, we are training for the labour market of the day after tomorrow based on knowledge of the day before yesterday (Nieuwenhuis, 2013). A second problem with the linear model is that the professional content is no longer a topic of discussion (after all, it is fixed in the QD), as a result of which the discussion between SVET-schools and the professional field mainly focuses on organizational aspects.

Figure 1
Lineair model for curriculum design



The problems of this linear approach - delay and conversation focus on organizational aspects rather than content - are recognized by the GPA. There is a need for a substantiated approach to design from the outside (the work field) inwards. Dialogue with one's own regional professional field offers the opportunity to respond to developments in the regional (labour) market. The core of the desired design model is a dialogue with the regional professional field by the members of the education team who develop the curriculum. In this approach, the QD takes on more of the function of a frame of reference: interaction with the local professional field, both in the design phase and in the implementation phase, is the most important ingredient of the design process. The contours of such a more interactive model are shown in figure 2:

Figure 2
Interactive model for curriculum design



This requires a more flexible curriculum model (permeable curriculum - a curriculum with a fixed core supplemented by flexible components with current themes - de Vries 2016), different professionalism of teachers (up-to-date knowledge of developments in professional practice; more design skills to fill) and ownership and facilitation at managerial level. It requires different professional behaviour for which teacher teams should develop a professional standard (Palonen, Boshuizen, & Lehtinen, 2014). In the expertise model of Palonen et al. (2014), professional standards are stabilizing factors that support professionals in making adequate choices in complex situations. Curriculum development for rapidly changing professions is such a complex problem situation. The interactive model requires a responsive protocol, a standard of topics for the school-work field discussion and possible context-sensitive

elaborations. This project aims to develop such a protocol that supports teacher teams in making choices when developing adaptive curricula.

1.1 Problem statement and research questions

The aim of the project "Educating for dynamic vocations" is to develop a guidepost for responsive curriculum development which supports educators to be connected to developments outside, more specifically in the professional field. The usability of the guidepost will be an important quality criterion.

The central knowledge question of the project is:

What are the characteristics of a responsive protocol that SVET teacher teams, in co-makership with their business partners, can effectively be used in the development of adaptive, vocation-oriented curricula?

Based on this main question, the following sub-questions have been formulated:

- What is the current routine for curriculum development of SVET teaching teams?
- What are the building blocks (or central elements) of a responsive protocol?
- Which arguments play a role in the development and use of a responsive protocol?
- What are important preconditions for the use of a responsive protocol?

2 Method

An inter-organizational professional learning community (iPLG) was set up to answer the research questions, in which education and research professionals have jointly developed a responsive protocol. The iPLG consisted of 10 teacher-researchers from 5 SVET-institutions and 4 researchers. The teacher-researchers are the 'liaison officers' to the teaching teams. They alter between work practice and the iPLG, collect questions and feedback, monitor the relevance of practice and link (interim) outcomes back to work practice.

The research was set up as a design study in which a protocol for curriculum development is designed and tested. The design process took place in the iPLG. Theoretical, professional and practical knowledge was combined with practitioners experiences. Within the iPLG and within the SVET teacher teams social learning processes took place. (Group) Interviews and observations were used to map the quality of this interaction, both in terms of process and content (De Laat, Schreurs, & Nijland, 2014; Wenger, Trayner, & De Laat, 2011; Hanraets et al., 2011; Akkerman & Bakker, 2011; Mazereeuw et al, 2016).

3 Findings

In this section we present the main results of this research project in accordance with the sub questions of our research.

3.1 The current routine for curriculum development of SVET teaching teams

The majority of the teams regard the QD as the starting point for curriculum development and follow a linear approach. The QD serves as a guiding program for curriculum plans. Modules and assessment materials may be purchased from educational publishers. The dominant approach is inside-out reasoning: "we need so and so many internships", and that is being organised. The discussion with the regional professional partners is often instrumental, i.e. aimed at agreements about for example work placement agreements (in terms of numbers, scope or supervision requirements). Outside in reasoning that starts with questions like what is happening in the regional work field, what developments are taking place, and how can we anticipate those developments seems to be a rare phenomenon.

Group interviews show that a majority of the teams feel that their SVET program is insufficiently connected to contemporary professional practice. Furthermore, they revealed that the

participating SVET teams are not always aware of their current routine for curriculum development. A striking finding was that all teams involved indicated that they actually do not have a clear working method. In many teams, curriculum (re)design is the responsibility of a small group of assigned persons. However, the fact that many teams opt for this construction does not automatically mean that they think this is a good way of working. Some of the participating members criticized this approach as being a weakness in their current way of working.

It is a real challenge for most teams to reason from the outside in. It requires a culture change from the teaching team (and the organization).

3.2 Building blocks for a responsive protocol

In order to adequately respond to developments in the (regional) professional field, it is necessary for teams to keep in touch with the dynamics in their region and to be able to translate them into the study curriculum. Yet, teams find this a very difficult task. Like any task that requires collective action from different stakeholders, it is important to build common ground by developing a shared vision on:

- Professional image and work processes. For which profession(s) is/are being trained? And what are the professional tasks within that profession?
- Developments in the profession: What changes and innovations are taking place in/around the profession nationally and in the region and what consequences does this have for the training?
- Learning from novice, via starting competence to competence: roughly what is the route from the status of novice/newcomer in the field to starting competence and competence? Up to what level can the training guide the student and where do social partners themselves take over this process?
- Assessing professional competence: how can the development of professional competence be assessed?

For each of these items, the question is whether there is a shared vision on the particularly item, i.e. sufficiently shared among team members and their professional partners. In doing so, the team always asks itself whether its shared insights are up to date. Documents from SBB (the QD and the trend reports) are important resources and frames of reference for this, in addition to our own observations in the field.

Looking from a value-creation perspective, professions or vocations change much less rapidly than looking from the level of tasks and techniques. In line with Gessler and Höwe (2015), we follow this distinction and thereby differentiate between spheres of work and tasks of work. The spheres of work form the robust core of the profession and are much less changeable than the tasks of work. The latter is directly influenced by social, technological, organisational and product developments and is much more changeable. The tasks of work can easily be adapted intermediately to regional work field developments. A responsive vocational curriculum, therefore, takes into account both the robust spheres and changing tasks; together, they can offer a way out of the problem of an unknown future labour market. In addition, this unknown future requires free space in the curriculum to be able to respond to new (regional) developments and to provide room for the development of the self-regulating capacity of future professionals. Miller calls this "future's literacy" (2013); learning to deal with uncertainties in work and preparing for lifelong development. Adaptivity, agility and self-regulation are important characteristics (or terms of development).

In this line of reasoning the iPLG identified the following building blocks for curriculum development:

- Constant and changeable elements in the curriculum: Which elements in the profession are constant and which elements can be flexibly filled in and continuously adapted?

- Learning environments; workplace learning and hybrid forms: What are appropriate learning environments for the different professional tasks?
- Assessment and evaluation in co-makership: With whom, when, what and how is professional competence assessed?
- Determining the structure of the curriculum or parts of it: In what order (sequence) should someone learn parts of the profession? To what extent is that structure flexible and is there a choice for students?

Development of self-direction: How does the student learn to steer his own professional development and deal with developments in the profession?

Based on the elements of shared vision making and curriculum development, the iPLG designed a guidepost for SVET-teams to organize for responsive SVET. In the tool, two agendas are combined: an explorative agenda and a developmental agenda (See table 1). The explorative agenda comprises the trends 'outside', the developments at the labour market and in the professional field. The developmental agenda contains the necessary curriculum components. The agendas are interrelated since developments at the occupational level should resonate in the educational programs of the SVET-college.

Every agenda item of the explorative agenda consists of an objective (what is the rationale of this item) and is devised into different investigating questions to be answered in collaboration with the occupational partners. In addition, potential risks are described when the agenda item is not in the picture of the SVET-team. The developmental agenda has the same kind of structure, although not all the items might be answered in dialogue with stakeholders from the labour market.

Table 1
Elements of the explorative and the developmental agenda

Explorative agenda	Developmental agenda
Developments in the professional field	Learning environments – workplace learning-hybrid designs
Learning: novice - competent - proficient	Stable and dynamic elements
Occupational profile & work processes	Training of self-regulation
Assessment of expertise development	Structure and sequence of the curriculum
	Valuation and assessment

The guidepost can be used either as an analytical tool (e.g. which agenda elements are solid, which ones are we proud of, which ones need further elaboration) or as a tool to improve particular agenda items in order to increase the responsiveness of the curriculum. By implementing the tool in a team routine, SVET-teams will be able to monitor the quality of the responsiveness of their curriculum and make (small) adjustments on regular basis.

3.3 Which Arguments Play a Role in the Development and Use of a Responsive Protocol?

Collaboration with educational practice in this project made clear that the urgency and effort of teachers is foremost on (organising) student learning and much less on a more abstract task of curriculum (re)development. In the hectic of everyday educational practice, it also appears difficult to make time and mental space for curriculum (re)design processes. Time and focus on curriculum development issues are mostly restricted to planned moments and usually with a specific assignment. A responsive curriculum as a continuous process with the active involvement of the professional field is not common practice at all. On the one hand, this is due

to the lack of time and mental space experienced by teacher teams. Their focus and energy are primarily directed at the professional development of their students and the daily issues involved (such as administration). It also has to do with the way teams perceive their task. Do they consider it their task to (continuously) engage in responsive dialogue with partners in the field? And is this task also fostered by the organisation? Is it a task entrusted to the teams or to specific people for example? In this project, we noticed that although the lines of communication with the professional field of work are always in place, but mostly flimsy organised. Sometimes they even depend on certain people. Most teams seem to lack a well-thought-out working method with which the developments from 'outside' are systematically translated into the curriculum. The lineair approach is a safe and generally accepted choice.

Another insight from this project is that a curriculum design seems to be regarded by teachers as an implementation plan. In terms of the curriculum concept of Thijs and Van den Akker (2009), the focus of teachers seems to be on the "implemented" curriculum and less on the "intended" curriculum. This hindered the design process in the iPLG from time to time, as practitioners did not always feel comfortable and equipped for the abstract decisions about developing a generic tool that can be applied in different contexts. Continuously switching between the perspectives of a generic tool and their own daily practice, especially when the student seems to be out of sight, is not easy. While a responsive curriculum and its development require the constant shifting between these perspectives. With the two different agendas that the Guidepost comprises, the exploration agenda and the development agenda, we have tried to meet this need.

3.4 Preconditions for the use of a responsive protocol

As mentioned above, teacher teams still have little routine for jointly and systematically translating 'outside' developments into their curriculum. The experiences in this project show that models of curriculum design in consultation with professional partners do work at the national level (as laid down in KDs) but not at the local level where the teacher teams should be in the lead. Part of the reason is that at the local level, ownership is somewhat lacking; teachers foremost feel responsible for the student. Only when the student encounters obstacles related to a lack of responsiveness do they feel the need to change this.

Another explanation is that responsive curriculum development requires the development of a different kind of professionalism. In the first place, it requires design knowledge and/or experience to ensure that teacher teams feel sufficiently equipped to take the lead in curriculum development (instead of leaving it to curriculum coaches or other designated experts).

In addition, the composition of teams must guarantee a mix of expertise, with an eye for the necessary expertise regarding:

- Current, (professional) content knowledge about the issue/theme/subject.
- Specific, current practical experience/field of work
- Knowledge/experience (current) education: how are we doing? What are our strengths/problems (see product 1. discussion of thesis)

The development of a robust team routine on responsive curriculum development naturally takes time, access to budget (for professionalisation) and support. Teams unanimously indicate a lack of enough support. Here it is good to realise that the call for support and resources is not always meant literally. It is often more about the mental space needed to come up with creative ideas and experiments. It is striking that the national KD is not really experienced as an obstacle for local creative ideas and experiments.

4 Conclusions

In the design of the guidepost, the significant characteristics of a responsive protocol are included, which will answer the central research question. In the tool, two agendas are combined: an explorative agenda and a developmental agenda. The explorative agenda comprises the trends 'outside', the developments in the labour market and in the professional field. The developmental agenda contains the necessary curriculum components. The agendas are interrelated since developments at the occupational level should resonate in the educational programs of the SVET-college.

However, the main insight of the project might be that professionals need qualified space to anticipate adequately on continuous uncertainty. This implies a perspective shift from controllability towards acceptance of a kind of uncertainty somehow. SVET-professionals are looking for a balance between insecurity and security, between robust and volatile/ dynamic aspects of the curriculum. In line with the distinction between 'spheres and tasks of work' (Gessler & Howe, 2015) we detected two processes that should be constantly balanced: declining uncertainty as well as stretching the professional space of professionals. The guidepost is a tool for SVET teams to support them in balancing these two processes.

References

Akkerman, S.F., & Bakker, A. (2011). Boundary crossing and boundary objects. *Review of Educational Research*, 81, 132-169.

Bussemaker, J. (2015, 14 september). Brief van de minister van onderwijs, cultuur en wetenschap. (Tweede Kamer, vergaderjaar 2014-2015, 31 524, nr. 250). Geraadpleegd op 16 augustus 2021, van https://tinyurl.com/tweedekamer-responsiefMBO

Cedefop (2012). *Curricula reform in Europe. The impact of learning outcomes*. Luxembourg. Publications Office of the European Union.

De Laat, M., Schreurs, B., & Nijland, F. (2014). *Communities of practice and Value Creation in networks*. The Routledge Companion to Human Resource Development, (1998), 249–257.

De Vries, B. (2016, 6 januari). *Een permeabel* curriculum*. Wij Maken het Onderwijs*. Geraadpleegd op 12 augustus, van http://www.wijmakenhetonderwijs.nl/actueel/eenpermeabel-curriculum-door-bregje-de-vries

Ellström, P.E. (2010). Practice-based innovation: a learning perspective. *Journal of Workplace Learning, 22*(1/2), 27 – 40.

Gessler, M. and Howe, F. (2015). From the reality of work to grounded work-based learning in German vocational education and training: background, concept and tools. *International Journal for Research in VET*. 2(3): 214-238.

Hanraets, I., Hulsebosch, J., & De Laat, M. (2011). Experiences of pioneers facilitating teacher networks for professional development. *Educational Media International*, 48(2), 85–99. http://doi.org/10.1080/09523987.2011.576513

Hermanussen, J., Verheijen, E., Visser, K. (2013). Leerplanontwikkeling in het middelbaar beroepsonderwijs. De bruikbaarheid van kwalificatiedossiers onderzocht. Den Bosch: ecbo.

Hoeve, A., & Van Vlokhoven, H. (2019). *Verslag van designteams Beroepsgerichte Didactiek* (Rapport). Hogeschool van Arnhem en Nijmegen.

Kans, K., Aa, R. van der (2013). Beroepenveldcommissies voor de bouwsector in het mbo en hbo. Rotterdam: Ecorys.

Mazereeuw, M., Wopereis, I., McKenney, S. (2016). Extended teams in vocational education: collaboration on the border. *Educational Research and Education*. 22 (3-4). 1-19.

Miller, R. (2013). *Uncertainty, learning and worth: imagining non-industrial futures*. Keynote ECER-conferentie 2013. Parijs: Unesco.

Nieuwenhuis, L. (2013). *Werken aan goed beroepsonderwijs*. (Designing good vocational education). Nijmegen: Hogeschool van Arnhem en Nijmegen.

OECD (2014). Skills Beyond School: Synthesis Report, OECD Reviews of Vocational Education and Training, OECD Publishing. http//dx.doi.org/10.1787/9789264214682-en

Palonen, T., Boshuizen, H.P.A., & Lehtinen, E. (2014). How expertise is created in emerging professional fields. In: Halttunen e.a. (eds): *Promoting, assessing, recognizing and certifying lifelong learning: international perspectives and practices.* Dordrecht: Springer. (Lifelong learning book series, 20).

SER (2017). *Toekomstgericht beroepsonderwijs: Deel 2 Voorstellen voor een sterk en innovatief beroepsonderwijs* [Future proof vocational education: part 2 Propositions for a strong and innovative VET]. The Hague:

The Social and Economic Council of the Netherlands (SER).
Thijs, A., & Akker, J. van den (2009). *Leerplan in ontwikkeling.* (Curriculum in design). Enschede: SLO.
Wenger, E., Trayner, B., & Laat, M. de. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework.* Heerlen: Ruud de Moor Centrum, Open Universiteit.
WRR (2013). *Naar een lerende economie.* Den Haag: Amsterdam University Press.

Biographical notes

Haske van Vlokhoven is a senior researcher at HAN University of Applied Sciences. Her focus is on practice-based research in the area 'from work-based learning to learning to work'. Besides vocational pedagogy, responsive design of powerful connections between education and professional practice has her specific interest.

Aimée Hoeve is a senior researcher at HAN University of Applied Sciences. The leading theme in her work is the question of how we educate (future) professionals in the best possible way, making use of the strengths of school and workplace learning. She specialized in design-oriented research in hybrid learning environments.

VETNET
European Research Network
Vocational Education and Training

Wahlgren, B., & Lindhardt Beck, L. (2022). Training school leaders to improve school practices. Cooperation between vocational school leaders and researchers. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 187–196). https://doi.org/10.5281/zenodo.6977570

Training School Leaders to Improve School Practices [1]
Cooperation Between Vocational School Leaders and Researchers

Wahlgren, Bjarne
wahlgren@edu.au.dk, Aarhus University, Denmark.

Lindhardt Beck, Line
line@edu.au.dk, Aarhus University, Denmark

Abstract

Context: A fundamental problem in competence development is how the added competences lead to a change in practice. There is a transfer problem from the competence development process to change of actual actions and activities. A similar fundamental problem is found in development projects when the new experiences do not lead to permanent new activities. In this project, an approach is used that qualifies the school leaders to perform new activities and ensure that these activities are used in practice. In the study, we anticipated that the interplay between researchers and school leaders would improve the quality of vocational education program at the participating schools.
Approach: Based on experiences from a project about improving practices at eight vocational schools in four countries, we analyse a cooperation between researchers and school leaders. Through this cooperation, the school leaders were trained to handle educational change. In this project, a development model is used to ensure quality development at the schools and for the competence development of the school leaders. The article describes how this learning process can be conducted and how the leaders' competences are developed, and not least, how they used this competence in practice. The specific activities in this development project include three factors. The first is a process in which the school leaders clarify what the development work is about and what goals they have. The second factor includes leaders' systematic reflection on what they do and what they learn from what they are doing. The third factor concerns systematic summaries of the reflection on the learning process.
Findings: We found that there was a long-lasting process and a systematic and guided interchange between reflections and actions. Mutual trust and positive personal relations are factors that benefit the process. Different understanding of purpose and meaning and the need for reflections are obstacles.
Conclusions: The findings indicate that establishing a constructive dialogue around a learning circle between researchers and practitioners is not a straightforward process. The practitioners' ability to join the process must not be taken for granted.

Keywords: Competence development, school leaders, school development, vocational school

[1] The paper is based on an article Wahlgren & Puge (in print). The process of implementing an internal formative evaluation. *Ceprastriben,* 2022. A description of the project and process can be found in *Sustainable Culture for Change II (2022):* https://www.epaper.dk/velux01/working_paper_scfc_ii_2022/

1 Introduction

As part of an international program development, projects have been initiated at eight vocational schools in four East-European countries: The Czech Republic, Hungary, Poland, and Slovakia. The aim is to improve the quality of vocational education and training at these schools. A research group from Aarhus University in Denmark has worked with the school leaders at each school to support the projects' development at the local level. By the researchers' training of the school leaders, each leader is expected to develop competence to improve the change process at the school.

In this article, we analyse the competence development of the school leaders. Based on experiences, we describe the content and form of the cooperation between researchers and school leaders. We argue that this is an educational process where the school leaders have to learn how to handle school development. As we will show, this is not a straightforward process.

2 School Leadership and Change

Leadership is pivotal for organisational change and developing new school structures (Schein, 2010; Gillon, 2018; Poole and Van de Ven, 2015). It is important that school leaders are willing and able to implement change. They must have a clear goal to which they are committed (Palmer et al., 2017; Jabri, 2017). Consequently, school leaders must have the necessary competencies to both plan and implement organisational change. External expertise can help support this process, with cooperation between school leaders and researchers comprising a potential source of such expertise.

In various projects, a constructive interplay between school leaders and researchers has been used to improve school practices (Constantinou & Ainscow, 2020). A study by Karagiorgi et al. (2018) showed how school leaders were able to transform the experiences they gained from a research project into modified and improved educational practices. With support from researchers and through systematic reflection in diaries, the school leaders were able to improve their own practices and the educational outcome of the school (Karagiorgi et al., 2018). In another study about interaction between school leaders and researchers, the findings show 'that the thematic and theoretical inputs of the program, practical training, and learning modes stimulated transformations of the principals' thinking and talking about school and leadership practices, what they do in practice, and how they relate to others and the circumstances around them' (Aas et al., 2020, p. 223).

Most research projects concerning school development focus on the advantages of engaging school leaders and teachers in the research process, whether the focus is on making teachers aware of tacit knowledge (Bulterman-Bos, 2017), improving teachers' classroom practices (Saunders, 2012), training mentors (Raaen, 2017), or on teacher training in general (Gibbs et al., 2017). In most of these studies, the interplay between researchers and practitioners is considered unproblematic and is therefore often taken for granted.

In some studies, the conditions for cooperation between researchers and practitioners are analysed. Motivation, trust, mutual respect, and resources (particularly time spent) are mentioned as important conditions (James & Augustin, 2018, p. 333). The practitioners' ability to reflect is mentioned in another study (Luttenberg et al., 2018). In a study on facilitating evidence-informed teacher practices, it is underlined that the stakeholders' different expectations must be 'negotiated', and the translation of research-based knowledge into practice must include practitioners (Flynn, 2018, p. 17). Another study explores how to develop a research relationship between researchers and school leaders, which the authors refer to as a school/university alliance. As part of this alliance the researchers asked the school practitioners to reflect on and write down their thoughts and feelings about being part of a research project, using their reflections to develop a research relationship (Solvason et al., 2018).

An action research project centred on leadership training demonstrated that the training made educational leaders more efficient. However, a lack of support in the form of 'critical companionship' - defined as personal support - reduces the effect (Manley & Titchen, 2017).

Research point to the possibilities for developing school leaders' competencies through an interactive process. However, the referred studies indicate the need to address obstacles such as different goals, a lack of professional respect, and a lack of support for the cooperation between researchers and school leader is to be successful.

3 Theoretical Background

In this project, the researchers qualified the school leaders based on a model of reflection. This model focuses on the mechanisms linking objectives and outcomes (Patton, 2011, 2012; Stufflebeam & Coryn 2014). According to this model, a qualified development of practice is based on an evaluation of the improvement. A qualified evaluation requires goals and procedures for collecting data to assess the improvement. Accordingly, one of the main activities in the cooperation between researchers and school leaders was for the former to support the latter in conducting a theory-driven evaluation of the new practice at their schools and to develop an action plan for quality improvement – including a plan for data collection.

The strategy to elaborate the action plans includes the reflection circle as a model for the action research process. The model, named 'model for emancipatory action research for organisational change', includes four elements in the change process: Plan, act, observe and reflect. The model describes the procedures for action research (Cohen et al., 2011, p. 352-358). In the model, inspired by Schön (1983, 1987) and Kolb (1984), development is a continuous reflection process starting with goals and new activities, resulting in new and improved practice through reflections and new experiences. The reflection process begins with a clarification of the goals for the development program at the school. What do the leaders mean when they talk about improving the quality of vocational training? What do they want to obtain? The next step is to realise these goals through relevant activities. Consequently, the leaders were asked to reflect on why and how the activities were expected to improve the quality. E.g. leaders from a school wanting to improve the quality of the teaching program (goal) and consequently focusing on the cooperation between the teachers (activities) were asked to reflect on why and how the cooperation improved the educational quality. Accomplishing the activities, the leaders were expected to reflect systematically on whether these activities actually improved the quality and, if so, in what way and to which degree. The school leaders were then asked to make a formative evaluation of the outcome of the activities (to qualify new experiences).

The researchers' main contribution to supporting the development process at each school was to implement the model mentioned above. In practice, the leaders in dialogue with the researchers drafted and qualified an action plan for developing quality.

4 Data

To understand how cooperation between researchers and school leaders progressed during the development of the leaders' competence, we collected the following data:

The different versions of the written plans drafted by the school leaders. By analysing this data, gradual improvements in quality can be illustrated and documented. The eight participating schools each drafted between two and four versions in a dialogue with the researchers. In total, 20 action plans were drafted. The improvement of the action plans included clarifying the goals for the school's improvement and for the gathering of experiences.

Interviews with the school leaders. The leaders were interviewed twice regarding their reflections on the process of developing local action plans for quality development and on the dialogue with the researchers. The first interview was conducted after filling out the plan, and the second after the first year of filling the reflection papers. The interviews were conducted as

semi-structured interviews focused on: a) the school leaders' experiences with the cooperation, b) their work with the local action plan for quality development, and c) their reflections on the usefulness of the learning process. The interviews, each lasting 30-60 minutes, were transcribed.

Reflective descriptions from the school leaders (reflection papers). The school leaders provided written descriptions of their reflections on their experiences during the process of implementing the new activities describe in the action plans. This data was used to analyse the extent to which schools had implemented the plans.

Recorded observations from summing-up meetings. The leaders' responses in the two summing-up meetings to the questions asked of the researchers concerning what they have done and what they have learned when they worked on implementing the new activities at the schools.

Based on the total data set, we analysed the progress in the leaders' competences and actions. The objective of this analysis was to pinpoint all significant statements that demonstrated the learning process and the obstacles and progress in this process.

5 The Content of the Competence Development

As the first step in the cooperation process between researchers and school leaders, the latter was asked to describe what they wanted to achieve regarding quality development at the school. The researchers asked school leaders to elaborate on these descriptions, posing the following questions: What do you regard as high-quality education? How will you assess the improvement of the quality? What data will you collect for this purpose? On the basis of these questions, the school leaders revised the original plan.

Through the researchers' work, the school leaders became aware of how the effectiveness of the development work was dependent on precise and elaborated descriptions of what is meant by quality of vocational education and of how this quality will be assessed and evaluated.

In this part of the dialogue, the researchers told the school leaders: 'It is important that you make clear what you perceive as an improvement of quality – not in general terms, but specifically in relation to your school.' The school leaders were thereby asked to reflect on the concept of 'quality' in relation to the particular context of educational practice at their school.

As the second step in the cooperation between school leaders and researchers, the concept of continuous evaluation was introduced. The researchers presented the reflection circle (see above) to illustrate the interrelations of goals, actions, experiences, and implementation. The idea was that development work was not primarily about 'describing what you do,' but instead 'reflecting on what you have learned from what you are doing'. As such, the focal point was a reflection on action.

As part of this process, the researchers developed a data collection tool that the school leaders were asked to continuously evaluate their experiences. The tool was primarily used to provide a short description of what school leaders had learned in the process of improving quality. The researchers asked the school leaders to give examples of improvements and to reflect on their experiences.

The third part of the training process was two summing up-meetings. At this meeting, the school leaders were asked to tell what they have done and what they have learned from what they have done.

The dialogue between the researchers and the school leaders was a highly structured and planned process based on continuous feedback from researchers to school leaders over a lengthy period. This feedback was rooted in the school leaders' initial action plans and ideas of how to improve and assess quality at their school.

6 What Have we Learned About the Process?

6.1 Conduction of a Quality Action Plan

From the work to develop the local action plans, we found that dialogue between researchers and practitioners requires a common understanding. It should not be assumed that such a common understanding already exists. Initially, the school leaders did not see the point in drawing up an action plan and found it difficult to understand what the researchers had in mind. In the interviews, the school leaders expressed some scepticism regarding the researchers' role and the need for an action plan. When asked about his experiences with compiling a plan, one school leader answered:

> It was mixed. However, this was our first time – the first time we produced such a document. Later on, it was easy because we had the goal at the back of our minds.

When another school leader was asked if the requirements from the researchers to develop an action plan was understandable, he replied:

> The answer is no. (…) In March or April, we did not really understand what the researchers communicated to us. We read it, we translated it (to the national language), but we didn't get it. It might as well have been in Swahili. Now I understand a lot more about your thoughts than I did at the time.

In the interview, this school leader explained that it was difficult to understand what the researchers had in mind, and it was not clear what the researchers expected of the school:

> It is quite stressful when you want to do your best. When I don't know what is expected of me, I become stressed. That happened back then, but now I understand what you expect of us.

Most school leaders saw developing a local action plan for quality development as hard work. One school leader described it as a difficult job, stating she considered giving up due to the pressure but eventually succeeded and got the 'reward'. She even compared the working process with giving birth:

> You are in extreme pain, and there's no end in sight. But when you hold the child in your arms, you forget the pain and are happy with the result. Now I have the plan, and I am happy with it.

The general experience from the dialogue between researchers and school leaders was that, after a turbulent start, the leaders began to recognise the many advantages of drafting a local action plan for quality development. One school leader commented on the work process and the outcome:

> Now we have some rules, perhaps a pathway to achieve our goals. (…) I see the plan as an important guideline for the work to improve the quality of the training [programs].

There is independently a mutual agreement amongst the leaders that 'The plan is a must.' The plans helped the schools focus on the development process from a long-term perspective. As expressed by one school leader:

> Because we were asked questions, we needed to set up some answers in our minds and think about the whole project in terms of an organizational metamorphosis or change. Now I am thinking about change in terms of the whole organization'. 'They (the researchers) taught us to think about the project holistically. Not only in a material way (to buy new machines), but also in the range of organization and how to improve the organization.

According to another school leader, at first, the researchers' questions were annoying and difficult to understand; however, as the project progressed, this started to change, and she began to see the benefit of having a plan:

> In the beginning, I was complaining about your questions. However, it was the same questions that somehow showed us that we can see technological development in a pedagogical context and why the pedagogical content is important. It was your questions that opened our eyes to that.

The collaboration between this school leader and the researchers to develop a local action plan highlighted the educational and developmental perspectives in the quality development work at the school, linking technological and educational development.

In the dialogue concerning the local action plans, it was crucial to make the school leaders understand the importance of ongoing formative evaluation. As we see it, this understanding developed along the way. As mentioned by one school leader:

> What you have helped me to understand is that the process is more important than the target. It was difficult to understand, but now I do.

Said by another school leader:

> If we had known you before the beginning, we would have structured the project quite differently. We have learned a lot from this process.

Some of the difficulties in the dialogue between researchers and practitioners were rooted in the fact that most of the school leaders had no previous experience with systematic development of the educational quality at the school level.

6.2 Filling the Reflection Papers

The filling of the reflection papers drawn up by school leaders developed the school leaders' ability to reflect on their actions.

The leaders were asked what they believed they befit from filling the reflection papers. The general answer was that they learned to reflect. Reflect on the progress in the development process at the school and on the activities, they were involved in. A leader expressed it like this:

> I become more reflective and more inspired for my work and for *life in general.* I know now that it is important to reflect on the process and not only on the outcome of this process.

How do you think we have influenced your project? We asked a school leader. She answered:

> The most important is the reflection papers because then we get time to reflect and find solutions. The content of the meetings between the managers has been quite different.

Filling the reflection papers has an informative function at the school and highlights the progress in the development process:

> It will actually be good that we stop op every second month and also that we can document. Also, to show the teachers what we have achieved in this project.

From an interview with the management group at one of the schools, the experiences with the reflection papers are expressed in different ways:

> These reflections also helped us implement the sustainable strategy and to find out how we can keep going on after the VELUX project. The whole group of leaders find it very useful now after they have been used to reflect more systematically on the activities. I am sure we will keep on doing so. We have to. This is one of the things we can't really succeed doing as an organization, it's more individually. But it's important that we somehow get it inside people's minds. We have learned it.

The headmaster of this school:

> When we start asking ourselves to answer the question to fill out the reflection paper, then we realize how much we have done. Maybe when you read it first, nothing comes to mind, but then you start to reflect about the questions more and more comes up.

6.3 Experiences from the Summing-Up Meetings

Concerning the summing-up meeting the data tell that the meetings and the process before these meeting were important elements in the school leaders' competence development.

> The meeting gave us a chance to summarize the progress. It seems very useful to sit together and talk about what we have done and what to do in the future.

Another leader says:

> We are glad to have you as a part of the project and for your mentoring. It is very valuable for us. We need to improve the implementation, and I feel you are something like a mirror for us. The discussions about the progress of the project are very important to us. We believe it develops a new culture for us.

Another school leader stressed the importance of the question before the meeting:

> The preparation questions for the midterm meeting helped a lot; it gave us time to be prepared it was very helpful. For us, it was interesting what you highlighted in our reflection papers to be discussed at the meeting. We all feel we understand each other. We understand you, and you understand us.

7 Which Factors Benefit the Process?

A key to understanding the cooperation between researchers and school leaders in this project is the fact that establishing such cooperation was a requirement for the schools' participation in the broader quality development program.

Therefore, the process of compiling an action plan, filling the reflection papers, and participating in the summing-up meetings was an integrated part of the development project at the different schools and a condition for receiving a grant from the VELUX-foundation. A vital part of the cooperation process is therefore convincing the school leaders that it is rewarding and relevant for them to engage in this process. If they do not initially understand the benefits of working with these activities, they will not be engaged in the process, and they will not be motivated to join the competence development.

An important factor in the competence development process is 'trust building', which means that the school leaders feel confident with us, the researchers. Some of the leaders express that they feel good to be in dialogue with us. They underline the importance of the smiling faces and the good vibes we were sending in the dialogue.

Another factor is the mutual respect in the dialogue: "The fact you ask us to be a mentor school touches our hearts because we feel you recognize our work", a school leader says in the interview.

However, we could also find examples of communication that went wrong:

> We feel that the communication was on two levels. We were on a very practical level on how the school works. And your communication was very scientific and not so practical. You used a different language. You should not speak in such a sophisticated way. After the first meeting with you, we had to discuss what was the aim and the focus in the process you were telling about. I would recommend you to listen better to the school what they do and then start the discussion after that. We had a feeling that you did not listen to us.

In general, the researchers' systematic and prepared questions to the school leaders were a vital part of the competence development process. The dialogue must be based on concrete questions for school leaders to answer. The data suggest that the more specific and concrete these questions were, the better the understanding of what 'we have learned'. It is important to ask questions that make school leaders reflect on their own project. The researchers must maintain the school leaders in this process and support them in refining their reflections.

In the dialogue between researchers and school leaders, a change occurs when the school leaders are told that the development process includes systematic reflection on one's experiences. The researchers introduced a paradigm shift from describing 'what we do' to reflecting on 'what we have learned from what we do' - a shift in focus from action to reflection on actions. Our observations show that competence development takes time - much longer than we had expected. Only through a long-lasting dialogue between the researchers and the school leaders did we succeed in making the school leaders think in a new way.

To sum up, an important factor in qualifying the school leaders was an ongoing dialogue where we insisted on the need for an evaluation process. This process must identify a goal for the work and include systematic reflection on how to gather relevant experiences concerning new knowledge generated in the project. Such dialogue, and especially the form of the researchers' questions to the school leaders, is crucial in improving the development of the school leaders' competence.

8 Discussion and Conclusion

The strategy behind this project is based on collaboration between researchers and practitioners. A prerequisite for successful collaboration is that both parties understand the usefulness of cooperation. In this project, it has been essential to convince the school leaders that systematic reflections and evaluation are appropriate when seeking to improve educational quality at the schools. An important part of this process is that we insisted on the importance of the school leaders' continuous reflection on what they planned to do, what they actually did, and what they have learned from what they did.

Our findings confirm the results of other studies in demonstrating the importance of mutual respect in the relationship between researchers and practitioners (Raaen, 2017) and in underlining that successful competence development depends on 'motivation, trust, mutual respect, and recourses' (James & Augustin, 2018, p. 333). Through our study, we became aware of the importance of 'common relevance, shared responsibility for research and mutual trust and respect for differences in professional identities' (Leeman et al., 2018, p. 9). Likewise, we found that a structured process supported school leaders in their efforts to improve educational quality (Karagiorgi et al. 2018, p. 252). We found that an 'important factor in promoting the relationship between research and practice is individual coaching or supervision' (Korthagen, 2007, p. 308).

The findings we have presented in this article have certain limitations in relation to generalizability - partly because of the limited number of participating schools and partly because of the specific contexts for cooperation and the specific schools. On the other hand, the descriptions of cooperation processes are very similar from school to school. Although we are talking about four different countries and different cultures.

The fact that we collected and analysed data about a cooperation we were part of limits reliability. However, we sought to counteract some of these limitations through extensive use of the school leaders' own statements. Likewise, we have compared the findings in our data with data from an external evaluation of our activities. The conclusion seems to be rather similar: The school teachers have learned to reflect on their activities. They have learned to evaluate these activities and reflect on the results.

We found that running this circle for the actual school leader demands a systematic and guided process. This process was long-lasting. Only after a while – in this case, more than half a year – the school leaders have learned to reflect systematically on the experiences gained. Mutual trust and positive personal relations are factors that benefit the process. Different understanding of purpose and meaning and the need for reflections are obstacles.

Based on experiences across all eight schools in the four countries, we argue that establishing a constructive dialogue around a learning circle between researchers and practitioners is not a straightforward process. The practitioners' ability to join the process must not be taken for granted.

References

Bulterman-Bos, J. (2017). How can a clinical research approach contribute to knowledge-building for the teaching profession? *Educational Action Research,* 25 (1), 119-127. Doi: 10.1080/09650792.2016.1154884.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. London and New York: Routledge.

Constantinou, E., & Ainscow, M. (2020). Using collaborative action research to achieve school-led change within a centralised education system: perspectives from the inside. *Educational Action Research, 28*(1), 4-21. doi: 10.1080/09650792.2018.1564686.

Flynn, N. (2018). Facilitating evidence-informed practice. *Teacher Development, 23*(1), 64-82. doi: 10.1080/13664530.2018.1505649.

Gibbs, P., Cartney, P., Wilkenson, K., Parkinson, J., Cunningham, S., James-Reynolds, J., & Zoubir, T. (2017). Literature review on the use of action research in higher education. *Educational Action Research, 25*(1), 3-22. doi: 10.1080/09650792.2015.1124046.

Gillon, A. C. (2018). *The nature of contemporary organization development*. New York: Routledge.

Jabri, M. (2017). *Managing organizational change*. London: Palgrave.
James, F., & Augustin, D. S. (2018). Improving teachers' pedagogical and instructional practice through action research: Potential and problems. *Educational Action Research 26* (2), 333-48. doi: 10.1080/09650792.2017.1332655.
Karagiorgi, Y., Afantiti-Lamprianou, T., Alexandrou-Leonidou, V., Karamanou M., & Symeou, L. (2018). Out of the box' leadership: Action research towards school improvement. *Educational Action Research 26*(2), 239-57. doi: 10.1080/09650792.2017.1310052.
Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs and New Jersey: Prentice Hall.
Leeman, Y., van Koeven, E., & Schaafsma, F. (2018). Inter-professional collaboration in action research. *Educational Action Research 26* (1), 9–24. doi: 10.1080/09650792.2017.1301827
Luttenberg, J., Oolbekkink-Marchand, K., & Meijer, P. (2018). Exploring scientific, artistic, moral and technical reflection in teacher action research. *Educational Action Research 26* (1), 75-90. doi: 10.1080/09650792.2017.1295875.
Manley, K., & Titchen, A. (2017). Facilitation skills: The catalyst for increased effectiveness in consultant practice and clinical systems leadership. *Educational Action Research 25* (2), 256-79. doi: 10.1080/09650792.2016.1158118.
Palmer, I., Dunford, R., & Buchanan D. A. (2017). *managing organizational change*. New York: McGraw-Hill.
Patton, M. Q. (2011). *Developmental evaluation. Applying complexity concepts to enhance innovation and use*. New York: The Guildford Press.
Patton, M. Q. (2012). *Essentials of utilization-focused evaluation*. Thousand Oaks, CA: Sage Publication.
Poole, M. S., & Van de Ven, A. H. (2015). Theories of organizational change and innovation processes. In Van de Ven, A. H., Dooley, K., & Holmes, M. E. (Eds.), *Handbook on organizational change and innovation* (pp. 374-97). NC USA: Oxford University Press.
Raaen, F. D. (2017). Placement mentors making sense of research-based knowledge. *Teacher Development 21* (5), 635-54. doi: 10.1080/13664530.2017.1308429.
Saunders, R. (2012). Assessment of professional development for teachers in the vocational education and training sector: An examination of the concerns based adoption model. *Australian Journal of Education 56* (2):182-204.
Schein, E. H. (2010). *Organizational culture and leadership*. San Francisco: Jossey-Bass.
Schön, D. A. (1983). *The reflective practitioner. How professionals think in action*. New York: Basic Books.
Schön, D. A. (1987). *Educating the reflective practitioner. Toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass Publishers.
Solvason, C, Cliffe, J., & Snowden, M. (2018). Researching in school – creating a meaningful school/university alliance: A reflection. *Educational Action Research 26* (4), 589-602. doi: 10.1080/09650792.2017.1388828.
Stufflebeam, D. L., & Coryn C. L. S. (2014). *Evaluation theory, models and applications*. New York: Jossey-Bass Publishers.
Aas, M., Vennebo, K. F., & Halvorsen K. A. (2020). Benchlearning – an action research program for transforming leadership and school practices. *Educational Action Research 28* (2), 210-26. doi: 10.1080/09650792.2019.1566084.

Biographical notes

Bjarne Wahlgren is a professor in adult education and director of the National Centre for Competence Development, Aarhus University, Denmark. He works with evaluation, assessment of prior learning and transfer from school to practice.

Line Beck Lindhardt is a research project member at the department of educational studies, Aarhus University, Denmark. Her research focuses on school development in vocational education within the project 'Sustainable Culture for Change'.

VETNET
European Research Network
Vocational Education and Training

Zanolla, G. (2022). Transitional solutions and achievement of VET qualifications. A case study of the canton of Ticino. In C. Nägele, N. Kersh, & B. E. Stalder (Eds.), *Trends in vocational education and training research, Vol. V. Proceedings of the European Conference on Educational Research (ECER), Vocational Education and Training Network (VETNET)* (pp. 197–205). https://doi.org/10.5281/zenodo.6977575

Transitional Solutions and Achievement of VET Qualifications. A Case Study of the Canton of Ticino

Zanolla, Giovanna
giovanna.zanolla@supsi.ch, University of Applied Sciences and Arts of Southern Switzerland

Abstract

Context: this contribution focuses on the group of youngsters living in the Swiss canton of Ticino who, after lower secondary school, attend one or more of the "transitional solutions" included in the Institute of Transition and Support (ITS). This institute aims at meeting the needs of youngsters with personal frailties, academic difficulties, social risk, cultural adaptation difficulties and complicated families and relationships. It supports them in the transition from compulsory school to post-compulsory education, promotes their integration into professional and social life and helps them in starting, maintaining and finishing a first basic vocational training and in containing the risk of failure in their training by providing them with educational support.
Approach: the pathways of all the youngsters who have started and attended at least one of the transitional solutions included in the ITS in Ticino in the period between the school year 2014/15 and 2016/17 (1280 youngsters) are examined through longitudinal analysis. Their access to the VET and the successful completion of the apprenticeship with the achievement of a certain qualification or, on the contrary, its interruption and the eventual reorientation or drop-out by the end of 2020 are highlighted. Vocational pathways are put into relation to the type of transitional solution attended, which in turn depends on the needs and on characteristics of youngsters. Data used belong to the Ticino's Department of Education, Culture and Sport, which has developed an application that makes available - in the form of a database - student-specific information, including data on the student's past and current training, subjects studied and end of the year results.
Findings: of the 1280 youngsters who attended the ITS, 60 % have begun at least an apprenticeship in the three-year period 2016-2018. The outcome of the apprenticeship, i.e. whether it has been completed or interrupted or it is still in progress, varies according to the transitional solution attended. Almost 40 % of the apprenticeships begun by those who only attended the Orientation pre-apprenticeship or the Semester of motivation or the Integration pre-apprenticeship were completed by the end of 2020, while half were abandoned.
Conclusion: Transitional solutions are important footholds for young people in difficulty when accessing and completing an apprenticeship after compulsory school. However, 40 % of youngsters who have attended ITS do not have access to any VET, and in the cases in which they succeed to access, the percentage of interrupted apprenticeships is higher than in the total population and non-compliance with duties and disagreement between the contracting parties are more frequent reasons for dropout. Notwithstanding the ITS measures, a percentage of youngsters is not successful, probably because they lack social skills that cannot always be overcome.

Keywords: vocational education and training, transitions, longitudinal studies, inclusion

1 Introduction

Many authors emphasize the importance of vocational training for a fairer and more inclusive society (Collier, 2018; Major & Machin, 2018, 2020; Putnam, 2016; Reay, 2017; Sandel, 2020). Additionally, a number of studies show that the percentage of young people in VET programs has a positive effect on the upper secondary education completion rate (e.g. De Witte et al., 2013; Lamb, 2011; Lavrijsen & Nicaise, 2015). Basic vocational training, in fact, can be a positive alternative to general training by offering a more practical mode of learning and the possibility of moving towards specific professions and can play a crucial role in tackling early school leaving and promoting the inclusion of young people at risk (Cedefop, 2016).

A longitudinal study carried out in the Canton of Ticino, in Switzerland, on four cohorts of ca. 3000 youngsters each confirms the crucial role played by VET in qualifying young people from the most socially disadvantaged groups at greater risk of early school leaving. According to this study eight years after the end of compulsory school, more than half of young people from low social backgrounds and youngsters with a migrant background are in fact in possession of a vocational qualification (Zanolla, 2021). 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 fact, a higher propensity to achieve the vocational baccalaureate, which gives access to university tertiary education. The more disadvantaged ones, on the contrary, may struggle to find and complete an adequate apprenticeship and when they manage, they more frequently achieve a Federal VET certificate that does not allow access to tertiary education or a Federal VET diploma that only allows access to non-university tertiary education (Zanolla, 2021). This confirms what other authors have pointed out, namely that despite the increase in the share of working-class students attaining secondary vocational education they are less likely than better-off families 'children to graduate from tertiary education (Falcon, 2020).

This contribution focuses on the group of among the most vulnerable young people in the Canton of Ticino, that is, those who after lower secondary school attend one of the "transitional solutions" included in the Institute of Transition and Support. This institute aims at meeting the needs of youngsters with personal frailties, academic difficulties, social risk, cultural adaptation difficulties and complicated families and relationships. It supports them in the transition from compulsory school to post-compulsory training for integration into professional and social life, and it helps them in starting, maintaining and finishing a first basic vocational training and in containing the risk of failure in their training by providing them educational support. This contribution aims to present the "transitional solutions" included in the Institute of Transition and Support. Its goal is also to illustrate the vocational tracks followed by young people in Canton Ticino after having attended one or more of the above-mentioned transitional solutions.

2 The School Inclusion in the Canton of Ticino

Ticino is a canton characterized by a relatively comprehensive school system, where inclusion and equity are core values of school policy, while in Switzerland most cantons adopt a selective school system. Indeed, while most cantons adopt a system of early detection from the end of primary school, in Ticino all pupils from the age of three follow the same program until the end of the second year of lower secondary school, i.e. up to the ninth of the 11 years of compulsory school. During the last two years of lower secondary school, pupils take courses in mathematics, and German differentiate according to their level of competence (A courses with extended requirements or B courses with basic requirements). While remaining within the same heterogeneous classes, they are grouped differently, by skill level, for what concerns mathematics and German. Exceptionally, particularly weak students are allowed to complete their compulsory schooling by following differentiated activities expressly designed for them instead of certain subjects in which they would meet significant difficulties.

Although the differentiation in courses A and B in mathematics and German only relates to a marginal part of the compulsory school curriculum, it is of crucial importance in the determination of the possible choices of the students for the continuation of their training course. The attendance of courses with extended requirements (A) associated with a final grade average of at least 4,65 (on a rating scale of 2 to 6, where 4 represents sufficiency) are necessary conditions for access to high school, which issues gymnasium baccalaureate allowing access to the tertiary university level. Even to attend basic vocational training in a full-time school, students must complete the compulsory education and, depending on the school chosen, must meet certain conditions. In order to start basic vocational training in a company, on the contrary, it is sufficient to have completed compulsory school or to be at least 15 years old and have signed an apprenticeship contract with a company. Those who complete one of the two paths of basic vocational training (full-time or dual VET) and obtain a vocational baccalaureate have access to tertiary vocational education, a university tertiary education, while the achievement of the Federal vocational diploma only allows access to non-university tertiary education.

In general, in Ticino, it is possible to identify two types of institutional measures (all included in the framework of the Department of Education) aimed at promoting a successful transition to post-compulsory education: measures implemented during compulsory schooling, measures which take place during the transition from compulsory schooling to post-compulsory education and measures explicitly provided after compulsory education.

During compulsory schooling, there are four measures aimed at facilitating the transition to post-compulsory education:

- *curricular differentiation*, which consists in exempting 13-year-olds with difficulties from certain subjects and in entrusting them to a teacher who helps them to fill the scholastic and practical gaps that are essential to face the need of vocational training;
- *education to choices path*, which consists of activities aimed at developing the ability to perform choices;
- the *educator*, who carries out individual interventions of socio-educational accompaniment of students in school and extra-school settings with the goal of preventing and containing school discomfort;
- the *LIFT project* (it consists of the accompaniment of students with potential difficulties in vocational integration).

In addition to the measures implemented in compulsory school, there are federal or cantonal measures aimed at facilitating the transition to the VET or the attendance of this kind of education. In the last twenty years, in fact, more and more young people struggle to access the labour market, dropout of VET or do not pass the final exams. The causes are personal frailties, school obstacles, social risks, cultural adaptation difficulties, complicated family relationships, etc. To meet the needs of these young people, over time, it becomes necessary to establish specific measures that comply with the transition from compulsory education to basic vocational training and support them during training.

The main measures that take place after compulsory schooling are the transitional solutions organized by an appointed institute, the Institute of Transition and Support (ITS) whose aim is to coordinate the following intervention measures:

- *Case Management Vocational Training* (CMFP), whose purpose is to identify pupils leaving compulsory school and young people up to 18 years considered at risk of dropout in the VET. It supports them in finding and completing an apprenticeship.

- *Orientation pre-apprenticeship* (PTO), which lasts one school year and attracts young people who failed to make a choice concerning training at the end of compulsory education or those who, in spite of making the first choice, did not succeed in being admitted to a school or could not find an apprenticeship in a company for the training they desired. Set up in 1994 with 12 students registered, enrolment for PTO has increased over the years and today stands at more than 200 units;
- *Integration pre-apprenticeship* (PTI), which is the main support measure for non-Italian-speaking young people who have not attended compulsory school in Ticino (or who have only minimally attended it) and who need to develop language skills necessary for starting an apprenticeship. Over the years, the PTI has differentiated its offer by establishing 3 paths, one directed to young people with schooling, one directed to non-literate or low-educated young people (*PTI and literacy*) and one for young adults between 21 and 25 years (*PTI for young adults*);
- *Semester of motivation* (SeMo), which is aimed at young people between 16 and 18 years of age who have interrupted an apprenticeship or a full-time VET and/or who have neither education nor professional and social integration prospects. The purpose of the service is to accompany these youngsters to find their way back to VET. The main goal of the SeMo is to define the individual training project in order to acquire and/or consolidate relational and social skills useful to professional integration, to acquire the skills necessary to find an apprenticeship, to improve school knowledge, to consolidate the ability to sustain work rhythms (respect for timetables, regular attendance and personal commitment).
- *Individual support in two-year training* (SiFb), which is a service that is mainly offered to young people who attend a two-year training with particular academic difficulties and problems adapting to the VET rhythms, whose educational success is seriously at risk of failure. The SiFb can also be requested for apprentices who follow the path to obtain the Federal VET diploma in the first year of training, and who need support aimed at identifying an adequate study method to allow the apprentice to continue the training independently.

3 Method

The pathways of all the youngsters who have started and attended at least one of the transitional solutions included in the Institute of Transition and Support in Ticino in the period between the school year 2014/15 and 2016/17 (1280 youngsters) are examined through longitudinal analysis. Their access to the VET and the successful completion of the apprenticeship with the achievement of a certain qualification or, on the contrary, its interruption and the eventual reorientation or dropout by the end of 2020 are highlighted. Vocational pathways are put into relation to the type of transitional solution attended, which in turn depends on the needs and on characteristics of youngsters. Data used belong to the Ticino's Department of Education, Culture and Sport, which has developed an application that makes available - in the form of a database called 'GAGI' - student-specific information, including some social and biographical details, data on the student's past and current training, subjects studied and end of the year results.

4 Findings

4.1 Pathways in the Vocational Training

1280 young people attended the ITS transitional solutions in the period between the 2014/15 school year and the 2016/17 school year. Among them, there are youngsters who did not access to any apprenticeship, youngsters who attended only one transitional solution,

youngsters who attended two (100 for example attended first the PTO and after the SeMo) or even three (25 people attended the PTI and literacy first, then the PTI and then the SiFb) or four (one person). In order to analyze the pathways in vocational training and the achievement of qualifications, it is necessary to keep in mind their different origins.

Of the 1280 youngsters who passed through ITS training, 732 have attended at least an apprenticeship in the three-year period 2016-2018, while 548 did not. The outcomes of the former vary according to the transitional solution attended (Figure 1). 42,5 % of the 438 apprenticeships begun by those who attended the PTO were completed while 11 % are still in progress and 47 % were abandoned by the end of 2020; these percentages amount to 35,5 %, 12 % and 52 % respectively for the 262 apprenticeships begun by youngsters who have only attended the SeMo. The lowest percentage of abandoned apprenticeships (40 %) can be observed among those who have only attended PTI although the 131 youngsters only started 70 apprenticeships. None of the 49 youngsters enrolled in the PTI and literacy managed to start an apprenticeship: this is because PTI and literacy is preparatory training for other transitional solutions or support measures and it is not aimed at direct entry into vocational training. The group of 25 youngsters who after the PTI and literacy attended the PTI and subsequently the SiFb, began 17 apprenticeships, of which 59 % were completed, 6 % are still in progress, and 35 % were interrupted.

Figure 1
ITS transitional solutions attended in Ticino during the period 2014/15 – 2016/17, apprenticeships begun in the period 2016-2018 and completed, interrupted or in progress by the end of 2020 (GAGI). Transitional solutions attended by less than 20 people were omitted.

ITS transitional solutions attended in the period 2014/15 – 2016/17	Number of youngsters who attended IST in the period 2014/15 – 2016/17	Number of apprenticeships started in the period 2016-2018	Percentage of completed apprenticeships	Percentage of apprenticheships which are still in progress	Percentage of interrupted apprenticeships
PTO	489	438	42.5 %	10.7 %	46.8 %
SeMo	335	262	35.5 %	12.2 %	52.3 %
PTI	131	70	42.9 %	17.1 %	40.0 %
PTO + SeMo	100	70	30.0 %	14.3 %	55.7 %
PTI and literacy	49	0	-	-	-
PTI and literacy + PTI	33	8	25.0 %	25.0 %	50.0 %
PTI and literacy + PTI + SiFb	25	17	58.8 %	5.9 %	35.3 %
PTO + SiFb	21	25	44.0 %	0.0 %	56.0 %
Total	1280	941	40.4 %	11.5 %	48.1 %

Of the 941 apprenticeships begun by the 1280 young people who attended the ITS, 61,5 % concerned the Industrial, Agricultural, Craft and Art Training Section and beyond 86 % a dual training, almost half were interrupted before the end, 40 % were completed, and 11,5 % were still in progress in December 2020. Even assuming that all the apprenticeships in progress are completed, the percentage of completed apprenticeships appears significantly lower than the corresponding one in the general population according to a recent study amounts to 68 % (Zanolla, 2017). The most common reason for dropout is professional reorientation (24 % of the cases of interruption), followed by poor results (22 %), personal reasons (17 %), and non-observance of duties (13 %) and the disagreement between the contracting parties (7 %).

Compared to the totality of the 13642 apprenticeships started in Ticino in the same three-year period 2016-2018, an over-representation of apprenticeships in the Industrial, Agricultural, Craft and Art Training Section as well as in the dual training and a higher dropout rate are observed. Among youngsters who have attended ITS non-compliance with duties and disagreement between the contracting parties are reasons that are more frequent for dropouts while vocational reorientation is less frequent (Figure 2).

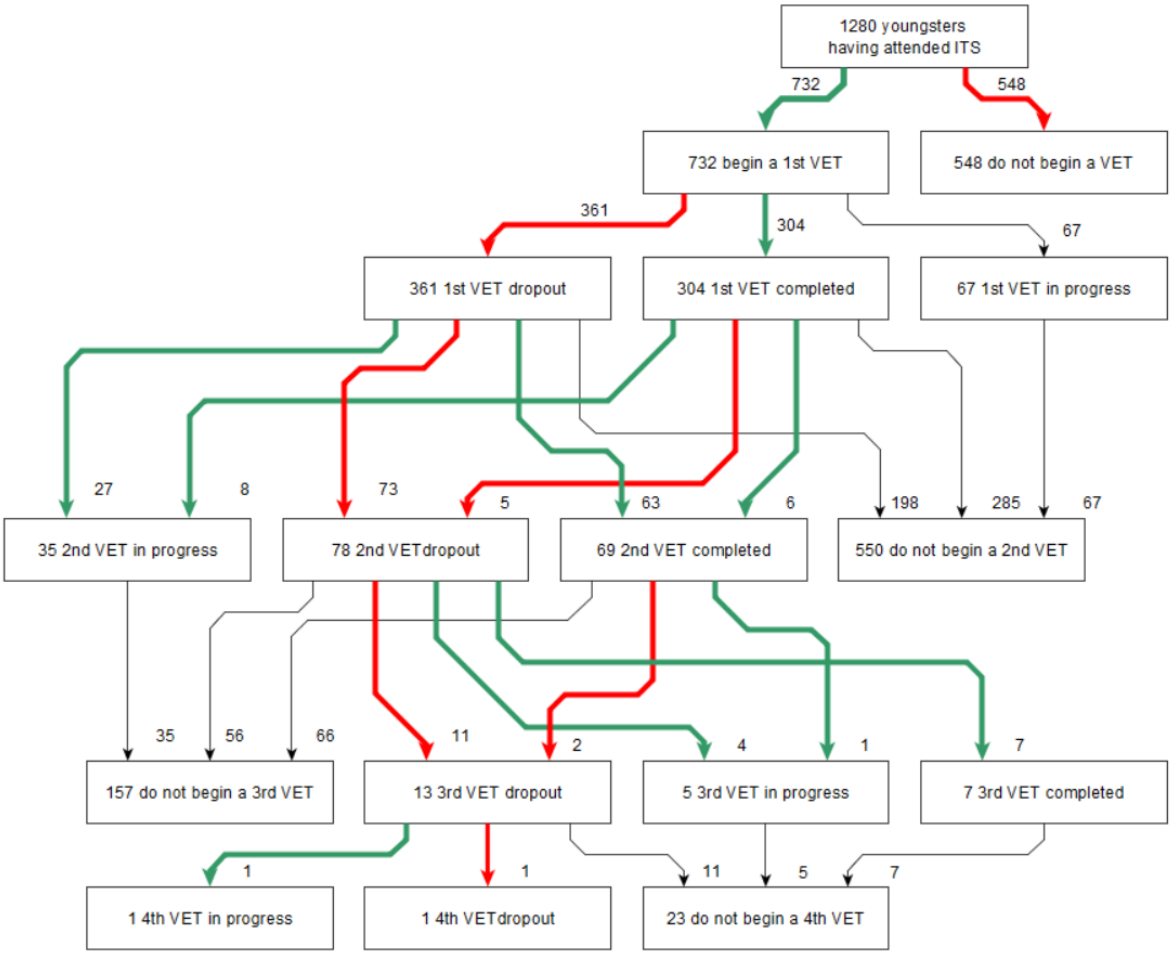
Figure 2
Comparison between youngsters who have attended ITS and the whole population in Ticino for what concerns the pathways in the VET in the period 2016-2018 (GAGI).

		Young people who have attended ITS (941 apprenticeships)	Whole population (13462 apprenticeships)
VET sections	Section of industrial, agricultural, artisan and artistic training	**61.5 %**	47.1 %
	Section of commercial training and services	24.4 %	35.2 %
	Section of health and social training	14.0 %	17.6 %
VET type	Dual VET	**86.4 %**	65.1 %
	Full time VET	13.6 %	34.9 %
Apprenticeship outcome by the end of 2020	In progress	11.5 %	23.1 %
	Completed	40.4 %	44.7 %
	Dropout	**48.1 %**	32.2 %
More frequent reasons for dropout	Vocational riorientation	24.0 %	30.8 %
	Poor results	21.7 %	21.0 %
	Non-compliance with duties	**12.9 %**	10.1 %
	Personal reasons	16.6 %	16.4 %
	Disagreement between the contracting parties	**6.9 %**	5.2 %

Of the 361 youngsters who quit the first apprenticeship, 198 (55 %) do not start a second one, 78 (22 %) start a second apprenticeship and drop out while 69 (19 %) complete it (Figure 3). In this case, there is a considerable deviation from the general population, which from another study does not appear to undertake a second apprenticeship after having quit the first one in only 13 % of cases (Zanolla, 2017). Of the 304 who had completed the first training, 285 (94 %) did not start a second apprenticeship, 6 started and completed it (2 %) and 5 (2 %) started and stopped it. Enrollment in a second apprenticeship after completing the first is, in almost all cases linked to the desire to achieve a Federal VET diploma after a Federal VET certificate. Young people who have attended ITS and completed their first apprenticeship and obtained a Federal VET diploma do not generally choose to undertake a second one, at least not in the time frame considered. This type of choice, on the other hand, is quite common in the general population, as it constitutes a way to consolidate one's profile and make oneself more attractive in the labour market (Zanolla, 2017). Two people enrolled in four apprenticeships within the period considered, without having completed any of the previous ones: if the professional reorientation is not in itself a negative fact, since it is a young population that is still defining its own professional project and life, too many breakups are an indicator of difficulty in adapting to the work context. In this case, there is a significant deviation from the general population, in which only 13 % of those who dropout of the first apprenticeship does not undertake a second one (Zanolla, 2017). Of the 304 who complete the first apprenticeship, 285 (94 %) do not start

a second apprenticeship, 6 started and completed it (2 %), and 5 (2 %) started it and dropout. Enrollment in a second apprenticeship after completing the first one is in almost all cases linked to the desire to achieve a Federal vocational diploma after a Federal VET certificate. Young people who have attended ITS and completed their first apprenticeship and obtained a Federal vocational diploma do not generally choose to undertake a second one, at least not in the time frame considered. This type of choice, on the other hand, is quite common in the general population, as it constitutes a way to consolidate one's profile and make oneself more attractive in the labour market (Zanolla, 2017). Two people enrolled in four apprenticeships within the period considered without completing any of them: if the vocational reorientation is not in itself a negative fact, since youngsters are still defining their own vocational project, too many breakups are an indicator of difficulty in adjusting to the work environment.

Figure 3
Vocational and non-vocational pathways undertaken by youngsters after the attendance of ITS in the period 2014/15 – 2016/17 (GAGI).



4.2 The Achievement of VET Qualifications

This paragraph will illustrate the qualifications achieved by the end of 2020 by young people who in the period between 2014/15 and 2016/17 have started one or more ITS transitional solutions (Figure 4). Transitional solutions that concerned less than 20 cases were omitted.

Figure 4
VET qualifications achieved by the end of 2020 by youngsters who attended one or more ITS transitional solutions in the period 2014/15 – 2016/17 (GAGI). Transitional solutions attended by less than 20 people were omitted.

ITS transitional solutions attended in the period 2014/15 - 2016/17	Vocational baccalaureate	Federal VET diploma	Federal VET certificate	Apprenticeship in progress	Dropout	Apprenticeship never started	Total
SeMo (335)	1.5 %	36.4 %	6.0 %	8.4 %	20.6 %	27.2 %	100.0 %
PTO (489)	1.4 %	37.6 %	12.1 %	8.4 %	19.6 %	20.9 %	100.0 %
PTI (131)	0.8 %	22.1 %	6.9 %	7.6 %	9.9 %	52.7 %	100.0 %
PTO + SeMo (100)	0.0 %	17.0 %	6.0 %	10.0 %	30.0 %	37.0 %	100.0 %
PTI & literacy + PTI (33)	0.0 %	3.0 %	3.0 %	6.1 %	6.1 %	81.8 %	100.0 %
PTO + SiFb (21)	0.0 %	0.0 %	61.9 %	0.0 %	33.3 %	4.8 %	100.0 %
PTI & literacy + PTI + SiFb (25)	0.0 %	0.0 %	40.0 %	4.0 %	16.0 %	40.0 %	100.0 %
PTI & literacy (49)	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	100.0 %	100.0 %

The upper part of Figure 4 shows the transitional solutions after whose attendance the highest percentages of qualifications were achieved. Of the 335 youngsters who have only attended the SeMo, 1,5 % have obtained a vocational baccalaureate, 36 % a vocational diploma, 6 % a Federal vocational certificate, 8 % are still attending the VET, 21 % have started and subsequently quit the apprenticeship, and the remaining 27 % have never started it.

The 489 who attended the PTO achieved in 1 % of the cases a vocational baccalaureate, in 38 % a Federal vocational diploma, in 12 % a Federal vocational certificate while 8 % are still in training, 20 % dropped out, and the remaining 21 % have never started this kind of education.

Those who have attended the PTI (131 youngsters) in 1 % of the cases achieved a vocational baccalaureate, in 22 % a Federal vocational diploma and in 7 % a Federal vocational certificate. 8 % of them are still in training, 10 % have dropped out, and 53 % have never started the VET.

The lower part of the figure concerns those who have attended the PTI and literacy with or without the attendance of further transitional solutions. Of the 49 subjects who attended the PTI and literacy, none has started an apprenticeship: this is due to the fact that, as above mentioned, PTI and literacy it is not aimed at direct entry into vocational training. Youngsters who have attended a PTI and literacy and other measures such as PTI and SiFb in 40 % of the cases achieve a Federal vocational certificate, in 4 % they are still in training, in 16 % they have dropped out of the VET and in 40 % never started it. It is important to remember that this is a particularly vulnerable segment of youngsters with little or no schooling at all.

The support system to transition I is well developed in Ticino since there are numerous propositions, especially for the more vulnerable who often experience greater difficulty during this stage. The transitional solutions are important footholds for young people with difficulty when accessing and completing an apprenticeship after compulsory school.

The analyses presented here show that of the 1280 youngsters who passed through ITS training in the period 2014/15 and 2016/17, 60 % have attended at least an apprenticeship in the three-year period 2016-2018 with an outcome which varies according to the transitional solution attended (which varies according to the youngsters' needs). Almost 40 % of the apprenticeships begun by those who only attended the PTO or the SeMo or the PTI were completed by the end of 2020, while half were abandoned. Among youngsters who have attended

ITS the percentage of interrupted apprenticeships is higher than in the total population and non-compliance with duties and disagreement between the contracting parties are more frequent reasons for dropout. This suggests that notwithstanding the ITS measures, a percentage of youngsters is not successful and remains at a standstill, probably because they have a lack of social skills that cannot always be overcome.

Further research is needed on the impact of each of the ITS transitional solutions through methods of counterfactual impact evaluation and on the reasons that lead young people to interrupt the apprenticeship before the end.

References

Cedefop (2016). *Leaving education early: putting vocational education and training centre stage. Volume I: investigating causes and extent.* Luxembourg: Publications Office. Cedefop research paper; No 57. http://dx.doi.org/10.2801/893397.

Collier, P. (2018). *The future of capitalism: Facing the new anxieties.* Penguin Books.

De Witte, K., Cabus, S., Thyssen, G., Groot, W., & van Den Brink, H. M. (2013). A critical review of the literature on school dropout. *Educational Research Review*, *10*, 13-28. https://doi.org/10.1016/j.edurev.2013.05.002

Falcon, J. (2020). Chapter Seven. The Swiss El Dorado? Education and Social Mobility in Twentieth-Century Switzerland. In R. Breen & W. Müller (Eds.), *Education and Intergenerational Social Mobility in Europe and the United States* (pp. 150-172). Redwood City: Stanford University Press. https://doi.org/10.1515/9781503611153-010.

Lamb, S. (2011). Pathways to school completion: An international comparison. In S. Lamb, E. Markussen, R. Teese, N. Sandberg & J. Polesel (Eds.), *School dropout and completion. International comparative studies in theory and policy* (pp. 21-73). Dordrecht: Springer.

Lavrijsen, J., & Nicaise, I. (2015). Social Inequalities in Early School Leaving: The Role of Educational Institutions and the Socioeconomic Context. *European Education*, *47*(4), 295–310. https://doi.org/10.1080/10564934.2015.1098265

Major, L. E., & Machin, S. (2018). *Social mobility and its enemies.* Penguin Books.

Major, L. E., & Machin, S. (2020). *What do we know and what should we do about social mobility?* Sage.

Putnam, R. D. (2016). *Our kids: The American dream in crisis.* Simon and Schuster.

Reay, D. (2017). *Miseducation: Inequality, education and the working classes*. Bristol Policy Press.

Sandel, M. J. (2020). *The tyranny of merit: What's become of the common good?* Allen Lane.

Zanolla, G. (2017). *Monitoraggio dei percorsi scolastici e professionali dalla Scuola media in poi: tre coorti a confronto*. SUPSI-DFA, Locarno.

Zanolla, G. (2021). Educational inequalities in the Swiss Canton of Ticino: The role of the VET. 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),* (pp. 279-289). Vocational Education and Training Network (VETNET). https://doi.org/10.5281/zenodo.541652.

Biographical notes

Dr **Giovanna Zanolla** is a senior lecturer at the Department of Education and Learning at the University of Applied Sciences and Arts of Southern Switzerland. Her research focuses on educational inequalities and school transitions.