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Learning On-the-Go: Understanding the Dynamics of Continuous Professional Development in a Tech-Driven World

ABSTRACT BOOK

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FOREWORD

Faculty of Education and Psychology in the University of Jyväskylä is organizing the EARLI SIG14 conference in Jyväskylä. The biennial EARLI SIG14 is an international three-day event. The conference is a forum that brings together researchers from different backgrounds who focus on studying work and education as contexts for professional learning and development. SIG14 focuses on the following research topics and themes:

- Work and education as contexts for professional learning and development;
- theories and methodologies for the study of professional learning and development;
- constraints and affordances of professional learning and work identities;
- vocational education and training in schooling and working life contexts;
- adult learning processes within the context of work.

This year's conference theme is 'Learning On-the-Go: Understanding the Dynamics of Continuous Professional Development in a Tech-Driven World.' In an increasingly digitalized world, professional learning and development are vital, and understanding their dynamics is more important than ever.

We received a remarkable turnout of nearly 200 abstract submissions. We extend our deepest gratitude to our contributors and speakers for their invaluable contributions. Your expertise and insights have truly enriched our event. You all truly make the conference unforgettable! Many reviewers and senior reviewers worked hard to evaluate the EARLI SIG14 2024 submissions. The review process comprised one review round. Two reviewers assessed each submission. We sincerely appreciate and thank our reviewers for their valuable contributions and efforts. We would also like to express our sincere gratitude to our sponsors and all those involved in making this event possible.

During the three-day EARLI SIG14 conference (21.8-23.8.2024), there will be three exciting keynote speeches, three invited symposia, six symposia, two

roundtable sessions, thirty oral presentation sessions (3–4 presentations per session), two poster sessions (9 posters per session), discussions and forward-looking ideas on professional learning and development, and the relationship between digitalization and work. Altogether, approximately 180 persons will participate in these activities.

We wish you all warmly welcome to EARLI SIG14 conference in Jyväskylä!

On behalf of organizing and scientific committees,
Anna-Maija Poikkeus and Raija Hämäläinen

1 KEYNOTES

1.1. This call may be recorded for training purposes: digital technology and professional learning

Allison Littlejohn, UCL Knowledge Lab, Institute of Education, University College London

Digital technology is changing how people work and learn, as technology systems and data transform work practices and ways of knowing. The growth in technology development is speeding the rate of change of work, with technologies replacing some tasks and altering others. These changes intensify the need for continual professional learning and open up opportunities for professionals to learn while using technologies for work.

Although the integration of digital technologies with work offers benefits to professionals, new associations of humans and technology generate a range of cultural and social issues related to identity, practice and knowledge. To address these issues, professional learning has to extend beyond learning new skills and knowledge, to supporting professionals to deal with the social and cultural challenges they experience at work.

In this keynote I investigate the interplay of digital technology, work and learning. Using concepts of professional practice, knowledge and identity, I examine some of the cultural and social issues and that influence ways of working and ways of knowing. I explore diverse forms of professional learning that may, in future, help to address the unseen challenges professionals face when digital technology systems are integrated with work.

1.2. Human-Driven Learning and Professional Development in a Tech-Driven World

Bram De Wever, Ghent University, Department of Educational Studies

In this keynote lecture I will present my view on how important humans are – and will increasingly be – for guiding future learning and professional development. Given the theme of this SIG14 meeting 'Learning On-the-Go: Understanding the Dynamics of Continuous Professional Development in a Tech-Driven World' I thus decided to focus on 'Human-Driven Learning and Development'.

In doing this, I will draw some parallels with technology-enhanced learning and instruction in higher education settings, focusing on challenges for developing online and blended learning environments and course design. I will make the point that we have been moving to a digital first type of education that is still human centered.

Both what technologies can bring to the table with regard to learning and professional development, as well as what human facilitators can bring to the table will be discussed, as well as competences needed for facilitating learning and professional development in an increasing digital world.

Based on PIAAC (Programme for the International Assessment of Adult Competencies, OECD) and related data I will also focus on differences regarding shorter and longer educated people, how they look at learning, and how we may need human-driven learning and professional development to ensure a broad spectrum of future opportunities for learning and development for all.

1.3. The potential and limitations of simulations - examples from the health care sector

Marianne Teräs, Stockholm University, Department of Education

This presentation explores the intersection of pedagogy and health care simulations, reflecting the evolving landscape of simulation technologies in education. Simulations, crucial in health care for both students and professionals, aim to replicate authentic work scenarios, fostering skills, competencies, and interprofessional collaboration. First, I will outline various types of simulations, then I will explore the concept of pedagogy in relation to simulations and different pedagogical models used in health care simulations. Second, I will examine ethics and pedagogical dilemmas surrounding simulations such as authenticity, fidelity, and

participant engagement, with a focus on the delicate balance between deception and realistic professional practice. Lastly, I will suggest some pedagogical principles in the design and implementation of health care simulations.

2 INVITED SYMPOSIUMS

2.1. Panel Sig14 EWIDE: Organizational Learning in the Digital Age

The panel will discuss the role of digitalization in professional learning and education. Guided by moderator, postdoc researcher Jenni Kantola from JSBE, the group of experts, representing diverse backgrounds from researchers to organization and technology developers, will delve into the impact of technology on organizational learning and how advanced technologies can help increasing organizational value.

We will cover a broad range of opportunities and challenges associated with technology-enabled learning and personnel development, such as: What are the constraints and affordances of using technology in adult learning compared to traditional learning methodologies?, How can technology enhance personalized learning experiences in professional development and vocational education? and how technology-enhanced organizational learning can be implemented sustainably?

Panelists:

- Prof. Dr. Christian Harteis, Universität Paderborn
- Postdoctoral researcher Ville Heilala, University of Jyväskylä
- HR Partner Janne Rajala, University of Jyväskylä
- CEO Ilkka Mäkitalo, Howspace

2.2. How to integrate work-related or informal learning experiences into educational settings?

Inge Timoštšuk, Tallinn University; Krista Loogma, Tallinn University; Päivi Tynjälä, University of Jyväskylä; Christian Harteis, Paderborn University; Stephen Billett, Griffith University

This symposium discusses approaches and insights from the field of research on integrating formal education and workplace learning (WPL) for students, schools and Vocational Education.

With the ongoing digital transformation, unleashed by the technological advances of the information age, there is an increasing research interest in enriched learning in various authentic environments. This symposium will pay special attention to students' participation in authentic work environments outside the school, their practice-based learning and the acknowledgement of those learning outcomes in educational programs. In the context of integrating learning at school and work, previous research activities have internationally mainly focused on vocational education, but this symposium widens the focus by extending the target group and including besides VET students also students in basic education and upper secondary general education.

Contributions:

- Broadening the context of learning through work-related experiences for supporting learning engagement in primary schools (Inge Timoštšuk, Tallinn University).
- Conceptualizing work-based learning of high school students in Estonia (Krista Loogma, Tallinn University).
- Integrating Theory and Practice for Professional Development in Higher Education (Päivi Tynjälä, University of Jyväskylä).
- "No – that does not work!" Challenges of coordinating workplace learning and VET (Christian Harteis, Paderborn University).
- Discussant Stephen Billett (Griffith University).

2.3. A tribute to Michael Eraut; his contributions to theory and methods of SIG 14

Michael Eraut was a very influential educational scientist from British origin. The scope of his work was mainly learning in the workplace, non-formal learning,

learning from others and professional development, leading to much cited publications. His most cited book of 1994 received 7445 citations according to Google Scholar (date January 14, 2024). Trained as an organic chemist, his interest in teaching and education put him on a career path in which he first got involved in educational technology and curriculum development, and later turned to continuing and professional education. His studies on professional learning and development regarded several very divergent professions such as teaching, medicine, accountancy, social work, and engineering. His oeuvre also includes critical analyses of concepts and theories that otherwise have an almost undisputed status. Examples are his work on Schön's reflection in action, on competence, and on apprenticeship learning, which had had the working title 'deconstructing communities of practice' (Eraut, 1995, 1996, 2004). This aspect of his work made academic discussions with Michael Eraut so interesting and inspiring.

Michael Eraut passed away in 2018, and it took a couple of years before the continental educational community became aware of this. Years of corona prevented that we discussed with one another what his work has meant for us as researchers of professional learning and development, and for us as a Sig.

In this symposium four presenters will each take one aspect of Eraut's work and will show what Michael's concepts and ideas contributed to their thinking and what problem it solved.

- Regina Mulder will show how Eraut's distinction between deliberate, reactive and implicit learning in relation to the time of focus of these activities provided first insight into the differences and complexities of learning activities at work.
- Martin Rehm and colleagues investigated how informal learning networks in social media develop and evolve. He used Eraut's view on informal learning at work to develop a robust framework that can incorporate other theoretical approaches.
- Els Boshuizen and colleagues will show how Eraut's model of modes of cognition and focus on time helps to find blind spots in teacher expertise studies.

Together we'll highlight what we consider Eraut's intellectual heritage. In line with the theme of the conference, discussants, Hans Gruber and Allison Littlejohn, will examine these concepts to consider the relevance of Eraut's work in the context of today's digital and 'data driven' work settings.

Eraut, M. (1994). Developing professional knowledge and competence. Routledge Falmer.
Eraut, M. (1995). Schon Shock: a case for refraining reflection-in-action?. Teachers and teaching, 1(1), 9-22.
Eraut, M. (1998). Concepts of competence. Journal of interprofessional care, 12(2), 127-139.
Eraut, M. (2004). Deconstructing apprenticeship learning: What factors affect its quality. In: R. Mulder & P. F.E. Sloane (Eds.) New approaches to vocational education in Europe: The construction of complex learning-teaching arrangements, pp. 45-57. Symposium Books.

2.3.1. Use of ideas of Michael Eraut when defining and investigating informal learning at work

Regina H. Mulder, University of Regensburg

Michael Eraut thought about all relevant aspects concerning learning in and for work. He wrote about types of knowledge, learning processes, social interaction, learning environments, how to foster learning, and more (e.g., Eraut, 2004a, Eraut & Hirsh, 2007). In a period with strong debates on informal learning (does it even exist?), Eraut defined non-formal and informal learning (Eraut 2000, 2004b). Especially his ideas on and typology of informal learning affected our work. Being interested in learning whilst working, outside formal learning-teaching settings and without clear learning objectives, and trying to empirically investigate that, we needed a definition of this informal learning as a basis for operationalisation. Eraut's work is important in the definition we developed and are still working with. He distinguished deliberate, reactive and implicit learning. In relation to the time of focus, reactive learning is considered brief near-spontaneous reflection on past episodes. Implicit learning concerns the implicit linkage of past memories with current experience, and is unconscious. Deliberate learning, which is planned, would be discussing and reviewing past actions and communications (Eraut, 2004b, p. 250). This distinction is used as important part of our definition of informal learning (author/s, 2011a). In addition to intention and time, in our opinion a definition of informal learning should also consist of information on the type of activities (individual or in social interaction with others) (cf. Eraut, 2000), as well as the setting or context (being alone or in a social setting) (cf. Eraut, 2000). We used our definition in empirical studies, e.g., surveys with vocational education teachers, and with students in vocational education (author/s 2011, 2015). The operationalisation resulted in different categories of learning activities: e.g., individual physical, social physical, and individual cognitive and social cognitive, that are used in empirical studies in different domains: IT-workers, trainers, healthcare, education, industry, with different instruments (e.g., learning logs) (author/s 2012, 2013, 2018). Furthermore, empirical studies on relationships between informal learning and their triggers (cf. Eraut & Hirsch, 2007), such as feedback and errors are conducted (author/s 2007, 2008, 2011b, 2013, 2016). Eraut's work is used in all these studies. How his ideas are used in our empirical studies on informal learning and the fitting learning activities will be discussed in the presentation. Furthermore, it gives input for discussing the role of the context and the usefulness of specific measurement instruments to grasp informal learning, and on how actual the ideas of Michael Eraut still are.

Author/s (2006, 2007, 2008, 2011a, 2011b, 2012a, 2012b, 2013, 2015, 2016, 2018)
Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. British Journal of Educational Psychology, 70, 13-36.
Eraut, M. (2004a). Deconstructing apprenticeship learning: What factors affect its quality. In: R. H. Mulder & P. F. E. Sloane (Eds.) New approaches to vocational education in Europe: The construction of complex learning-teaching arrangements. Symposium Books.
Eraut. M. (2004b). Informal learning in the workplace. Studies in Continuing Education, 26(2), 247-273. Eraut, M. & Hirsh, W. (2007). The significance of Workplace Learning for Individuals, Groups and Organisations. Skope.

2.3.2. Knowledge Brokers' Influence on Informal Learning Networks on Social Media

Martin Rehm, University Of Regensburg; Marie Lockton, University of California, San Diego; Anita Caduff, University of California, San Diego; Alan J Daly, University of California, San Diego

Educational professionals need to develop and implement new, collaborative approaches to learning to tackle new and unprecedented challenges. Yet, this type of development cannot be achieved only through formalized interventions, as they are generally detached from individuals' working environments (Eraut, 2004). Here, informal learning networks can provide a valuable, complementary building block, providing educational professionals with an opportunity to continuously share and update their practice and engage in collaborative informal learning. Furthermore, a growing body of literature has suggested social media constitutes a promising communication space wherein such processes can flourish.

In this context, the work of Prof. Michael Eraut has been instrumental in theoretically framing the activities that underly informal learning networks (Eraut, 2007). Eraut (2004) distinguished between three different types of informal learning, namely implicit, reactive and deliberative learning. We argue that all of these types of informal learning can be found on social media. Furthermore, combined with social capital (Tsai & Ghoshal, 1998), Eraut's work constitutes a valuable theoretical construct to better understand how informal learning networks develop and evolve (Dubos, 2017; Phua et al., 2017).

Yet, educational professionals do not always know how to find and apply relevant information and resources. Here, knowledge brokers take on pivotal roles in shaping the underlying communication flows and structures. Consequently, it has been argued that more research is required to better understand knowledge brokers' influence on informal learning networks. Building on the work of Eraut, our talk then formulates its main research questions as: What influence do knowledge brokers

have on the informal learning networks on social media? What type of information and resources do knowledge brokers share within these informal learning networks? Providing empirical evidence from an international project on knowledge mobilization within informal learning networks, we provide preliminary findings from Twitter / X. More specifically, by employing social network analyses, we can identify different types of knowledge brokers. Additionally, using computational linguistics, we reveal significant differences in sentiment and topical foci between the different knowledge brokers. These findings provide valuable insights for policymakers and educational professionals to better understand the extent to which informal learning networks are subject to the influence of knowledge brokers. This understanding, in turn, is particularly important as a wide range of educational initiatives have already been launched that actively incorporate knowledge brokers in policy processes.

Dubos, R. (2017). Social capital: Theory and research. Routledge.
Eraut, M. (2004). Informal learning in the workplace. Studies in Continuing Education, 26(2), 247–273. https://doi.org/10.1080/158037042000225245
Eraut, M. (2007). Learning from other people in the workplace. Oxford Review of Education, 33(4), 403–422. https://doi.org/10.1080/03054980701425706
Phua, J., Jin, S. V., & Kim, J. J. (2017). Uses and gratifications of social networking sites for bridging and bonding social capital: A comparison of Facebook, Twitter, Instagram, and Snapchat. Computers in Human Behavior, 72, 115–122.
Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. The Academy of Management Journal, 41(4), 464–476. https://doi.org/10.2307/257085

2.3.3. Fast cognitive processes – a blind spot in teacher expertise research

Els Boshuizen, Open Universiteit; Charlotte Wolff, University of Iceland; Dorothy Duchatelet, Open Universiteit

Research on teacher expertise – didactic as well as classroom management – is dominated by video-based methods. Examples are studies in which teachers' own activities in the classroom are video recorded. These recordings are then input to collect stimulated think-aloud protocols that provide a basis for investigating teacher's cognition, actions and decision-making in the classroom. Other studies use video recordings of other teachers, record eye movements and again collect think-aloud protocols. Most of these studies regard teaching subject matter such as mathematics or biology. The theoretical concept mainly used to describe the cognitive processes involved is Noticing, going back to the professional vision literature (e.g., Goodwin). Other investigators focused on classroom management: for beginning teachers, classroom management and teaching are two distinctive activities, for experts they are intertwined. The theoretical concepts mainly used in

these studies include Noticing but also Situational Awareness. Situational awareness is a concept originally used in research on skilled behaviour in aviation and the military. The authors did not mean to say that the classroom is like a battlefield, but that these situations have things in common, such as, many different events and activities are taking place simultaneously that all may require attention from the teacher. Doyle characterised these situations as immediate, simultaneous and multidimensional. Comparison of the notions of Noticing/Professional Vision and Situation Awareness drew our attention to the time aspect that implicitly differentiates between the two approaches: where research on noticing didactic phenomena mainly focusses the slow cognitive processes taking place, the situation awareness approach draws our attention to fast(er) processes.

This reminded us of Michael Eraut's Modes of Cognition analysis (Eraut, 1994) that he applied to episodes/actions in the workplace. It focused on speed of emergence of episodes and cognitive processes needed. This resulted in a grid ranging from instant occurrences that require spot-on recognition and routine actions, to activities that may have been planned long ago and allow conscious analysis and deliberative decision-making on next steps during action. We overlaid this grid to the verbal and visual data of the combined research outcomes of studies that had been done in our lab or in close cooperation with the co-authors (six studies) to search for blind spots in the data. Data about classroom scanning, and event detection and interpretation showed that beginning teachers' cognitive processing was often too slow to even recognize potentially impactful events, however a different analysis model is needed to gain a deeper understanding of expert and novice teachers' detection and interpretation of fast events. We must also think of fundamentally different methods. One way may be supported viewing. In pilots by master students, it was found that beginning teachers' ability to recognize such events is stimulated when they receive simultaneous support by an experienced colleague who takes the role of observer and simultaneously guides the students' attention to potentially impactful events through whisper-in-my-ear technology.

Eraut, M. (1994). Developing professional knowledge and competence. Routlegde/Falmer

3 SYMPOSIUMS

3.1. Wisdom in Practice: Theorisations and Empirical Findings of Practical Wisdom in and for Occupational Practice

Wisdom in practice has long been a subject of philosophical and theoretical inquiry dating back to Aristotelian propositions much of them centred on Phronesis, to more recent theorizations about what it constitutes and investigations seeking explanatory accounts informed by empirical data. This symposium seeks to bring together both theoretical and empirical approaches to advance further this important concept. It is important because identifying a comprehensive account of what constitutes effective performance in socially and culturally-generated practices, such as occupations, is salient for understanding how these can be developed through deliberate educational interventions and also practices in occupational and work settings. It is also timely insofar as there is now movement across a range of explanatory accounts to accommodate both personal capacities associated with human performance with the circumstances in which that performance occurs, can be judged to be worthwhile, effective and morally supported. Hence, the interplay between, for instance, expertise when seen as a personal set of capacities, as opposed to expert practice that typically involves the enactment of interdependence amongst individuals either intact or intra-professionally in performing complex work tasks such as nonroutine problem-solving and innovations. In these ways, the focus of this symposium is well aligned with the goals of SIG 14 through its consideration of what constitutes performance within professional work and how that performance is learnt.

Elaborating this phenomenon and its implications for education are the focuses of the Wisdom in Practice (WiP) project funded by the Research Council of Finland.

The project comprises three work packages that variously focus on theoretical understandings (WP1), empirical knowledge of Wisdom in practice (WP2) and implications for education (WP3). The first presentation is based on the theoretical work in Work Package 1, and the two other presentations that present findings from empirical work are based on Work Package 2. They comprise, firstly, the theoretical construct of Holistic Wisdom Model, and secondly, an analysis of empirical accounts of wise practitioners, based on interviews undertaken in Australia, thirdly empirical accounts of wisdom in practice gathered from informants in Switzerland and Finland. The symposium will be reflected upon and discussed by Professor Laurent Filliettaz from University of Geneva.

Of pertinence is that both the empirical and theoretically derived explanations point to there being elements of WiP that comprise attributes developed and held by individuals but identifying that these attributes alone are insufficient for predicting and realising effective performance in practice which would be deemed to be wise. Instead, it is necessary to account for an interdependence with situational factors and extra personal qualities, such as how others come to view individuals' capacities, contributions and solutions. Perhaps most important is the degree by which once the person is absent from the situation that their legacies deemed wise by others are retained within practice. Added here is the conclusion that educating for WiP needs to extend beyond a focus on the individual to include engagement in, responsiveness to and outcomes associated with the circumstances of practice.

3.1.1. Holistic Wisdom Model (HWM)

Eeva K. Kallio, University of Jyväskylä; Päivi Tynjälä, University of Jyväskylä; Maarit Virolainen, University of Jyväskylä; Hannu L. T. Heikkinen, University of Jyväskylä

Holistic Wisdom Model (HWM) is based on critical literature analysis of former psychological models of 15 individual and 4 metamodels on the field. The HWM is a multidimensional construct, including cognitive, affective-social, ethical-existential and action dimension, where the subject/person, as locus of control, is coordinating the dimensions and outer action. Subject-based metaconscious reflection and regulation, and committed positive values seem to be essential in wisdom. A central characteristic in the HWM wisdom model is bidirectional dialectical loop with constant dynamics between intra- and interpersonal nodes. We propose that wisdom is axiological, value-based term for ideal human conduct, and it always presumes concrete practice to be defined as wise action, depending both on subject/person and interindivual contexts. Closer collaboration between separate

scientific fields is needed in future wisdom studies for tackle personal, societal and planetary challenges of our time.

Assmann, A. (1994). Wholesome knowledge: Concepts of wisdom in a historical and cross-cultural perspective. In D. L. Featherman, R. M. Lerner, & M. Perlmutter (Eds.), Life-span development and behavior (Vol. 12, pp. 187–224).
Hillsdale, NJ: Erlbaum. Glück J. New developments in psychological wisdom research: a growing field of increasing importance. The J of Geron ser.B 2018; 73, 1335-1338.
Grossmann, I., Weststrate, N. M., Ardelt, M., Brienza, J. P., Dong, M., Ferrari, M., ... & Vervaeke, J. (2020). The science of wisdom in a polarized world: Knowns and unknowns. Psychological Inquiry, 31(2), 103-133.
Kallio, E. K. (2020). From multiperspective to contextual integrative thinking in adulthood (pp. 9-32). Abingdon, UK: Routledge.
Kallio, E.K., Tynjälä, P., Paananen, E., Virtanen, A.S., Virolainen, M.H., Ek, T., Isomäki, H., & Heikkinen, H.L.T (TBS 2024) Towards a Holistic Wisdom Model – Part I: An Inquiry into the Concept of Wisdom Sternberg, R. J., & Glück, J. (Eds.). (2019). The Cambridge handbook of wisdom. New York, NY: Cambridge University Press.

3.1.2. Wisdom in practice: its character, formation and development

Stephen Billett, Griffith University

What constitutes high levels of performance in occupational practice and its acquisition has long been the focus of speculation and investigation. Here, the concept of practical wisdom or phronesis is used as a basis for a project funded by the Research Council of Finland that seeks to variously conceptualize and investigate what constitutes wisdom in practice and how is it learnt. Serial studies of expertise identified a range of domain-specific capacities individual possess that enabling their purposive responses to nonroutine problems in their domain of knowledge (Ericsson, 2006; Ericsson, Hoffman, & Kozbelt, 2018). However, these personal attributes, including well-developed personal domains of occupational knowledge are necessary, but insufficient bases, to fully account for a broader range of performance requirements, as found earlier (Billett, 2001). These include situational awareness and appropriateness of actions, and co-working with others, which are work requirements for social and healthcare, and what constitute wisdom in practice.

Reported here are initial findings from an element of this project comprising semi-structured interviews of 20 Australians whose work performance was judged as highly competent in their occupational fields. They include medical, health and social care practitioners, forensic pathologist, union leader, higher education professional developer and administrators, teacher, painterly artist, project manager. The analysis enabled differentiations between occupational expertise and wisdom in practice, and identified sets of personal and extra-personal qualities (i.e., situational awareness, engagement and valuing) that distinguishes practitioners as

being wise. A detailed analysis of the data identified quadrants capturing four elements of personal and extra personal characteristics comprising sets of interdependent capacities that together explains wisdom in practice.

From a related analysis, a set of nine bases through which these individuals reported developing those capacities were indentified. In many ways, these processes of learning are analogous to what has been proposed for how effective practitioners learn and develop further their occupational capacities across working life (Billett 2023). These bases were elaborated further through delineating how that learning was mediated by a duality of personal engagement premised on agency, capacities and subjectivities, on the one hand, and a range of affordances from educational and work settings, on the other. Tentative considerations are also advanced for understanding how these qualities might be developed, thereby contributing to considerations of how experiences in educational and work settings might be afforded in the quest to develop individuals whose capacities are aligned with the identified qualities of individuals deemed to be wise in practice.

Billett, S. (2001). Knowing in practice: Re-conceptualising vocational expertise. Learning and Instruction, 11(6), 431-452.
Billett, S. (2023). Learning across working life: educative experiences and individuals' participation. Studies in Cotinuing Education, 1-17.
Ericsson, K. A., Hoffman, R. R., & Kozbelt, A. (Eds.). (2018). Cambridge Handbook of Expertise and Expert Performance (2nd ed.). New York: Cambridge University Press.

3.1.3. Experts learning to be wise

Maarit Virolainen, University of Jyväskylä, Päivi Tynjälä, University of Jyväskylä; Eeva K. Kallio, University of Jyväskylä; Hannu L. T. Heikkinen, University of Jyväskylä

Finding solutions to the wicked problems requires multidisciplinary collaboration between experts. Experts need a strong interest in following professional ethics and imagining the consequences of their actions - what can be called as wisdom (Sternberg & Gluck, 2019; Kristjansson, 2022; Dong et al., 2023). According to a recently developed Holistic Wisdom Model (HWM; Kallio et al., 2024) wisdom is multidimensional, situational, and dynamic. Its interlocking dimensions combine: 1) the cognitive dimension, (i.e. deep understanding and multi-persperctive integration); 2) the ethical-existential dimension (ethical values); 3) the socio-affective dimension; and 4) the action dimension with the pursuit of the common good. The person/subject element acts as a coordinative decision-maker across these dimensions. Empirical research on experts' perceptions of learning to be wiser is scarce (Conroy et al. 2021; Swartwood, 2013). This presentation reports findings on experts´ experiences of learning to be wiser. The research questions are: (RQ1)

What experiences experts find relevant to their learning to become wiser actors?, and (RQ2) How they try to find wiser solutions?. The interview data were collected from 11 experts who had worked in international assignments in multicultural settings.

The data were analysed using abductive analysis, with HWM providing the theoretical framework. The findings suggest, as a preliminary answer to RQ 1, that experiences of becoming wiser included working with more senior experts, listening to and taking into account the views of experts from other professions, and the desire to continuously learn from others by reflecting on different activities and their outcomes. Leadership training was also found to be helpful. Initial findings related to RQ 2 underline the importance of seeking second opinions for problem solving, as well as having mentors, advisors and networks to help reflect on experiences. The findings highlight how interdependent and dynamic the dimensions of wisdom are in expert agency, and raise issues that require further attention in the development of expert wisdom education.

Bynner, C., & Terje, A. (2021). Knowledge mobilisation in public service reform: integrating empirical, technical and practical wisdom. Evidence & Policy, 17(1), 75-91.
Conroy, M., Malik, A. Y., Hale, C., Weir, C., Brockie, A., & Turner, C. (2021). Using practical wisdom to facilitate ethical decision-making: a major empirical study of phronesis in the decision narratives of doctors. BMC Medical Ethics, 22, 1-13.
Dong, M., Weststrate, N. M., & Fournier, M. A. (2023). Thirty years of psychological wisdom research: What we know about the correlates of an ancient concept. Perspectives on Psychological Science, 18(4), 778-811.
Kristjánsson, K. (2022). Teaching phronesis to aspiring police officers: some preliminary philosophical, developmental and pedagogical reflections. International Journal of Ethics Education, 7(2), 289-305. Sternberg, R. J., & Glück, J. (Eds.). (2019). The Cambridge handbook of wisdom. Cambridge: Cambridge University Press.
Swartwood, J. D. (2013). Wisdom as an expert skill. Ethical Theory and Moral Practice, 16, 511-528. Kallio et al. (2024, to be submitted) Towards a Holistic Wisdom Model – Part I: An Inquiry into the Concept of Wisdom

3.2. Professional Development from Student Selection to Teacher Education and the Teaching Profession: Theoretical, Empirical and Methodological Considerations

In recent years, societies have rapidly changed with increasing multiculturalism and rapid technological advances, forcing education systems to adapt to the changing landscape. There's an increased focus on educators' professional development, explored through different theoretical paradigms and concepts, seeking empirical evidence and methodological rigour to advance understanding of teacher education from student selection to teaching practice.

This symposium integrates four presentations that explore different facets of teacher professional development. It begins with theoretical reflections on paradigms in teacher research, followed by empirical findings that contribute to our

understanding of the selection of students for initial teacher education and the development of important skills for teachers, namely reflective thinking and situation-specific skills. The symposium brings together and problematises our discourses and ways of understanding and measuring desirable academic and non-academic characteristics in the teaching profession.

1. Are the research paradigms on teacher expertise and teacher competence complementary or contradictory to each other? Gabriele Kaiser, Stefan Krauss and Hans Gruber from the Universities of Hamburg and Regensburg examine the theoretical paradigms of teacher competence and expertise. The study examines the complementarity or contradiction between these paradigms and aims to bridge the gap between competence research, which focuses on teacher impact, and expertise research, which emphasises teacher performance. Using a narrative literature review method, the authors compare the two paradigms, identify shortcomings and suggest ways of integrating them.

2. Understanding and assessing the dispositional characteristics of preservice teachers. Janet Clinton from the University of Melbourne discusses the Teacher Capability Assessment Tool, a comprehensive approach to teacher education selection in Australia. Using a database of over 18,000 teacher candidates, the research examines how dispositional factors predict the behaviour and performance of pre-service teachers. The findings highlight the importance of assessing individual dispositions at entry to teacher education.

3. Reflective thinking in teacher education: Connections to admission tests and attitudes towards diversity. Sotiria Varis, Riitta-Leena Metsäpelto and the research group from the Universities of Jyväskylä and Helsinki investigate student teachers' reflective thinking and its relationship with admission tests and attitudes towards diversity in teacher education. The study of ~600 students links students' reflective thinking with their matriculation exam grades, VAKAVA exam performance and attitudes towards diversity. Preliminary findings suggest that student teachers who demonstrate a higher capacity for critical reflection are also more inclined to appreciate and place value on diversity within the learning environment.

4. Assessing preservice teachers’ situation-specific skills via text and video: empirical findings and methodological considerations . Henna Vilppu, Mirjamaija Mikkilä-Erdmann and Ville Mankki from the University of Turku investigate the assessment of pre-service teachers' situation-specific skills in classroom management. Using text vignettes and video clips as stimuli, the study investigates how these methods capture pre-service teachers' perception, interpretation and decision-making skills. The findings highlight the methodological differences between the stimuli in relation to a specific classroom scenario and offer insights

into their potential use in examining situation-specific skills. Els Boshuizen from the Open University in the Netherlands synthesizes the presentations, emphasizing their contributions and broader implications for the field.

3.2.1. Are the research paradigms on teacher expertise and teacher competence complementary or contradictory to each other?

Gabriele Kaiser, University of Hamburg; Stefan Krauss, University of Regensburg; Hans Gruber, University of Regensburg

This theoretically oriented paper investigates the issue of teachers' professional development and students' learning from an innovative perspective. We aim to integrate two pertinent research perspectives, which so far have been addressing professional development and learning from different starting points: research on dispositions of teachers (competence research) and research on performance of teachers (expertise research). We will discuss in-how-far these two theoretical paradigms are complementary or contradictory to each other and whether – and how – they can be integrated. Method A narrative literature review method is used. We have carried out extensive literature surveys based on our own knowledge of the field in the style of a narrative review. As the authors of this paper come from different paradigmatic approaches, the most important references from both areas were collected and are systematically compared. Findings While one of the two approaches (i.e., competence research) predominantly focusses on the impact of teacher competencies via instructional quality onto student outcomes (in order to explain consequences of teacher competencies), the other one (i.e., expertise research) focusses on the reverse direction (e.g., in order to re-construct teacher expertise). Furthermore, our narrative review showed that it is necessary to mutually address inadequacies and restrictions of both approaches, such as assumptions of stable dispositions and neglect of intraindividual development processes in competence research as well as the limitation of the focus on well-structured domains and, thus, on a gap in the definition of expertise in teaching in expertise research. The paper thus aims to critically question the implicit assumptions in the underlying conceptualisations of both approaches in order to discover avenues to link them. We will point out that it seems inevitable to conduct both integrative theoretical and empirical studies based on the two approaches and to simultaneously consider both analytical directions, from dispositions to performance, and vice versa. Theoretical and practical significance The paper aims to contribute to the theoretical discourse on the conceptualisation of teacher competence and its relation to performance. In comprehensive recent conceptualisations, Blömeke et al.

(2015) describe competence as a continuum embracing performance, whereas Krauss et al. (2020) in their cascade model distinguish different components of competence. It is shown that even in these approaches, which had their origins in the teacher competence paradigm, the teacher expertise paradigm has not yet been appropriately considered despite close relations that repeatedly have been part of the discourse. This discourse shall be further developed by developing approaches that simultaneously consider the dispositional part and the performance part. We will outline avenues how empirical studies can look like to achieve this, based on a sound and comprehensive theoretical basis.

Blömeke, S., Gustafsson, J.-E., & Shavelson, R. J. (2015). Beyond dichotomies. Competence viewed as a continuum. Zeitschrift für Psychologie, 223(1), 3–13. https://doi.org/10.1027/2151-2604/a000194.

Krauss, S., Bruckmaier, G., Lindl, A., Hilbert, S., Binder, K., Steib, N., & Blum, W. (2020). Competence as a continuum in the COACTIV study: The "cascade model". ZDM – Mathematics Education, 52, 311–327. https://doi.org/10.1007/s11858-020-01151-z

3.2.2. Understanding and assessing the dispositional characteristics of Preservice Teachers

Janet Clinton, University of Melbourne; Katina Tan, University of Melbourne

Teachers shape the future, and initial teacher education plays a critical role in ensuring that our future teachers can practice effectively in ever-changing, complex and diverse contexts. To this end, selection into initial teacher education (ITE) programs continues to be an area of interest, debate and scrutiny. There is an international recommendation that entrants to ITE programs be selected through sophisticated and transparent approaches that consider both academic and non-academic characteristics of prospective teacher candidates. One such approach in the Australian context which has proven to be sufficiently robust and comprehensive is the Teacher Capability Assessment Tool (TCAT).

TCAT is an online tool with standardised scales that embeds a range of factors including motivations for teaching, cognitive reasoning skills and importantly, non-cognitive domains. Following the selection process, candidates are provided individual feedback for reflection and Teacher Educators are provided cohort results to ensure impact.

This paper presents research findings from the TCAT database of over 18,000 teacher candidates. The data suggest that key characteristics predict intended behaviour and performance during a pre-service teachers' journey. Evidence will be presented in relation to these dispositional factors and include a discussion of the measures of cultural sensitivity and social desirability. Building on the notion that

teaching is a complex and challenging profession, it is argued that it requires a mix of knowledge, skills, competencies, dispositions, and personal characteristics.

Further, research findings that illustrate the differences between teacher candidates' beliefs about effective teachers in Australia, the USA, and Ecuador will be shared. The differences across the countries provide a diverse perspective while demonstrating latent dimensions across the key characteristics. This paper culminates in a discussion about implications for policy and practice. It is argued that reflection on attitudes, behaviours, and cognitive characteristics in different contexts is essential to understanding an educator's impact. It is also argued that both teacher educators and pre-service teachers must understand the importance of individual dispositions to ensure a career as an effective educator.

3.2.3. Reflective thinking in teacher education: Connections to admission tests and attitudes towards diversity

Sotiria Varis, University of Jyväskylä; Riitta-Leena Metsäpelto, University of Jyväskylä; Tuomo Virtanen, University of Jyväskylä; Manne Kallio, University of Helsinki; Iina Pousi, University of Helsinki; Anna-Maija Poikkeus, University of Jyväskylä

Aims. Teacher education aims to encourage prospective educators to examine their knowledge, professional experiences, beliefs and values in order to develop and learn as professionals. This requires students to develop reflective thinking, which serves as a metacognitive skill that involves critically questioning one's own thoughts and actions, while also considering the societal and cultural influences that underlie one’s knowledge, beliefs and values. The importance of reflection in teacher education is consistent with a constructivist approach to learning in which students acquire new knowledge through critical thinking and understanding. This presentation focuses on the assessment of students' reflective thinking in the early stages of their studies. A distinctive aspect of Finnish teacher education is its selection process, which aims to admit candidates with the highest potential for development as educators. This selection process evaluates candidates on the basis of their matriculation examination grades and VAKAVA - a source-based, multiple-choice examination - which assesses what are commonly referred to as cognitive attributes that are considered to provide a strong foundation for further academic pursuits. This study explores the potential relationship between matriculation exam grades, VAKAVA exam performance and reflective thinking in teacher education students. As the VAKAVA exam includes tasks that require higher order cognitive processing to analyse and apply information, we hypothesise that performance on

these specific tasks will be related to reflective thinking. Increasing diversity in society has a significant impact on the educational landscape and the role of teachers. School communities include individuals with different backgrounds, roles and affiliations to different groups and communities. Embracing diversity within the teaching profession involves the ability to recognise and value differences, while appreciating the unique strengths and backgrounds of each individual. This study explores students' attitudes and values towards diversity. It also explores whether these attitudes correlate with students' prior academic success, as indicated by their matriculation exam grades or VAKAVA exam performance, or whether they are more influenced by students' reflective thinking skills. Methods. The study participants include a cohort of approximately 600 students who began their studies in 2022 in four Finnish universities in the teacher education programs for primary education, special education, and early childhood education. The research utilizes student admission data and surveys collected from students during their first study year to measure reflective thinking and attitudes towards diversity. Findings. The preliminary findings show that student teachers' level of reflective understanding is relatively high, whereas critical reflection is more difficult for them. However, critical reflection has the strongest correlations with valuing learning diversity (.40), whereas correlations with reflective understanding are somewhat lower (.31). Theoretical and practical significant of the research. Our findings contribute to the body of research that highlights the importance of students being able to think reflectively, including challenging and critically evaluating their evolving pedagogical perspectives and adapting or refining their practice. The study also contributes to our understanding of which measures at the selection stage are associated with reflective thinking and how such thinking relates to diversity competence.

3.2.4. Assessing preservice teachers' situation-specific skills via text and video: empirical findings and methodological considerations

Henna Vilppu, University of Turku, Finland; Ville Mankki, University of Turku, Finland; Mirjamaija Mikkilä-Erdmann, University of Turku, Finland

Teacher education programmes require effective and motivating methods to evaluate and enhance the development of teacher's professional competence, such as situation-specific skills related to perception, interpretation and decision-making in the classroom (known as the PID model, Blömeke et al., 2015). These situation-specific cognitive skills play a vital role as mediators between teacher disposition (e.g., knowledge, beliefs, experiences) and observable classroom practices. Since practical teaching experience is limited in teacher education programmes, videos

have often been utilized to offer practice-related learning opportunities for preservice teachers to support the learning of PID skills. However, the use of text vignettes or combination of text and video cases for similar purposes requires further investigation. The current study has a two-fold aim: firstly, to investigate how a text vignette and a video clip are able to capture the situation-specific skills related to classroom management among beginning preservice teachers; secondly, to consider the potential of using both stimuli in order to assess and support the development of these skills.

The participants of the study were preservice teachers (N = 97) participating in the first teaching practicum in one Finnish University. The data collection was organized in Moodle platform, where the participants answered written assignments independently at any time during a two-week period following the first lecture of the course. The assignments were based on two different stimuli: a text-based vignette and a video clip of a classroom situation. After both stimuli, the participants were presented with three open-ended questions: 1) Where do you pay attention to in the situation? 2) Why do you think it is important? and 3) How would you act as a teacher in the situation? Inductive, data-driven qualitative content analysis was chosen to analyse the written answers related to both stimuli, with the aim of attaining a broad but condensed description of preservice teachers' PID skills and resulting categories describing the phenomenon.

Both the text vignette and the video clip were able to elucidate beginning preservice teachers' situation-specific processes concerning classroom management. However, the video-related categories were more situation-specific and suggestions for teacher's actions concerning these were often proximal, concerning very near-future actions. In contrast, the categories concerning the text vignette included also areas that were not classroom-specific, but dealt with the pupil's parents and home, for instance. The differences between the two stimuli are inevitably highlighted in the resulting categories and thus diminish their comparability, but also show how they can supplement each other.

While videos provide a more authentic material, written cases can be a cost-effective and easily modifiable way to perceive and interpret classroom situations. They might also be easier for beginning preservice teachers due to their linear organization compared to videos where multiple events take place simultaneously. Both stimuli could be used to support teacher reasoning and enhancing professional development throughout the programme. Methodological considerations for using both stimuli are discussed more in the symposium.

3.3. Professional learning in the era of digital transformation: Exploring the challenges of meta-work

This symposium explores challenges to professional learning at work in environments heavily affected by digitalisation, as well as approaches to researching learning as situated in organisational practice. As digitalisation becomes more intensified and aim at digital transformation of work organisations, the challenges of learning in everyday work settings are not limited to digital skills. Rather, professionals are challenged to develop and adapt to new ways of working, which affect their identities and forms of expertise in significant ways.

Their work may involve managing change processes, regulating tasks and workloads, reconfiguring human-technology relations and continuously re-establishing the social and epistemic basis for work (e.g., Beer & Mulder 2020). Novel digital tools and information systems will often imply changes in the established regime of knowing, which alter the distribution of responsibilities in expert communities and generate new tasks that need to be learned in situ (Pachidi et al. 2021).

While many of these tasks and responsibilities are made explicit and well recognized, others are not. Consequentially, the informal work needed to keep activities going and cope with changing practices may increase. Accounting for this work and how it is learned is important for research on professional learning and development (PLD) in our 'tech-driven' times.

This symposium employs the concept of meta-work as an umbrella concept (Hirsch & Levin 1999) to examine how digitalisation expands demands to expertise and challenges professional learning in selected settings where ways of knowing and working are significantly transformed. Meta-work includes tasks and practices that are needed to run the core services or work processes, but typically not recognised as such. Moreover, it includes 'work that enables work' (Aroles et al. 2022), such as organising, planning and coordinating primary tasks and activities.

Bringing together researchers from five countries, the symposium presents four papers that complement each other in their approaches to examining learning related to meta-work in different professional context:

1) Meta-work and identity negotiation in a digitalised science community;
2) The relationships between new technologies, metawork and professional development in nursing;
3) Learning by stabilizing: Health care work in the multi-layeredness of digital transformation;

4) Becoming a back-office health expert: Care professionals' formation as 'meta-workers.'

Each paper is given 15 minutes, followed by 15 minutes for the discussant and 10-15 minutes general discussion with the audience. The symposium offers novel insights in how digitalisation affects PLD, and in turn what aspects of PLD are needed to cope with further digitalisation in work life. These insights can be used in the development of vocational education and training. Discussant: David Guile, UCL

Aroles et al. (2022). Conceptualising 'Meta-Work' in the Context of Continuous, Global Mobility. Work, Employment and Society.
Beer, P., & Mulder, R. (2020). The Effects of Technological Developments on Work and Their Implications for Continuous Vocational Education and Training. Frontiers in Psychology.
Hirsch & Levin (1999). Umbrella Advocates Versus Validity Police: A Life-Cycle Model. Organization Science.
Pachidi, S. et al. (2021) Make Way for the Algorithms: Symbolic Actions and Change in a Regime of Knowing. Organization Science.

3.3.1. Meta-work and identity negotiation in a digitalised science community: the case of Astronomy

Allison Littlejohn, UCL Knowledge Lab, Institute of Education, University College London; Koula Charitonos, Institute of Education, Open University, UK; Fransisco Duran Del Fierro, UCL Knowledge Lab, Institute of Edcucation, University College London, UK; Eileen Kennedy, UCL Knowledge Lab, Institute of Education, University College London, UK

Recent technological developments have given rise to forms of work that may be 'invisible' (Star & Strauss, 1999; Hatton, 2017), 'marginal' (Giustini, 2022), and not valued in contemporary work settings. The invisibility of work has also been referred to as 'meta-work' – i.e., 'the work that enables work' (Aroles et al. 2022). There is, however, lack of understanding about how meta-work plays out in specific work settings as work is transformed, for example during the digitisation of work. Little is known about how meta-work affects professional identity and influences opportunities to learn for professionals to remain productive in professional communities and whether or how professionals engage in practices of resistance in response. This paper explores the relationship between meta-work and identity negotiation in a specific work community setting (astronomy research) by problematising the practices of resistance carried out by astronomers as new digital research infrastructure facilities and services are set up. Drawing on interviews with astronomers working on the SKA (Square Kilometer Array) pathfinder and precursor telescope, and the UK Regional Centre (UKSRC), we explore whether and how mainstream and visible work becomes meta-work through practices of resistance

due to the digitalisation of work – for example, despite using new digital research infrastructures designed to provide 'observatory data products' ready to be analysed, astronomers still try to keep track of raw data in established ways. Thus, rather than focusing on hidden or undervalued tasks, we conceptualise meta-work as 'spectral work', that is, work in a state of becoming that circulates across work. Put differently, we argue that this form of meta-work is woven-into and circulates across hidden and not hidden, visible and not visible, rationalised and legitimate work. Advancing our argument, we suggest that meta-work can be mobilised by practices of resistance through which each subject of knowledge carries out necessary transformations on themselves (Foucault, 2006); that is, the reorganisation of work and meta-work entails identity negotiation processes. Viewed as a productive force, spectral work has a possibilising dimension (Lorenzini, 2020) that lies in creating the continuous possibility of identity negotiation.

Aroles et al.(2022). Conceptualising 'Meta-Work' in the Context of Continuous, Global Mobility. Work, Employment and Society. Foucault, M. (2006). The hermeneutics of the subject: Lectures at the Collège de France, 1981-1982 (F. Gros, Ed.; 1st ed). Picador.
Giustini, D. (2022). Embedded Strangers in One's Own Job? Freelance Interpreters' Invisible Work: A Practice Theory Approach. Work, Employment and Society, 0(0). https://doi.org/10.1177/09500170211059351
Hatton, E. (2017). Mechanisms of invisibility: rethinking the concept of invisible work. Work, employment and society, 31(2), 336-351.
Lorenzini, D. (2020). On possibilising genealogy. Inquiry, 1–22. https://doi.org/10.1080/0020174X.2020.1712227.
Star, S. L. & Strauss, A.(1999). Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. Comput. Support. Cooperative Work (CSCW) 8, 9–30.

3.3.2. The relationships between new technologies, metawork and professional development in nursing

Regina H Mulder, Faculty of Human Sciences, University of Regensburg; Theresa Hartl, Faculty of Human Sciences, University of Regensburg; Tai Nguyen, Faculty of Human Sciences, University of Regensburg; Louisa Siemens, Faculty of Human Sciences, University of Regensburg

Technological developments in society lead to changes at work, also in healthcare (Cascio & Montialegre, 2016). Such changes can lead to new, additional tasks, that are pivotal for good performance, but not always visible, nor recognized. About this so-called metawork (e.g., Aroles, et al., 2022) little is known, especially in situations of changes in work due to new technologies, nor about the learning activities that emerge from that. These insights are needed to be able to foster ongoing professional development required for current and future work. The research questions are: What are components of metawork in nursing in the context of

changes in work tasks due to the introduction of new technologies? What kind of professional development activities emanate from metawork?

Professional development consists of three categories of learning activities: 'elaboration', 'expansion' and 'externalization' (Simons & Ruijters, 2004). Different kinds of metawork conceptions exist: metawork is considered as work tasks that makes the actual work possible (Aroles et al., 2022), or as person related components consisting of personal competences or behaviour (Müller-Teusler, 2013). Metawork can be invisible to the external social environment (Star & Strauss, 1999), and be not recognized (Hatton, 2017).

This explorative interview study among nurses confronted with new technologies (e.g., patient management software system), uses the Interview To The Double Technique (Nicolini, 2009) for investigating the components of metawork, and the Critical Incident Technique (Flanagan, 1954) to discover emanating learning activities. An interview guideline was developed (with 5 test interviews) and used for the data collection. The first 3 conducted interviews will, in January/Februari 2024 in cooperation with a hospital, be followed by additional interviews, until the saturation point is reached. First results reveal examples of the different conceptualizations of metawork. For example, a new, required task which is not considered part of the job is 'regularly checking and exchanging the batteries of the laptops'. This is invisible to colleagues, as is 'answering additional emails'. Metawork as person related component was found in 'organizing and planning capability'. Learning activities emanating from metawork are for instance 'reflection on possible solutions and actions for new encountered problems' (elaboration), 'asking colleagues for help' (expansion), and 'developing a timetable for colleagues with all the to-do's' (externalization). We will elaborate on metawork, all results, and the usefulness of the techniques used.

Aroles, J., Bonneau, C., Bhankaraully, S. (2023). Conceptualising 'Meta-Work' in the Context of Continuous, Global Mobility: The Case of Digital Nomadism. Work, Employment and Society, 37(5), 1261–1278.

Nicolini, D. (2009). Articulating Practice through the Interview to the Double. Management Learning, 40(2), 195–212.

Simons, P. R.-J., & Ruijters, M. C. P. (2004). Learning Professionals: Towards an Integrated Model. In H. P. A. Boshuizen, R. Bromme, & H. Gruber (Hrsg.), Professional Learning: Gaps and Transitions on the Way from Novice to Expert (S. 207–229). Springer.

Star, S. L., & Strauss, A. (1999). Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. Computer Supported Cooperative Work, 8(1), 9–30.

3.3.3. Learning by stabilizing. Health care work in the multi-layeredness of digital transformation

Monika Nerland, Department of Education, University of Oslo; Åsa Mäkitalo, Dept of Education, Communication and Learning, University of Gothenburg

Current changes in work environments related to digital transformation will not only require new skills and competencies as a basis for professional work. They also generate learning as part of everyday activities that come with the need to stabilize work practices and secure the continuity of services to clients. Such stabilizing will necessarily happen at the ground floor but involves learning as a response to dynamic and relational changes which implicate a multi-layered organizing of tasks and responsibilities in the work environment. This paper examines how health care professionals engage in stabilizing care work during digital transformation, and how learning is embedded in these efforts.

We exemplify how the dynamics of digital transformation generates “work that enables work” (Aroles, 2022) and discuss in what respect this would be considered "meta-work". Empirical context and methodology We approach learning as an emerging property of everyday work, conceptualized as gapclosing when pursuing work tasks in the coordination with technologies (Mäkitalo, 2012), as boundary work renegotiating rights and obligations (Edwards, 2010) and as managing relations and accountabilities in wider service innovation (Toivianen et al., 2022).

Empirically, we draw on ethnographic cases from a larger project running over a three-year period in the primary health services in a Norwegian city. Two cases of digitalisation are drawn on: (1) the design and implementation of a patient information system, and (2) the introduction and use of assistive technologies in the services. We conduct a meta-ethnography of the case studies reported, adopting a “line-of-argument synthesis” (Noblit & Hare, 1988: 38) to highlight how learning by stabilizing work manifests across layers of organizing. Findings Our analysis identifies three instances of learning that are critical to stabilize health care work during digital transformation:

1) learning how to adapt to or shape newly introduced digital tools to pursue specific work tasks;
2) learning in response to emerging work practices, as tasks and responsibilities are re-located and redistributed between groups of professionals and clients;
3) learning as organizing and coordinating the ecosystem of professional work, to meet the expectations of many stakeholders.

These learning processes are to a limited extent about digital skills and prescribed competences. Rather, they involve multi-layered organizing, systems thinking and

relational ways of working that emerge in situ and typically is not recognized as core work. This meta-work and the learning it involve need to be recognized in research on Professional Learning and Development.

Aroles et al. (2022) Conceptualising 'Meta-Work' in the Context of Continuous, Global Mobility. Work, Employment and Society.
Edwards, A. (2010) Being an Expert Professional Practitioner: the relational turn in expertise. Springer.
Mäkitalo, Å. (2012) Professional learning and the materiality of social practice. Journal of Education and Work 25(1), 59-78.
Noblit GW, Hare RD. (1988). Meta-ethnography: Synthesizing qualitative studies. California: Sage.
Toiviainen, H., et al. (2022). Dimensions of expansion for configuring learning spaces in global work. Journal of Workplace Learning, 34 (1), 41-57.

3.3.4. Becoming a back-office health expert: Care professionals' formation as 'meta-workers' in the service management platform

Mervi Hasu, Department of Education, University of Oslo; Eveliina Saari, Finnish Institute of Occupational Health

This paper aims to gain a better understanding of how frontline health care practitioners navigate their work identities as back-office professionals. 'Meta work', defined as the work that enables work (Salzman & Palen, 2004, 2), has recently gained interest in research on professional work in the digital era (Klein & Watson-Manheim, 2021). Digitalised care largely detaches professional work from the 'here-and-now' work sphere and replaces or combines such work with activities in digital solutions and platforms. Limited knowledge of how this shapes professionals in their actual work necessitates more nuanced research on the formation of care professionals into 'back-office meta-workers'.

The empirical case concerns frontline care professionals who are newly responsible for reorganising primary care work with a digital care management platform. The platform provides a generalised view of the patient population entering into the care service path and allows practitioners to manage patient cases and perform back-office meta-work for coordinating care placements and patient flow. Data consist of nine (9) semi-structured participant interviews and two (2) interviews with management-level representatives. Additionally, the discourses of organisational strategy documents are highlighted.

By adopting a narrative approach to identity (Ibarra & Barbulescu, 2010) and identifying the valuation of discourses regarding subject positions (Angermuller, 2018), this paper interprets how frontline care practitioners adopt discursive resources to comprehend their expected platform-mediated work and how they apply these to craft new identities. This analytic approach asks how meta-work is

understood and valued in subject positions concerning platform work narratives. Findings Care professionals use discursive resources to assemble narratives that help them to navigate their identities between two ends: 'personalised human carer' and the anticipated 'impersonalised meta-worker'. The ambiguous liminal phase in the adoption of the platform work model enables practitioners to adopt temporal reflection in their identity while disturbing their identity formation.

This paper demonstrates the significance of local organisational vocabularies available for employees engaged with digital platform work. It contributes to theorising on multiple work identities (Barker Caza et al., 2018) in digital transformation by showing how practitioners use discursive resources for constructing multiple narrated identities to make sense of their changing work. Naming, sharing and discussing emerging multiple identities in a work community may serve as a springboard for professional development and learning in platform-mediated professional work.

Angermuller, J. (2018). Accumulating discursive capital, valuating subject positions. From Marx to Foucault. Critical Discourse Studies, 15(4), 414–425.
Ibarra, H. & Barbulescu, R. (2010). Identity as narrative: Prevalence, effectiveness, and consequences of narrative identity work in macro work role transitions. Academy of Management Review, 35(1), 135–154.
Klein, S. & Watson-Manheim, M. B. (2021). The (re-) configuration of digital work in the wake of profound technological innovation: Constellations and hidden work. Information and Organization, 31(4), 100377.
Salzman, M. & Palen, L. (2004). The tools we live by: A description of personal support media in work life. Computer Science Technical Reports CU-CS-981-04, University of Colorado, Boulder.

3.3.5. Human and Machine Learning: a "Recontextualised" Connectionist & neo-Vygotskian Perspective

David Guile, UCL - Institute of Education

It has been argued that machine learning (ML) algorithms are a new form of the externalisation of human thinking because they operate on a cycle of internalisation and externalisation - the hallmark and driving force of cultural evolution (Renn (2020, p. 398). To understand why Renn's insight is not widely accepted in ML community and the ensuing implication for professional learning it is necessary to firstly, understand that the early pioneers of "Connectionism" maintained that human perception is an act that can be analytically represented and mechanised (Ash, 1998). There has been a close relationship between connectionism and ML ever since, because it offered a "parsimonious" model of the brain (Childers et al. 2023). The model consists of a network made up of 3 layers: an input layer which roughly corresponds to a brain's sensory layer; an output layer that stands for the model's action; and, the hidden layers comprising webs of nodes where computation takes

place because each node is connected to one another. Building on Renn's internalisation-externalisation argument, the paper presents a "recontextualised" (Guile, 2018) connectionist & neo-Vygotskian perspective on ML and its implication for professional learning. It firstly demonstrates that ML models are only capable of generating outputs because cultural practices such as "filtering algorithms" and pooling mechanisms" have been embedded in them. Secondly, it draws on Hutchins' (2008 p.2018) neo-Vygotskian argument that we use cultural practices to "orchestrate our interactions with natural phenomena and "produce cognitive outcomes" to reveal how computationalism & connectionism eviscerate role of cultural practices by overattributing that to the inside of the inside/outside boundary. Thirdly, it draws on Jaton (2021) to identify how three cultural practices are critical to the constitution of algorithms – "ground truthing" (agreeing the purpose of an algorithm); "programming" (interfacing an algorithm with data pertaining to that purpose) & "formulating" (tweaking the algorithm and data) – and their generation of patterns from data. The paper concludes by arguing that the ML internalization-externalization process is similar & different to human internalization-externalization: both involve a process of inference. It is different because algorithms use cultural practices to infer predictions from statistical patterns they detect in data whereas humans use cultural practices to infer predictions: deductively via explicit webs of reasons (i.e. normative conventions underpinning professional fields); inductively via hunches & intuition (implicit webs of reasons): and deductively and inductively from algorithmic predictions etc. This new human-machine learning relationship suggests that: theories of professional learning will have to be re-thought to take account of the ever-increasing distribution of cognition between humans and machines; research on professional learning will have to design investigations to take account of ML as a technology that learns; and, programmes of professional education will have to prepare professionals, irrespective of their field, to understand the constitution of algorithms and develop the capability to appraise critically the design and deployment of ML models of learning in their field of practice.

3.4. A glance at professional development: Mobile eye tracking in ecologically valid educational environments

Professional development is a multi-faceted process where visual information processing is often essential. Active and effective noticing of key features of a specific environment and appropriate interpretation of them promotes optimal

actions. Such is important in educational settings for the teachers to promote optimal learning. Eye tracking studies have indeed shown significantly different visual patterns and associated cognitive processing between experts and novices in, for example, chess, air traffic control, or the investigation of X-rays. Furthermore, several studies have provided positive results in training visual skills in educational settings. However, the majority of these prior studies used static stimuli and/or were run in controlled laboratory environments. Thinking of professional development in teaching and education, studies in authentic environments are needed to take the necessary next step and examine visual processing in the conditions the professionals actually employ their skills. With the rapid development of eye trackers during the past decades, new opportunities have arisen and non-intrusive mobile eye trackers can now relatively easily be employed in ecologically valid environments. While this can shed new, important light on the professional development of visual skills and enable many new possibilities for conducting a study it also creates challenges regarding methodology, data analysis, ethics, and more.

This symposium discusses the use of mobile eye tracking in teachers' professional development studies conducted in ecologically valid educational environments. The aim of the symposium is to present results and address insights into what to consider in planning and conducting mobile eye tracking studies in these complex environments.

Hans Gruber is the discussant, and the contributors will discuss the following:

- Senne M. Van Hoecke will present a study based on a large data set collected with mobile eye trackers from authentic classroom settings. He will discuss some preliminary results as well as obstacles that one can encounter during the analysis of such a large and varying data sample. Additionally, he will discuss some possibilities machine learning can offer to cope with these issues.
- Marjaana Puurtinen and Jan Löfström's presentation expands the use of mobile eye tracking to another kind of learning environment, a cultural-history museum. In their study future history and education specialists' cognitive-emotional engagement with museumized milieus was investigated with eye tracking, a writing task, and an interview. In addition to the findings, she will discuss their balancing between a domain-relevant task and sufficient control of the research environment.
- Kateryna Horlenko and Lina Kaminskienė will present their study focused on teachers' visual attention distribution between students in one lesson in relation to teachers' knowledge about their students as self-regulated learners. Alongside the findings based on questionnaire data and mobile eye tracking they will

discuss considerations regarding authentic classroom data variability and teacher and student characteristics.

- Finally, Maikki Pouta and her colleagues will present their mixed method study about primary school teachers' focus of attention comparing experienced teachers' and student teachers' gaze during observation and interaction. Together with the findings, the potential of using novel GRI metrics in comparative study settings using authentic data sets is discussed.

3.4.1. Mobile eye tracking and visual expertise in authentic classroom settings

Senne van Hoecke, Open University, Heerlen, Netherlands

In order to maximize learning, teachers have to cater to the needs of each individual pupil as well as coordinate the classroom learning activity as a whole. This classroom management is challenging for teachers in training and beginning teachers. A significant part of classroom management relies on the teacher's ability to notice (potential) problems and provide an adequate and timely response. Preliminary previous research has shown differences in the ability to notice (eye movement patterns) and react between beginning teachers and experienced teachers. If effective viewing patterns or responses can be recognized, however, it may be possible to translate these into teacher training to more effectively prepare pre-service teachers for their educational career. Yet so far little is known yet about how teachers' visual noticing and following classroom management relates to teacher's experience and expertise. Furthermore, due to the wide variety of teaching topics, approaches, exercises and class characteristics, among others, it is no easy feat for researchers to make broad, well-founded statements that can improve teacher's visual expertise in more than just a few specific educational settings.

At the Open University in the Netherlands, Van Driel et al. (2023) collected one of the biggest eye tracking data sets recorded in authentic classroom settings. Data from 58 secondary school teachers from 25 Dutch schools teaching a regular class in their specific discipline were collected using SMI eye tracking classes. Of these 58 teachers, 22 teachers were still in training (pre-service), 17 had on average 2.5 years of experience and 19 had at least 10 years of experience. The classes covered all major Dutch disciplines and ranged from grade 7 to grade 11 (ages 12-17). Classes were on average between 40 to 50 minutes long. Other than the requirement to wear eye tracking glasses, the teachers were completely free to teach their class whoever they seemed fit. This resulted in highly dynamic and varied data with numerous different learning activities and classroom settings. The mobile eye tracking data that were collected eventually amounted to 216.95GB of data.

The data are currently still being processed. Evidently, a dataset of this magnitude and variance imposes limits on what is feasible in terms of data analysis approaches. The present discussion wishes to address these limitations and aims to show some possible approaches to deal with similar data and such a significant sample size. One possibility that will be discussed is the use of machine learning to recognize important variables and patterns in the data. Preliminary findings will also be discussed.

van Driel, S., Jarodzka, H., Crasborn, F., van Strien, J., & Brand-Gruwel, S. (2023). Capturing and characterizing teachers' noticing as basis for their classroom management in different career stages: A data paper. International Journal of Research and Method in Education, 46(3), 313-325.

3.4.2. History and education specialists' cognitive-emotional engagement with a historical milieu

Marjaana Puurtinen, University of Turku, Finland; Jan Löfström, University of Turku, Finland

The popularity of visual presentations of 'history' is immense: historical TV series, movies, memes and games do not seem to lose their attractiveness to the masses. These various ways of visually presenting the past in popular history are also affecting our expectations and dealings with the past in different learning environments, of which cultural-history museums are one example. Building on the educational turn in the museum field (e.g., Pérez López, 2021) as well as on history-theoretical takes on historical imagination (e.g., Pihlainen, 2021), we see museums as both learning and 'yearning' environments. Specialists of history working in museums and school teachers need to consider both of these kinds of dimensions, when supporting visitors and students' learning in museums. However, how the future professionals of these fields approach museum exhibitions is still largely unclear.

In this qualitative study we discuss future domain specialists' (history majors) and pedagogical specialists' (education majors) cognitive-emotional engagement with the past in a historical, museumized milieu. We approach the topic via two research questions: (1) How do history and education majors visually inspect museumized interiors under a given task? And (2) What kind of cognitive-emotional perspectives to presenting the past in a historical milieu do history and education majors demonstrate in their task responses and retrospective interviews?

The experiment was conducted at a museum where we invited history and education majors (N = 9) to inspect a museumized interior for 20 seconds with the task of writing an advertisement for children about the interior in question. The

procedure was then repeated with another interior. Visual inspections were recorded with a Tobii Pro Glasses 3 mobile eye-tracker. Afterwards each participant was interviewed about their task responses (advertisements) as well as their takes on history education and museums in general, while using their own gaze videos and still images of the interiors as interview stimuli. Finally, the participant answered a background questionnaire. Data handling and analyses are ongoing and findings will be available at the conference.

In the discussion, we will address the benefits of these kinds of experiments in the education of history and pedagogical specialists. We will also evaluate the presented research design as one attempt to find balance between a meaningful, domain-relevant task and sufficient control of the research environment and suggest ways for its improvement. Put together, we hope to contribute to the development of best practices about the use of mobile eye-tracking in educational research and practice especially in museum context.

Pérez López, I. (2021). Museum Education and the Epistemological Turn. In Oxford Research Encyclopedia of Education. Oxford University Press.
Pihlainen, K. (2021). "History culture" and the continuing crisis of history. Faravid 52, 17-35.

3.4.3. Teacher attention distribution between students in relation to teacher knowledge about student learning behaviours

Kateryna Horlenko, Vytautas Magnus University, Kaunas, Lithuania;
Lina Kaminskienė, Vytautas Magnus University, Kaunas, Lithuania

Teaching adaptively is a key to address different learning needs of students in the classroom. Students vary not only in their levels of subject knowledge, but also in learning approaches and motivational predispositions, known as the capacity to regulate own learning. In the classroom, teachers observe students and diagnose student learning continuously to provide support when necessary. Teacher attention in the classroom is not arbitrary but interrelated with their professional and contextual knowledge, thus is part of teacher professional vision (Sherin and van Es, 2002). Teachers can proactively guide their attention to students depending on the current instructional intentions (i.e., to explain new material comprehensively or to provide feedback) and what they know about students as learners, in a top-down manner. At the same time, teachers respond to behaviours, reactions, and interactions in the classroom, thus distribute their attention to stimuli in the environment in a rather bottom-up way (Wolff et al., 2016).

This study investigates how teachers distribute visual attention between students in one lesson in relation to teacher's knowledge about their students as

self-regulated learners. Ten secondary school teachers and their respective students (N=158) took part in the study. The teachers taught one full lesson wearing a mobile eye tracker and provided a rating of each student's learning behaviours. The number and duration of teacher gaze visits to each student in the classroom were coded in the eye tracker recordings and analysed in relation to the teacher ratings.

Analyses with Mann-Whitney U tests showed that teachers allocated significantly more attention to higher-regulated students when presenting lesson content, while there were no significant differences in attention between higher-regulated and lower-regulated students when teachers monitored student work and gave feedback. Further cluster analyses showed that a sub-group of the higher-regulated students received more teacher attention than others in the whole lesson.

The findings suggest that teachers distribute attention between students in a rather balanced way with a tendency to look more at higher-regulated students. These results from the natural classroom settings challenge the theoretical assumption that teachers would proactively monitor lower-regulated students who potentially require more support from the teacher in the lesson. Besides, the results suggest a need for investigation of the bottom-up process such as amount of interaction from the students linked to student characteristics that influence teacher attention distribution to students. Finally, considerations regarding variability in the authentic data from different classrooms, as well as teacher and student characteristics in the present sample will be discussed in connection with previous mobile eye tracking studies.

van Es, E. A., & Sherin, M. G. (2002). Learning to notice: Scaffolding new teachers' interpretations of classroom interactions. Journal of Information Technology for Teacher Education, 10(4).

Wolff, C. E., Jarodzka, H., van den Bogert, N., & Boshuizen, H. P. A. (2016). Teacher vision: Expert and novice teachers' perception of problematic classroom management scenes. Instructional Science, 44(3), 243–265.

3.4.4. Development of primary school teachers' focus of attention in authentic teaching situations

Maikki Pouta, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland & Vytautas Magnus University, Kaunas, Lithuania; Tuire Palonen, University of Turku, Finland

Being aware of the classroom situation and predicting pupils' forthcoming needs for guidance requires a teacher's situational awareness, in short, knowing what is going on in the classroom (Endsley, 2000). Furthermore, guiding pupils optimally is possible through accurate noticing, interpretation and decision-making of a pupil's processing, namely professional vision (van Es & Sherin, 2002). Through situational

awareness and professional vision, a teacher monitors their focus of attention, that in an authentic classroom situation is constantly challenged with several simultaneous triggers of which the essential ones need to be selected to focus on. Professional vision and situational awareness are known to be situated processes. As the interaction with pupils is in the core of teaching, a lesson includes a plethora of situations. In this study we focused on two naturally emerging types of teacher's actions during an authentic lesson: interaction with pupils and observation.

This study aims to investigate how teachers' visual focus of attention differs during observing and instructing. Furthermore, differences by teaching experience are investigated. One mathematics lesson from each student teacher (n=4) and experienced teacher (n=4) was recorded with Tobii Pro Glasses 2 mobile eye-tracker. Three types of focus of attention was created through times of interest analysis of the video and eye movement data: focus of attention in a) observing (when a teacher only looks at a pupil), b) interaction (when a teacher talks to a pupil and looks at them) and c) other (when teacher looks at something else than a pupil). Analysis was continued with statistical comparisons based on a novel metrics, gaze relational index (GRI) (Lowe & Boucheix, 2016). GRI is a potential metrics to overcome the problem of comparability of authentic eye movement data as instead of pure comparisons by gaze count and duration it indicates the relation of them.

The results show that both student teachers' and experienced teachers' focus of attention included dominantly short, scanning type of glances at pupils whereas focus of attention in interaction promoted longer, deepening type of attention on pupils. Furthermore, despite the general similarities in dividing attention there was a significant difference with small effect size between student teachers' and experienced teachers' focus of attention during both observation and interaction, that indicates experienced teachers' faster and more effective processing of visual information.

In addition to results, insights of the analysis process of mobile eye tracking data of authentic classroom settings and using the combination of qualitative and quantitative methods are discussed. The discussion will also address the advantages and considerations about using GRI for authentic classroom data.

Endsley, M. R. and Garland D. J (Eds.) (2000). Situation Awareness Analysis and Measurement. Lawrence Erlbaum Associates.

van Es, E. A., and Sherin, M. G. (2002). Learning to notice: Scaffolding new teachers' interpretations of classroom interactions. Journal of Information Technology for Teacher Education, 10(4), 571–596.

Lowe, R., K., & Boucheix, J-M. (2016). Principled animation design improves comprehension of complex dynamics. Learning and Instruction 45, 72–84.

3.5. Unravelling and Prompting Informal Workplace Learning Using Experience Sampling and Mobile Apps

Informal workplace learning is typically characterised by the absence of formal structures such as a scheduled time, predefined learning goals, and pedagogical guidance (Tannenbaum et al., 2010). On a continuum, Eraut (2011) distinguished between implicit, reactive, and deliberative learning. Implicit learning refers to routine processes, in which rather small-scale, day-to-day adjustments in behavior, knowledge, and attitudes often go unnoticed. Reactive learning includes more awareness of learning goals (i.e. perceived knowledge gaps), learning activities (e.g., reflecting, asking others, observing), and learning outcomes. Deliberative learning refers to conscious, self-monitored problem-solving activities that are critical for achieving work goals. In retrospective research (e.g. interview studies), incidents of deliberative learning may be easier to recall by participants while reactive learning may only be remembered to a limited extent. Incidents of implicit learning are likely to be heavily underrepresented in retrospective evaluations. Intensive longitudinal studies try to overcome these shortcomings by using repeated in-situ measurements for instance with the Experience Sampling Method which is often implemented via mobile apps. ESM enables the capturing of daily experiences, behaviours, or physiological states of individuals in their natural environment (Beal, 2015; Gabriel et al., 2019; Seifried & Rausch, 2022). At the same time, however, applying ESM in field studies might have the effect of an intervention because it triggers monitoring of and reflection on learning processes that might otherwise have gone unnoticed. From this perspective, ESM can be interpreted as a micro-intervention in the sense of learning prompts or nudging (Endedijk & Cuyvers, 2022).

The four empirical contributions in our symposium investigate factors of informal workplace learning using ESM and investigate the effects of ESM and similar app-based micro-interventions on informal workplace learning.

- In the first contribution ('Investigating Structure and Predictors of Informal Workplace Learning Using Experience Sampling'), Häußermann and Seufert present an ESM study with full-time employees across various sectors and investigate the factor structure of informal learning activities.
- In the second contribution ('Uncovering Informal Learning Processes With a Mobile Application: Comparing Time-based and Event-based Experience Sampling'), Goosen and Endedijk investigate methodological variations in using ESM. They compare time-based and event-based ESM in two groups of students engaging in a challenge-based learning course that required them to act as human resource development (HRD) consultants.

- In the third contribution ('Investigating Effects of an App-based Prompting on Informal Workplace Learning Using Experience Sampling'), Böhm and Rausch address the design of micro-interventions to foster informal workplace learning. They compare two groups of HR employees, one exposed to app-based prompting and the other engaging in app-based ESM only. In the fourth contribution ('Supporting Ongoing Workplace Learning Processes in District Nursing Teams Using Experience Sampling'), Wolbers and colleagues highlight the increasing preference for aging at home and the suboptimal adoption of clinical practice guidelines in district nursing. The authors investigate the effects of an educational intervention combining face-to-face sessions with an ESM via a mobile app, hence applying ESM as an intervention.

David Gijbels (University of Antwerpen) will discuss the four contributions from a methodological and a pedagogical perspective.

3.5.1. Investigating Structure and Predictors of Informal Workplace Learning Using Experience Sampling

Katja Häußermann, Ulm University; Tina Seufert, Ulm University

The aim of this study was to investigate informal learning with longitudinal methods using experience sampling. According to our definition, informal learning in the workplace comprises all conscious learning behaviors that result from daily work, are learner-driven, take place alone or in interaction with others, and aim to improve knowledge and skills.

The added value of the present study is manifold. Firstly, a wide range of 12 informal learning activities was included according a literature review to provide a basis for study standardization. Previous study results are hardly comparable due to the use of different learning activities and measurement instruments (Jeong et al., 2018). Secondly, self-report measures were carried out directly in the work situation and were therefore more precise than in retrospective research which is prone to recall-bias (Stone & Shiffman, 2002). Thirdly, experience sampling allowed the within- and between-person perspective (that is situation and person level) to be adopted (Hektner et al., 2007).

The study investigated the factor structure of informal learning, as well as factors influencing informal learning and barriers to informal learning. For this purpose, 364 full-time employees from different sectors and with predominantly desk-based work filled out short online questionnaires at 5824 measurement points (twice a day on 8 days). Participants were asked during their working hours about their current task and the informal learning activities used to complete this task

successfully. Additionally, they provided information about their work context in a presurvey. A multilevel confirmatory factor analysis revealed a factor structure with the identical three factors learning from oneself, learning from others and learning from media at both, the situation and person level with the best model fit. Reflection, professional exchange (with colleagues) and sharing knowledge proved to be the most frequently used informal learning activities between individuals. Within persons, for example, professional exchange, asking for feedback and knowledge sharing often occurred together. The preliminary results for Multilevel-SEM showed that task difficulty (level1), task newness (level1) and learning culture (level2) were significant predictors for all three informal learning factors compared to job autonomy (level2), task variety (level2) and leadership conducive to learning (level2). The analysis of the most frequently mentioned barriers to learning across situations revealed that external disruptions (caused by telephone, colleagues and incoming messages) accounted for the majority of learning/working barriers by far. Internal barriers such as motivation or concentration problems were hardly mentioned.

Overall, the three-factor structure of informal learning had already been found in previous research without a multilevel structure (e.g., Noe et al., 2013). We found that it also applies to white-collar employees in various industries in a longitudinal setting. A practical implication is that informal learning is not a sure-fire success. Companies should strive for a positive learning culture and create an infrastructure for learning, for example in the form of space for (quiet) autonomous as well as social learning. Moreover, jobs should be designed in such a way that tasks go beyond routine processes to stimulate self-directed learning.

3.5.2. Uncovering Informal Learning Processes With a Mobile Application: Comparing Time-based and Event-based Experience Sampling

Nick Goossen, University of Twente; Sebastian Dennerlein, University of Twente; Marcella Hoogeboom, University of Twente; Maaike Endedijk, University of Twente

While informal learning has long been considered something that is dynamic and individually differing (e.g. Marsick & Volpe, 1999), researchers still sparsely use more process-oriented measures for informal learning (Seifried & Rausch, 2022). In this study, we employed one such measure, experience sampling method, to uncover more about the dynamics of informal learning, using two different types of sampling: Time-based sampling and event-based sampling.

This intensive longitudinal study followed third-year university students while engaging in a challenge-based learning course that required them to act as human resource development (HRD) consultants. In one part of the course, students

needed to develop their consulting skills by engaging in iterative self-directed learning. This means students planned, monitored, performed, and evaluated their learning activities, where each cycle could inform the next one, to work on two skill-oriented goals that fit within a chosen competence domain. This process was supported by working sessions, a reflection portfolio that gave a guiding structure throughout the cycles, and a mobile application that used short questionnaires to have students record their learning activities and initial reflections, close to the actual performance. The mobile application represented the experience sampling method, as well as the monitoring part of the self-directed learning cycles.

This study setup was used in two different cohorts of the course: Once in 2022/2023 (22 participants, 238 activities), where the mobile application employed a time-based sampling design, and once in 2023/2024 (currently collecting), where the application used an event-based sampling design. The core difference between the two designs was that for time-based sampling, one questionnaire was available each working day that could yield up to five learning activities, with items measured on the activity level, but also on a daily level (across activities). For event-based sampling, questionnaires were available throughout working days, where a new one would arrive when the previous was filled. The items were all measured on the learning activity level, as each questionnaire could fit one activity.

For the first cohort, the items in the questionnaires asked about what activity participants engaged in, with whom, what they learned, how they wanted to proceed, how they selected the activity, and how much progression they made towards their goal. These items were also used in the second cohort and new items were included to also ask about perceived emotion, satisfaction, and effectiveness concerning the activity.

The results of the study give a more fine-grained image of informal learning and the differences between activities, their context, and how they are perceived. Additionally, the study gives more insight in experience sampling as a method for capturing informal learning and what differences time-based sampling and event-based sampling elicited in two cohorts of the same study. These results add to the knowledge body on informal learning processes and have implications for researchers setting up experience sampling studies focused on learning behaviour.

3.5.3. Investigating Effects of an App-based Prompting on Informal Workplace Learning Using Experience Sampling

Manuel Böhm, Mannheim University; Andreas Rausch, Mannheim University

The role of day-to-day informal workplace learning has received increasing attention (Rintala et al., 2019). However, most of this informal learning is not recognized as learning at all and is difficult to capture by retrospective self-reports (Endedijk & Cuyvers, 2022). While experience sampling tries to overcome these shortcomings (Seifried & Rausch 2022), intervention studies that intend to foster informal workplace learning are still very scarce (Cerasoli et al., 2018) and it is unclear how such micro-interventions (i.e., nudging, prompting) should be designed. However, experience sampling is suspected of already triggering informal learning, which is a challenge for the development of study designs. In a quasi-experimental field study, we use experience sampling and micro-prompting via a smartphone app. The experimental group receives two micro-prompts each workday for two weeks, followed by two weeks of experience sampling. The control group only engages in experience sampling for four weeks. The micro-prompting refers to a difficult activity during the past hours and offers four different learning tasks, one of which is to be selected: 1) Setting a learning goal ('Please describe what specifically you would like to learn to master this activity even better in the future?'), 2) Help-seeking ('Where or from whom could you find helpful information that could be useful for this activity in the future?'), 3) Passing on knowledge ('What would you share with a colleague to help them with this activity?'), or 4) Preserving knowledge ('What would you like to keep in mind so that you can handle this activity well or even better in the future?'). After responding to the respective learning task, the participants are asked to explain why they have selected this particular learning task. In contrast, experience sampling refers to the current work task and requests a short description of the work task followed by the completion of Likert-scale items on task characteristics, work strategies, and perceived learning. In case at least a minimum extent of learning was indicated, an open item asks for a short description of what was learned from this task. The study addresses the following research questions: Which work characteristics and work strategies explain perceived learning? Which learning tasks within the micro-prompting do the participants prefer and why? What is the effect of micro-prompting on the perceived learning? What is the effect of continued experience sampling on perceived learning? An estimated 80 office employees of a large German energy company will participate. Data collection will start in February 2024. Data analysis will consider the multi-level structure of the

data where appropriate. For analysing the freetext answers, we plan to utlise AI based on a large language model.

This study adds to our knowledge of situational and individual influences of informal workplace learning. More importantly, it provides first insights into employees' preferences in micro-prompting and into the effects of micro-prompts and ESM on informal learning.

3.5.4. Using the Experience Sampling Method to support ongoing workplace learning processes in district nursing teams

Inge Wolbers, University of Applied Sciences Utrecht; Maaike Endedijk, Twente University; Pieterbas Lalleman, Fontys University of Applied Sciences; Lisette Schoonhoven, UMC Utrecht; Nienke Bleijenberg, UMC Utrecht

Consequential to the strong focus on ageing at home instead of residential care, patients with a wide range of physical diseases, comorbidities and psychological vulnerabilities live at home as long as possible (World Health Organization, 2015). They receive district nursing care, which can be described as any technical, medical, supportive or rehabilitative nursing care intervention or assistance with personal care for older people who live at home (Van Eeno et al., 2016). District nurses work in teams, consisting of care professionals with wide variation in staff levels (bachelor-educated district nurses, vocational nurses, certified nurse assistants and helping aides (Van Kraaij et al., 2022)), skill mix, and differences in contract hours (Larsson, Erlingsdóttir, Persson & Rydenfält, 2022). Clinical practice guidelines potentially support the care provision process, improve consistency, and improve care quality (Institute of Medicine,2011). Although guidelines may be necessary, adopting and adhering to guidelines in district nursing practice remains suboptimal (Cassidy et al., 2021). Therefore, an educational intervention was developed with the objective of learning how to work with the guideline 'loneliness' or 'caregivers burden' in daily nursing practice. The educational intervention consists of face-to-face team sessions alternated with the experience sampling method (Kuppens, 2021) on a mobile app to support continuity in the learning process during their daily work practices. This study aims to show how the mobile app with the experience sampling method supports the ongoing workplace learning processes.

A multiple case study of four different district nursing teams varying between 8-14 members from three different care organisations was carried out. The team intervention included five sessions, totalling thirteen hours. In between the team sessions, their workplace learning was recorded via a mobile app that prompted to reflect on a recent learning experience (reflections, learning activities, subsequent

actions). Teams differed in the extent they used the app in combination with the team intervention. Questions focused on the learning activities and subsequent actions. During the team session, the input from the app was discussed. We conducted a within and cross-case analysis to understand how the reflections in the app contributed to the overall learning goals of the team. We saw large differences within and between teams in the extent of use of the app and the quality of the answers. We selected four different team members to analyse in-depth the learning pathways and were able to show the recursive relations between team reflection and individual reflections in the app: learning processes in the team meeting were ignated by the reflections in the app and the other way around. Our first results show how and under what conditions the experience sampling method contributes to the understanding and support of workplace learning during a formal learning intervention.

3.6. Communities as learning incubators

For a long time, Communities have been recognized as learning entities. The seminal work of Lave and Wenger (1991) on communities of practice established the idea that learning at work consists of participation in communities, the negotiating of meaning and construction of identity. Researchers adopted this perspective to study the social nature of knowledge. Also practitioners warmly embraced this way of looking and translated it in management practices and interventions to foster learning and innovation in organisations. But through time, as the concept spread across the field, also the research got scattered. Various concepts and methodological approaches were implemented, reflecting different foci, theoretically and practically.

This symposium wants to do justice to this diversity of the use of communities for learning in practice and how research builds understanding. The four contributions in this symposium share the idea of learning in communities. As such, they provide a strong illustration of how the ideas of communities have developed in various professions and organisations. Also, the contributions showcase different -but potentially complimentary – conceptualisations and methodological approaches. This shows a.o. in the composition of communities (within organisations vs interorganizational, functional vs cross-functional), in their goal (individual professional learning within the community vs learning and innovating by the community) and accordingly the conceptualisations (CoP, team learning, etc.) and methodological approaches applied. The goal of this symposium is to describe the diversity in research on communities in all its guises. Hereby, we want to initiate a

discussion on this diversity, but foremost on the (learning) potential in confronting this variety. Moreover, it is explored how these different approaches point to factors that need to be taken into account in fostering learning and innovating in communities.

Contributions

- The first paper by Amber Kornet and colleagues (Twente University, the Netherlands) 'Combining learning and reflexivity to define, refine, and attain team goals in cross-functional learning communities' is conducted in the installation sector and focuses on organizational communities bringing together employees with different functions. To understand this collective learning, team learning and reflexivity are studied by studying behaviors through time.
- The second paper by Simon Lox (ILVO, Belgium) and colleagues 'Farm Demonstration Networks on Integrated Pest Management through a Community of Practice lens', aims to understand the collective learning of farmers in inter-organisational setting by relying on the concept of Community of Practice and collecting data through observations.
- The third paper by Margot van Rees (Saxion Hoogeschool, the Netherlands) 'Stimulating innovative behaviour for professional development through learning communities' investigates inter-organisational communities in the installation sector and their impact on individual learning. A realistic evaluation framework identifies mechanisms that foster learning.

Discussant Kaija Collin (University of Jyväskylä, Finland).

3.6.1. Combining learning and reflexivity to define, refine, and attain team goals in cross-functional learning communities

Amber Kornet, Saxion University of Applied Sciences; Sebastian Dennerlein, University of Twente; Maaike Endedijk, University of Twente; Tijmen Schipper, Windesheim University of Applied Sciences

Given the rapid energy transition, new technologies are coming up quickly leading to challenges within installation companies to implement these technologies and to upskill employees to work with them. Cross-functional learning communities in which learning, working, and innovating merge are a promising form to solve these challenges and simultaneously upskill the workforce (Schipper et al., 2023). The members of these LCs need to understand each other's perspectives to co-create new knowledge (team learning) and plan, monitor, and evaluate their process (team reflexivity) to achieve their goals (e.g. solve the challenge) (Decuyper et al., 2010;

Edmondson, 1999; Wijga et al., 2023). LCs engage in three team development phases over their lifespan (1) a forming phase to define goals; (2) a functioning phase to work on and refine goals based on gained knowledge; and (3) a finishing phase to plan and work toward goal attainment. In every phase teams perform learning and reflexivity activities (Ilgen et al., 2005). Although, it is known that team learning and team reflexivity influence team performance positively (Schippers et al., 2015; Widmann et al., 2016), little is known about how these teams combine both activities in real-life settings. Therefore, the research question of this paper is: How do learning communities combine learning and reflexivity activities within team development phases to define, refine, and attain their goals? We will present a multiple-case study of eight LCs that worked on a specific challenge like implementing a new technology across multiple departments. Participants all dealt with the challenge in their everyday work and met weekly to work on their challenge together for about ten weeks. Meetings were recorded and activities were coded as team learning activities: collaborative idea generation, seeking and receiving feedback, experimenting and discussing results (Decuyper et al., 2010; Edmondson, 1999; Widmann et al., 2016), and team reflexivity activities: planning, monitoring, and evaluating (Wijga et al., 2023). The transition to the next development phase was determined by the moments of goal definition and last goal refinement. Mixed methods research, deductive video analyses, lifespan analyses, process mining techniques, and excerpts were used to analyse the data. Findings reveal that meetings in the forming phase are characterized by a strong reciprocal pattern of planning and collaborative idea generation. Most teams spent more than 80% of the time generating ideas about possible solutions for their challenge and 20% on reflecting what this means for their goal definition. Meetings in the functioning phase show two reciprocal patterns containing collaborative idea generation. Alternating with discussing, results show that talking about experimental outcomes leads to new ideas for possible solutions. Alternating with planning, results show how possible solutions are planned to be tested between the meetings. In the finishing phase, LCs deviate most from each other and learning and reflexivity are least connected. Findings contribute to theories on team learning and team reflexivity by showing how the two constructs relate to each other over time in real work settings. Future research could use our methods to compare teams based on performance outcomes.

3.6.2. Farm Demonstration Networks on Integrated Pest Management through a Community of Practice lens

Simon Lox, ILVO; Jo Bijttebier, ILVO; Laure Triste, ILVO; Piet Van den Bossche, UAntwerp

Introduction: To reduce the use of chemical products to deteriorate pests in crops, integrated pest management (IPM) as a farming strategy is incorporated in policies of the EU. Farm demonstration networks (FDN) are initiated to support the implementation of IPM. FDNs are permanent groups of 10-15 farmers that visit each other farm, facilitated by an agricultural advisor. To understand how knowledge on IPM is shared, created and applied in these FDNs, this study takes the perspective of community of practice (CoP) (Wenger, 1998). CoPs are constituted by their practice, community and meaning. This study aims to: (1) understand how farmers define IPM as a practice; (2) understand how community interactions create learning opportunities; (3) identify which meanings of IPM are negotiated within the community? Methodology: Observations were done in three FDNs over three years, with a total of 45 contact hours. Transcribed notes were coded, focusing on: (1) Practice, the topics farmers addressed; (2) Community, interactional rules and conversational elements specific to experiential learning (Malinen, 2000); (3) Meaning, the values, attitudes, beliefs, barriers, opportunities, opinions, conflicts and power issues shared. The codes were validated by member check.

Findings:

1) Practice: It showed that IPM as a scientific and political concept is re-defined by farmers and understood in terms of: (1) biology and ecology of the pests; (2) technical aspects of different cultivation practices; (3) field and crop management; (4) farm system and planning.
2) Community: FDNs enable learning by the experience of visiting each other's farm, and by discussion on shared practices. The conversational interactions that facilitate these peer experiential learning processes are concerning Malinen (2000): (1) retrospective sharing; (2) critical questioning; (3) analytical testing; (4) rational justification of alternative practices; (5) personal believing. Added to this theory are political interactions of speaking-up, demanding control, building narratives, installing checks-and-balances, naming responsibilities, pushing priorities and searching for opportunities to scale-up.
3) Meaning: The analysis shows how IPM practices become meaningful in relation to: (1) existing resources; (2) farm strategy; (3) production; (4) risk-limits; (5) farming culture and the farmers' identity; (6) political struggles.

The CoP perspective enables a detailed description and understanding of the learning processes in FDNs. It underscores how farmers should not be perceived as 'takers' of a set of pre-defined choices, but as 'makers' of their own, complex and site-specific IPM strategy. It is about giving farmers the credibility and agency to think for themselves (Bartlett, 2008) and qualify how farmers "tinker IPM" and create logics of why practices could be meaningful in their farm management. The findings add a political dimension to learning in CoPs, which was not yet recognised in the literature. These findings form the basis for guidelines on the programming, facilitation and evaluation of future FDNs.

3.6.3. Stimulating innovative behaviour for professional development through learning communities

Margot van Rees, Saxion Hogeschool; Stijn Visschedijk, Saxion Hogeschool; M.D. Endedijk, Universiteit Twente

The energy transition leads to large changes in the work of installation workers. Employees are faced with new technologies leading to new and innovative work practices. Employees' innovative work behaviour (IWB; Messman, & Mulder, 2012) is crucial for the successful development and implementation of these innovative technologies and work practices. However, in a strong hierarchical sector such as the installation sector, in which low-skilled employees have low autonomy in their work, employees need encouragement to develop and show this innovative work behaviour. Many Dutch organizations have therefore embraced the concept of learning communities (LCs) for combining learning and innovation in relation to wicked problems (Schipper et al., 2023). These learning communities are public-private partnerships, in which employees work in small innovation teams on a specific innovation challenge and simultaneously develop their learning and innovation skills (Schipper et al., 2023). Previous research has shown the benefits of these interprofessional and interorganizational communities in knowledge intensive sectors and that IWB can also be stimulated at the team-level (Widmann et al., 2016). This study focuses on if, how, and under which conditions LCs can stimulate IWB with practically trained employees in the technical sector.

4 ROUNDTABLES

Roundtable 1: Understanding the Dynamics of Continuous Professional Development in a Tech-Driven World

Roundtable 1.1. Challenges of understanding, measuring, and supporting the dynamics of production workers' learning-on-the-go in the Smart Industry sector

Maaike Endedijk, University of Twente; Akvilé Bouwens, University of Twente; Marcella Hoogeboom, University of Twente; Suzanne Janssen, University of Twente; Jessie Koen, TNO, Netherlands Organisation for Applied Scientific Research; Lisa Winkelman, University of Twente

Continuous updating and renewal of skills is necessary for production workers need to keep up with and contribute to smart technology development. Yet, production workers within the Smart Industry currently mostly lack such "smart skills" (e.g., digital skills, innovative work behaviour) and as a result they are insufficiently equipped to use and appropriate (further develop) new technology. Moreover, a large majority of production workers (over 80%) hold jobs that do not require or allow learning new skills and knowledge (SCP, 2019). To overcome these challenges and to contribute to an employable, robust and resilience workforce (Habraken et al., 2018; Wolffgramm et al., 2019), we received in 2023 funding for a nation-wide eight-year research project to study and support production workers' "learning-on-the-go" in the Smart Industry sector.

In a first exploratory study, we conducted a systematic literature review on activities and interventions to support production workers' learning in the Smart Industry sector. In total, 2187 papers were screened, resulting in a final selection of 28 papers that reported 14 different types of activities and interventions. However,

the majority of these activities and interventions were formal learning interventions, taking place off-the-job. The informal learning activities were rather generic (e.g., mentoring, time for reflection), without specific suggestion for adaptation to this target group or how to take into account the dynamics of the work practice. Focus groups with 15 participants from the Smart Industry Sector about current and future activities resulted similar generic activities.

To better understand and support the dynamics of production workers' learning-on-the-go, we take in this project a strong processual perspective. We combine ethnographic research with intensive longitudinal data collection with a mobile app. The ethnographic studies will focus on how intelligent technologies constrain traditional on-the-job learning pathways and provides alternatives to support production workers' development around smart technology use. The intensive longitudinal studies aim to unravel daily personal and contextual triggers driving (or hampering) production workers' learning activities, in order to build a solid foundation for the development of adaptive learning tools.

In this round table session, we invite researchers to discuss the challenges we face in designing these series of studies with this specific target group (e.g., low literacy). We will present the set-up of our studies and discuss questions, such as: - How to capture the dynamics of the phenomena of our interest with a mobile app in an engaging, but also valid and reliable way? - For the ethnographic study we will shadow production workers on multiple sites during technology implementation. What additional data sources can help to enrich the data set and support interpretation of results? - How can we build a shared knowledge base within our SIG on methods and designs to understand and support learning-on-the-go in a tech-driven world? We strive for collaboration in an early stage with other research groups to validate our methods, tools, and insights in other countries as well. In this way, we hope to contribute to better understanding of the dynamics of learning-on-the-go in a tech-driven world.

Roundtable 1.2. The AI Literate Researcher: Cross-Disciplinary Conceptualizations in Mathematics, Biology, and Educational Science

Stephan Drechsler, Paderborn University; Christian Harteis, Paderborn University

Emerging literature and a new focus on AI literacy are beginning to lay the foundations for curricula, courses, certifications, and other educational tools for AI literacy (Faruqe et al., 2022). Existing guidelines for K-12 AI education define AI literacy as a set of competencies that enable individuals to function proficiently in an AI-integrated society. Often, Long & Magerko's (2020) framework is taken as a

role model for AI literacy and the development of instruments to measure AI literacy (Carolus, 2023; Ng et al., 2021), but it does not consider cross-disciplinary differences between professions, ages, and levels of expertise (Cetindamar et al., 2022). However, the need for AI-literate researchers stems from the increasing integration of artificial intelligence in the research process of various fields, including mathematics, biology, and educational science. These fields are experiencing a paradigm shift, utilizing AI technologies for literature review, data analysis, problem-solving, and decision-making. Therefore, AI literate researchers are essential to effectively navigate and harness AI's potential within the research process.

This comparative Delphi study (each: ≥35 experts) unravels the differences in conceptualizations of an AI-literate researcher. For each research discipline, experts have obtained their PhD before 2017, and have at least post-doc positions in academia. Moreover, their h-index is ≥ 3, including publications that deal with aspects of AI and their area of expertise (1) explaining phenomena using mathematics, (2) explaining biological phenomena, or (3) explaining educational phenomena. Each of the three Delphi studies has 4 rounds. Within the first round, experts generate items that describe competencies that an AI-literate researcher must have to be perceived as AI-literate in their field. Within rounds 2 to 4, experts rate all items according to their importance on a 5-point Likert scale. The results of the three Delphi studies are compared and analyzed, unraveling cross-disciplinary differences.

In the future, this study can be used to develop curricula and programs to educate researchers in AI literacy. For instance, such AI literacy programs have the potential to increase the ethical and efficient use of artificial intelligence in the research process.

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Roundtable 1.3. Expertise and counselors' perception of counseling sessions – an eye tracking study

Josef Strasser, RPTU Kaiserslautern-Landau; Kristina Ackel-Eisnach, RPTU Kaiserslautern-Landau; Inga Wagner, RPTU Kaiserslautern-Landau; Ilona Weyrauch, RPTU Kaiserslautern-Landau

It seems to be indispensable for counselors to be able to perceive their clients accurately and attend to even the slightes signs of their current emotional state. Correspondingly, existing research on the development of counselors expertise indicates the specific role of perception processes in counselors' professional learning (Strasser & Gruber, 2015). Counseling expertise seems to be based on specific knowledge structures that integrate basic and case-specific knowledge (Boshuizen, Gruber & Strasser, 2020). When reasoning about cases, expert counselors take more aspects into account referring more often to the specific counseling situation (Strasser, 2020). Their ability to deeply understand the individual client goes along with a comprehensive perception of her/his situation. It is plausible to assume that this specific expertise comes into play during actual counseling sessions and helps counseling experts to view their clients and their behavior in a comprehensive way. Despite their evident importance perception processes of professional counselors, however, have not yet been directly investigated. The proposed paper is to present an ongoing study that strives to close this research gap and explore expertise-related differences in the perception of an actual counseling session. In order to investigate what determines the perception of a counseling session perceptual processes of counseling experts (n=10) and novices (n=10) when watching an authentic counseling session were investigated via Eye tracking technology. Beside the actual eye movements (fixations, saccades) certain characteristics of the subjects were assessed such as their prior knowledge, preference for verbal or visual information processing (Kirby et al., 1988), cognitive load (Paas, 1992), empathy (Leibetseder et al., 2001) as well as counseling related self-efficacy (Hertel, 2009). Taking into account the critical discussion of the eye-mind-hypothesis (Just & Carpenter, 1976) and the recommendation for a triangulation of eye tracking data with verbal data (Orquin & Holmqvist, 2018) a retrospective thinking aloud procedure was applied. Hence, to be able to represent underlying cognitive processes, subjects were confronted with the videotaped counseling situation once again (after the initial eye tracking session) and asked to think aloud and retrospectively remember their thoughts. Analyses of the data are not yet finished. In a first step, heatmaps were produced that indicate the breadth and foci of subjects' visual perception. These heatmaps hint to expertise-related

differences. Hence, the perceptual field of more experienced counselors seems to be broader taking into account more and different aspects of the situation. Thus, they not only focus on the faces of the two speakers (counselor, client) in the video, but pay more attention to their position in the room, their gestures and body language. The explorative study may give first insights that help to uncover the role of perceptual processes in the professional development of counselors.

Roundtable 2: Theories and methodologies for the study of professional learning and development

Roundtable 2.1. Developing adults learning abilities – from single to three-dimensional workplace learning

Ulrik Brandi, Aarhus University/Danish School of Education; Lars Bengtsson, Lund University; Åsa Dahlstrand, Lund University; Jessica Wadin, Lund University

Learning is a crucial aspect of success and well-being in workplaces, and the ability of employees to learn, adapt, be flexible, and have an innovative mindset is a well-known imperative and research topic. However, the dominant approach in this field of study and in practice is still an explanation and study of the ability to learn as a phenomenon that can be managed in workplaces from a controlled linear process based on formal and codified knowledge (Börjesson & Elmquist, 2011; Forsman & Rantanen, 2011; Svensson et al., 2023). This approach fails to capture the complexity of adults learning in workplaces and the importance of participant-driven and experience-based using explicit and tacit aspects of knowledge (Brandi & Elkjaer, 2023; Bäckström & Bengtsson, 2019; Ellström, 2010; Haapasaari et al., 2016). The purpose of this paper is to recount the results of a collaborative research and development project that designed and tested a Nordic-inspired learning model called Learning Labs (LL). The LL model was assumed to enhance the learning ability of adults in two case organizations.

The context of this study was provided by two participating enterprises, one from Sweden and one from Denmark. The Swedish enterprise is represented by a large multinational industrial company headquartered in Sweden. The Danish industry partner is represented by a large food production enterprise with a production facility and headquarter in Denmark. The research part focused on designing and implementing a multiple explorative case study research employing semi-structured interviews (n=20), observations, and process data detailing the outcomes from the LLs on the learning ability of adults in the Swedish and Danish enterprise sample groups.

Based on an explorative case study, observed changes were primarily connected to a development in adults learning abilities from actualizing a multifaceted learning mode that we call 'Three-dimensional learning' (3D learning) that describes a change in how workplace learning processes and content was understood and performed by the informants via the implemented LLs. 3D learning refers to a development in individuals' and groups' construction, sharing, and use of knowledge, experiences, and competencies to solve tasks. Three analyzed themes substantiate that the LLs supported an advance of a multifaceted mode for framing and realizing learning in the workplace: Length, Width, and Depth.

This paper explores a still under-researched area, namely how adults can develop their ability to learn manifested from testing a participant-driven and experience-based learning model. Existing knowledge on how to explain and change the learning abilities of adults are still dominated by formalistic models. This paper enhances our knowledge of how learning abilities can be developed in workplaces from a Nordic inspired learning model and format. Theoretical and practical implications of the findings are discussed in relation to the concept of 'learning ability'.

Roundtable 2.2. Challenges in Studying Team Processes: Lessons learned from a Longitudinal Study of Team Reflexivity

Lieke Lochten, University of Antwerp; Piet Van den Bossche, University of Antwerp; Sven De Maeyer, University of Antwerp

Effective teamwork requires continuous adaptation and growth, which are linked to the concept of team reflexivity or the degree to which a team openly reflects and communicates about its objectives, strategies, and processes and adapts them to present circumstances (West, 2000). This involves an iterative process of reflection, planning, and adaptation (West, 1996). While several studies have examined the determinants and outcomes of team reflexivity, there is little published data on the development and manifestation of this team phenomenon. Surprisingly, despite the dynamic nature of teams, previous studies have primarily utilized cross-sectional research methods. This study aims to fill this gap by identifying and describing the dynamic features of team reflexivity. An intensive longitudinal study with 19 data points was conducted to capture reflexivity across the whole lifespan of project teams (n = 12). Data were collected via an online questionnaire and analyzed using a visual analytic approach. Findings revealed that team reflexivity does not follow a universal linear or progressive path but fluctuates over time. Overall, team

reflexivity increased at the beginning and decreased towards the end of the lifespan of teams. However, differences were observed between teams and between reflexive behaviors within teams. This study highlights the existence of diversity in team reflexivity at various levels, including over time, between teams, and in different reflexive behaviors within teams. This finding poses several challenges for future research on team reflexivity and for all group and team research examining group processes. The first challenge is how to study dynamic constructs such as team reflexivity. A temporal approach is necessary to capture how processes unfold over time and to examine their dynamic features. However, navigating the various temporal perspectives and frameworks available for studying dynamic constructs is challenging. This round table session will discuss issues such as the appropriateness of temporal approaches, advisable time windows, and suitable measurement methods to capture dynamics. Another challenge is related to the observed diversity between teams. The present study's findings revealed differences in the reflexive journeys of teams. However, past studies often generalize their findings across teams. How should team researchers navigate this diversity and what precautions should they take when generalizing findings? A final challenge centers around the distinct and occasionally contrary dynamic features of different reflexive behaviors. Notably, when aggregated, the diversity in dynamics becomes obscured, raising concerns about the common practice of aggregating data into a unified scale score. How can team researchers assess and prevent the potential risk of losing valuable information through this aggregation? These challenges are not only of interest to researchers studying team reflexivity. The discussion in this round table session will result in valuable key notions and requirements for future group and team research in general.

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5 POSTERS

Changes in students' self-efficacy through critical incidents in simulations

Helen Jossberger, University of Regensburg; Sarah Kölbel, University of Regensburg; Rebecca Seethaler, University of Regensburg; Dorothy Duchatelet, Open Universiteit

In the context of political simulations, the development and the influence of self-efficacy is a key learning goal, because it can affect how students engage in simulation-based learning. Self-efficacy refers to the belief in one's ability to effectively perform. It can determine whether someone initiates coping behaviours or not, how much effort is invested, and how persistent individuals are in pursuing their own goals when encountering obstacles or critical situations (Bandura, 1977). Recent research in the field of political role-play simulations indicates that the sources of self-efficacy (mastery experience, vicarious experience, social persuasion, and physiological/psychological states) (Bandura, 1977; Won et al., 2017) play an important role in how self-efficacy is developed and influenced (e.g., Duchatelet et al., 2020). Duchatelet et al. (2020) recommend investigating what triggers increases as well as decreases in self-efficacy in simulations of political decision-making. The present study aims to examine students' self-efficacy to enhance our understanding of the sources that come into play during critical incidents (Flanagan, 1954) in role-play simulations and how their interplay relates to students' perceived changes in self-efficacy. Critical incidents were designed events in the simulation scripts to challenge students and get them out of their comfort zone. The research design of a longitudinal case study was chosen to address the following research question: How does students' self-efficacy in problem-solving change by experiencing critical incidents in role-play simulations on political decision-making? We collected

retrospective and real-time data and ensured the triangulation of data, time, and researcher. Instruments were carefully designed to capture the data: a passlet (cf. Duchatelet et al. (2020)), a semi-structured interview protocol, and a semi-structured observation scheme. The sample consisted of ten students with an average age of 24.50 years (SD = 5.50). The qualitative data is analysed using inductive and deductive data analysis strategies (Kuckartz, 2018). Currently, the analysis is ongoing. Very preliminary findings indicate that experiencing the induced critical incidents during the role-play simulation led to no changes or positive changes in students' self-efficacy regarding their problem-solving skills. At the conference, the poster will illustrate the role-play simulation, the case study design, and the findings related to the inter- and intraindividual changes in students' self-efficacy to contribute to ongoing discussions about fostering learning and professional development using simulations.

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Designing and developing a 360° learning environment for the development of soft skills

Elena Van den Broeck, AP University of Applied Sciences and Arts Antwerp; Yasmine Wauthier, AP University of Applied Sciences and Arts Antwerp; Peter David, AP University of Applied Sciences and Arts Antwerp; Siham Chaoui, AP University of Applied Sciences and Arts Antwerp; Ellen De Bruyne, AP University of Applied Sciences and Arts Antwerp

Students should be as well prepared as possible for future work. Therefore, next to job-specific skills, soft skill development is crucial and getting more attention in higher education. Soft skills are intra- and interpersonal (social) skills, essential for personal development, social participation and success in the workplace. Supporting the development of soft skills in students is however a challenge. We find that higher education institutions do not always know how to diagnose, monitor and

support soft skills development. Previous research showed that instructors and mentors struggle with both providing objective feedback on soft skills and supporting learners in their soft skill development. The latter is often due to the lack of availability of educational support materials. Research also shows that learners overestimate their own soft skills and underestimate their importance to their employability (Succi & Canovi, 2020). There is a growing need for tools that can be used in higher education by learners and in the supervision of young adults, for example during internships and workplace learning.

This project aims at designing an online learning environment 'Boost your soft skills' on supporting soft skills development. The tool enables them to map and strengthen their soft skills through a self-perception questionnaire, 360° feedback and support materials. It includes key information and activities to encourage thinking about the further development of their soft skills, which skills they need to work on and how they can improve them. Students can use the learning environment by self-regulated learning or with help of a coach. Methodologically, we use Educational Design Research as a framework. In order to make this learning environment as relevant and user-friendly as possible, teachers, students and workplace partners were included in the co-design of the initial prototype. The development is based on participatory research and follows iterative educational research design cycles. User experience of the online learning environment was investigated.

This contribution presents the design and development process of the online learning environment and includes customer journeys, prototype testing, and the status of the pilot study in our higher education institution. 'Boost your soft skills' was used during internship practice through a pilot project in three trainings programs. Through successive projects, we have been able to sufficiently unlock the needs of users. They confirm the added value of the tool and expose opportunities around further development. Through further development and a second iteration, we want to encourage the employability of the tool and promote the chances of transfer to educational practice and sustainable success.

Emotions in the implementation of the organization´s strategy – Emotional agency and psychological safety as a perspective

Elina Koivusalo, University of Jyväskylä

The turbulence and constant change of working life requires organizations to be flexible and capable of change. Responding to changes at work requires employees to have agency in adopting new roles and changed responsibilities. It has also been established that changes naturally evoke both positive and negative emotions. Research on employee's role and emotions in implementing of organization´s strategy, however, is scarce.

The aim of this longitudinal study is to investigate the connection of emotional agency and psychological safety to the implementation of organization´s strategy. Study focuses on whether emotional competence and influencing emotions at work, as a dimensions of emotional agency, and psychological safety predict the implementation of the organization´s strategy. The second aim of this study is to examine whether participation in emotion-focused intervention moderates the connection of emotional agency and psychological safety to the implementation of the organization´s strategy.

The research data for this quantitative study is part of the survey data of the TUNTO2 -project. A total of 837 subjects responded to the initial measurement (time 1, before emotion-focused intervention) and 694 subjects responded to the final measurement (time 2, after emotion-focused intervention). Confirmatory factor analysis (CFA) and structural equation modeling (SEM) was conducted to specify cross-lagged panel model (CLPM). Data was analyzed with Mplus.

The preliminary results indicated that only emotional competence at work at time 1 was statistically significant predictor of implementing organization´s strategy at time 2. Furthermore, emotional competence at work and implementing organization´s strategy at time 1 statistically significantly predicts influencing emotions at work at time 2. The results of this study will provide new information that supports learning and development in the field of working life research.

Enhancing Historical Thinking Concepts in History and Social Sciences Education in Latvia: A Comprehensive Strategy

Evi Daga - Krūmiņa, University of Latvia, Interdisciplinary Centre for Educational Innovation; Liene Ozoliņa, University of Latvia, Interdisciplinary Centre for Educational Innovation

Latvia's new history and social sciences curriculum emphasize deep learning approach, departing from the conventional practice of rote memorization of historical facts. However, this transition presents significant challenges for educators, as they lack the necessary continuous and effective professional development. The research aligns with contemporary educational theories emphasizing the importance of active learning, technology integration, and ongoing professional development in enhancing student outcomes. To address the problem, we have chosen the methodology of design-based research and are in the process of developing teaching and learning materials based on the theory of historical thinking concepts, which include continuity and change, causes and consequences, historical significance, and historical perspective-taking. These materials are being customized to align with the Latvian curriculum context. By drawing on data collected through approbation of our made materials, artefact examination, and teacher reflections, we can pinpoint the specific areas that require attention and improvement. This research delves into the three key elements that form the core of our proposed strategy to address these challenges: Implementation of Historical Thinking Concepts: Historical thinking concepts inherently align with the curriculum's skill-focused objectives. These concepts foster critical thinking, analysis, and the interpretation of historical data, nurturing the skills essential for a deeper understanding of history and social sciences. Incorporation of Blended Learning: Blended learning seamlessly combines traditional classroom instruction with online resources and activities. This approach necessitates a re-evaluation of student and teacher roles and a deep understanding of the interactions between content, technology, and pedagogy. Through professional development, teachers can harness digital technologies to create dynamic, interactive learning experiences that promote skill acquisition. Continuous in-service professional development for history and social studies teachers, rooted in research, integrates blended learning to enhance teaching strategies. This approach melds traditional classroom teaching with online tools, demanding a re-evaluation of roles for students and teachers and an understanding of the synergy between content, technology, and pedagogy.

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Exploring AI's Role as an Intelligent Assistant for Students and Teachers: The Beginning of a Strategic Development Journey

Minna Silvennoinen, Jamk University of Applied Sciences; Satu Aksovaara, Jamk University of Applied Sciences

The rapid development of artificial intelligence (AI) and the advancement of AI-related solutions present both challenges and opportunities for higher education pedagogy. These challenges are related to teaching, research, and understanding how to engage with artificial intelligence in various learning situations (Alanko-Turunen, 2023). Addressing these challenges requires close collaboration between higher education institutions and working life, continuous teacher training, and students' adaptation to rapid change. This abstract introduces the agile and exploratory strategic development's first cycle, scheduled for implementation in 2024, with the aim of promoting the integration of artificial intelligence in developing competencies and collaborative learning situations among higher education students. At the heart of applied, practice-based research development is the active engagement of teachers and students in mapping their experiences with the use of artificial intelligence. In the first phase, exploratory research is conducted on students' and teachers' utilization of artificial intelligence, accompanied by a literature review. Additionally, participatory workshops are organized for the higher

education institution staff, with the aim of supporting the development of staff's competence development relating AI and involve them in research development. The results are critically analyzed, and a report is generated, evaluating the readiness of students and teachers to leverage artificial intelligence in future workplaces. In the second phase, the role of artificial intelligence in students' teamwork is examined (see e.g., Siemon 2022; Caldwell et al. 2022), using a multidisciplinary course integrating experiential team learning as a pilot platform. Through the design process, artificial intelligence is integrated into various phases of students' teamwork, where they collaboratively solve real-world assignments. The research identifies best practices and challenges in utilizing artificial intelligence as an intelligent assistant, collaborator, and work enhancer. Challenges and best practices are identified and critically examined from both the students' and team coaches' perspectives. Strategically, the project supports the goals aligned with the higher education institution's strengths and its role in research as a developer of pedagogical solutions related to digitizing operational environments. The development work is aligned with the objectives of international collaboration in higher education, generating new models of intelligent experimentation and fostering opportunities for international networking.

Alanko-Turunen, M. (2023). Kohti kestäviä korkeakoulupedagogisia tekoälyratkaisuja – kartoittava kirjallisuuskatsaus. [Towards Sustainable Artificial Intelligence Solutions in Higher Education Pedagogy – a Scoping Review]. eSignals Research, 4(2). http://urn.fi/URN:NBN:fi-fe20230915127158

Caldwell, S., Sweetser, P., O'Donnell, N., Knight, M. J., Aitchison, M., Gedeon, T., ... & Conroy, D. (2022). An agile new research framework for hybrid human-AI teaming: Trust, transparency, and transferability. ACM Transactions on Interactive Intelligent Systems (TiiS), 12(3), 1-36.

Siemon, D. (2022). Elaborating team roles for artificial intelligence-based teammates in human-AI collaboration. Group Decision and Negotiation, 31(5), 871-912.

Exploring Essential Competencies and Conceptual Thinking Skills for Future IT Engineers

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There is a global deficit of IT professionals (Di Battista et al., 2023), and to overcome this problem cooperation between business sector and engineering education is vital (Rikala et al, 2024). IT professionals are expected to possess strong technical skills (i.e., a broad understanding of technology and its possibilities) as well as soft skills

such as teamwork, creative thinking, and communication skills (Akdur, 2021; Do et al., 2023). In addition, they should have the ability to predict and discover creative, functional and competitive solutions needed – thus, using future-gazing, foresight, and futureproofing skills intelligently (Royle & Laing, 2014). By launching a bachelor's/master's program in information technology and software engineering in the fall of 2021, the University of Jyväskylä has taken a step towards addressing tis need.

This research aims to identify essential competencies and conceptual thinking skills needed for upcoming IT engineers. By understanding IT industry requirements from gathered data, we seek to capture what kind of skills are needed to be employed in the field of information technology and software engineering. This versatile perspective on the skills needed should help ensure/increase the supply of IT professionals in the business sector. In the educational program launched, workplace learning plays a central role. In short, we produce new information on what employers (N=50) consider to be the critical competencies and conceptual thinking skills required for upcoming IT engineers. The research data has been collected using the Delphi method (Fish & Busby 1996).

Our findings will inform the development of IT education and training programs that focus on the specific skills and knowledge areas identified as crucial by industry experts. This targeted approach will enhance IT graduates' employability and career prospects, enabling them to contribute effectively to technological advancements. In our poster, we will also illustrate insights into the specific skill sets needed to bridge the gap between technical training of software engineers and industry demands – the gap which, based on the earlier literature, slows down the introduction of key technologies and the achievement of key goals in business sectors (Rikala et al., 2024). By enhancing IT professionals' competence and conceptual thinking abilities, we can ensure a skilled workforce that can drive technological advancements and contribute to the local and global business sectors.

Akdur, D. "Skills gaps in the industry: Opinions of embedded software practitioners." ACM Trans. Embed. Comput. Syst. (TECS) 20.5 (2021): 1–39. https://doi.org/10.1145/3463340

Di Battista, A., Grayling, S., Hasselaar, E. "Future of jobs report 2023." World Economic Forum, Geneva, Switzerland, 2023. http://hdl.voced.edu.au/10707/648248

Do, H.-D., Tsai, K.-T., Wen, J.-M., Huang, S.K. "Hard skill gap between university education and the robotic industry." J. Comput. Inf. Syst. 63.1 (2023): 24–36. https://doi.org/10.1080/08874417.2021.2023336

Fish, L. S., & Busby, D. M. (1996). The delphi method. Research methods in family therapy, 469, 482.

Rikala, P., Braun, G., Järvinen, M., Stahre, J., & Hämäläinen, R. (2024). Understanding and measuring skill gaps in Industry 4.0—A review. Technological Forecasting and Social Change, 201, 123206.

How can collaboration between companies and universities improve the transition of engineering students into the workforce? The six c's of successful collaboration

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Transitions from higher education to the workforce are crucial as they involve significant learning and adaptation, with the alignment between educational background, job context, learning skills, and social networks playing pivotal roles in determining a graduates' success and integration into the labor market to achieve a sustainable career (Grosemans et al., 2017). Enhancing the transition phase and improving the employability of engineering graduates can be realized through stronger collaboration between universities and industries/businesses (Winberg et. al., 2020).

The aim of this study is to examine how collaboration between companies and higher education (HE) can improve the transition of engineering students into the work life. To achieve this aim, we have developed the following research questions:

1) How is collaboration between HE and industry manifested?
2) What are the main stakeholders in HE and industry collaboration? What are the enabling and hindering factors for those stakeholders?
3) What are the reported outcomes of HE and industry collaboration?

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009) to perform an extensive literature search. Our study applied a scoping review approach to provide an overview of how educational institutions support students' transitions to work in collaboration with the industry in engineering education. 36 Studies were included in the review after meticulous screening process.

Results indicate that collaboration between higher education and industry involves, in most cases, the industry partner, students, teaching/research staff, and higher education institutions. Common approaches to involving industry partners in course implementation included site visits, guest lectures and, for example, co-op teaching. Internships, bachelor's or master's degrees done with partner companies and other work placement forms were also common practice in higher education and industry collaboration. Main enabling factors for collaboration stakeholders included R & D opportunities for HE institutions and industry. Students'

employability was reported to improve as a result of HE—Industry collaboration. Main hindering factors for all stakeholders included lack of resources, communication and time.

Drawing from the enabling and hindering factors of HE-industry collaboration for different stakeholders highlighted in the articles included in this study, six themes stood at the core of successful collaboration; Clarity, communication, commonality, commitment, continuity, and confidence. Having clear roles, goals, and communication channels, trusting collaboration partners, and committing to long-term collaboration are all crucial factors for collaboration efforts to be successful between HE and the industry.

Grosemans, I., Coertjens, L., & Kyndt, E. (2017). Exploring learning and fit in the transition from higher education to the labour market: A systematic review. Educational Research Review, 21, 67–84. https://doi.org/10.1016/j.edurev.2017.03.001

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. Annals of Internal Medicine, 151(4), 264–269. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

Winberg, C., Bramhall, M., Greenfield, D., Johnson, P., Rowlett, P., Lewis, O., Waldock, J., & Wolff, K. (2020). Developing employability in engineering education: a systematic review of the literature. European Journal of Engineering Education, 45(2), 165–180. https://doi.org/10.1080/03043797.2018.1534086

Modelling the Effectiveness of Training for Military Pilots

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Effective training is a universal requirement for operational military pilots. To guarantee that pilots will maintain and refine their skill sets, they have to follow a standardised training program, with limited possibilities to address personal needs or to adapt to new demands. Practical limitations, such as lack of air space for training, aircraft availability, lack of training devices or support personnel, and environmental rules, provide challenges to implement and schedule the training program effectively and efficiently. Optimising training programs, in which personal needs are addressed and training is scheduled flexibly given the opportunities provided, will require more specific and current information on what is needed for each individual pilot.

At the same time, both civilian and military contexts recognize that needs and circumstances evolve. Training evaluation involves continuous assessment and feedback mechanisms, allowing educators and military leaders to fine-tune training programs to remain responsive. In the realm of military aviation, this adaptability

becomes especially critical due to the ever-evolving nature of operational environments. It guarantees that training programs remain pertinent and flexible to meet the dynamic demands of skills and knowledge required for successful mission execution.

In the study of this proposed poster presentation, we examine the multifaceted training planning and evaluation process in order to create an ex-ante decision aid for pilots and operations officers.

An initial literature review shows that key elements in training evaluation are the formulation of learning objectives, test design, feedback and evaluation, and differentiation in education (Illeris, 2007; Merriënboer & Kirschner, 2018; Wiggins & McTighe, 2005). Many of the general principles and methods used in the evaluation of learning goals are applicable in a training context. Beyond the general principles, there are also resources specifically focused on the formulation and evaluation of learning objectives in training and professional development contexts.

This study will result in a theoretical framework for an ex-ante training evaluation instrument. The framework intents to guide the development of training optimisation principles that will enable effective, efficient, and personalised maintenance of pilot skills. While the study focuses on the more complex situation of military pilots, the results are expected to be applicable to civil pilot training organisations as well, and perhaps extend to any profession with regulated training requirements.

Illeris, K. (2007). How we learn. Taylor & Francis US. Merriënboer, J. J. G. van, & Kirschner, P. A. (2018). Ten steps to complex learning: A systematic approach to four-component instructional design (Third edition). Routledge.
Wiggins, G., & McTighe, J. (2005). Understanding by Design. Association for Supervision and Curriculum Development.

Objects supporting collaborative knowledge creation in cross-functional teams

Amber Kornet, Saxion University of Applied Sciences; Sebastian Dennerlein, University of Twente; Maaike Endedijk, University of Twente; Tijmen Schipper, Windesheim University of Applied Sciences

Nowadays, organizations often turn to cross-functional teams of members with different backgrounds, to solve complex challenges. To be able to make use of the amount of knowledge and skills these teams contain, team members need to overcome so-called "knowledge boundaries" (Edmondson & Harvey, 2018). Team learning activities and team reflexivity activities, accompanied by the creation and

use of objects, enable teams to cross knowledge boundaries by creating shared mental models and acquiring knowledge about each other's expertise (transactive memory system) (Edmondson & Harvey, 2018). This is needed to understand each other's perspectives and co-create new knowledge (Decuyper et al., 2010). These objects are called boundary objects when they are created and used to translate between perspectives of different practices (Star & Griesemer, 1989). An example of a boundary object is a visual representation of cognitive structures that integrate knowledge across the boundaries of professions and disciplines e.g. mind maps, schematic overviews etc. (Carlile, 2002). If team members create boundary objects together they can support a team's memory, identify key intersections among pieces of information, recognize divergent and convergent viewpoints, identify knowledge gaps, and provide common ground to integrate pieces of knowledge into a shared mental model (Rentsch et al., 2014). These objects can prevent teams from repeatedly retrieving old knowledge but building upon the newly formed knowledge (Decuyper et al., 2010). Facilitators of these cross-functional innovation teams can introduce working on boundary objects to support learning and reflexivity (Kolb et al., 2008).

Despite what is known about objects supporting teamwork, little is known about how teams interact with these objects (e.g., learning as well as reflexivity activities) and how these objects might change shape and purpose over time (Edmondson & Harvey, 2018). In addition, the role of the facilitator in the use and creation of boundary objects is not yet clarified. Therefore, we aim to answer the following question: How does the interaction with boundary objects contribute to team learning and team reflexivity activity during team meetings? In this poster, we will present an embedded multiple case study (Yin, 2018) in which four teams are followed and observed in their entirety (10 meetings). Interactions with the boundary objects are captured with a 360-degree camera to see when objects are introduced and how team members interact with the objects and how these object evolve. Facilitators and team members are periodically questioned about motivations for introducing or refraining from objects. After the collaboration, we asked team members to identify the boundary objects and reflect on their use, during a group interview. We will provide insight into the formation and transformation of objects for different purposes and the interaction with objects during specific activities over time. A problem-driven content analysis (Krippendorff, 2019) will reveal how facilitators and participants used boundary objects to support learning and reflexivity over time.

Power relations and knowledge creation in a public-private collaboration

Nathalie Schram-Wesselink, University of Twente; Ellen Nathues, University of Twente; Maaike Endedijk, University of Twente

How is new knowledge created in collaborations between public and private organizations? Learning communities are becoming more common for organizations to keep up with innovations (Schipper et al., 2023). Yet differences between participating organizations can also be experienced as hurdles rather than an inspirational change of perspective (Nathues et al., 2023). In public-private collaborations, organizations operate with different goals, funding, and paces of work. Furthermore, the power relations between these organizations need to be navigated. In this poster presentation, we will address the main opportunities and hurdles that a learning community consisting of public and private organizations encounters based on a rich empirical case study. Possible solutions to overcome the hurdles will be outlined, too.

This research is based on an ethnographic case study of an interorganizational learning community consisting of over a hundred organizations in the IT sector. The many organizations in the community are divided into six different sectors, of which five consist of public organizations and one of private organizations. The data of this ongoing research consist of field notes and recordings from a total of nine general and sector-specific meetings, one interview with a key actor of the learning community's organization, presentation slides used in the general and sector-specific meetings, and content on the community's online platforms. Data collection started with observing the community's strategy discussion day after which the first subsequent round of general and sector-specific meetings were observed and recorded. Furthermore, this community organizes activities regularly and is in the process of expanding these activities by creating a campus. These factors provide the opportunity to observe the participants in a variety of different settings, through a transitional stage, and during success and struggles in collaboration.

After a first round of coding and analysis, hurdles between the public and private organizations became prominent. Therefore, a second round of data gathering is scheduled for the coming months to dive more in-depth into these difficulties and will include interviews with at least one key actor from each sector. Furthermore, we will continue to observe and record upcoming general and sector-specific meetings.

First insights show that knowledge creation and sharing occurs regularly and fruitfully within the sectors, but less so between sectors. Specifically, the private organizations struggle to collaborate with the public organizations despite their efforts. As such, both good and struggling practices of knowledge creation and sharing can be observed within the community.

This research will give insights into the specific factors that cause a divide between private and public organizations and how this divide can both reinforce and impede learning opportunities.

Schipper, T. M., Mennens, K., Preenen, P., Vos, M., van den Tooren, M., & Hofstra, N. (2023). Interorganizational Learning: a Conceptualization of Public-Private Learning Communities. Human Resource Development Review, 15344843231198361.

Nathues, E., Endedijk, M. D., & van Vuuren, M. (2023). Perk or Peril? Making Sense of Member Differences When Interorganizational Collaboration Begins. Small Group Research, 54(5), 10464964221148682. https://doi.org/10.1177/10464964221148682

Single case experimental designs to investigate change in professional learning and development over time

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The research field of professional learning and development (PLD) is challenged to grasp the dynamic development of professional competency over time. One methodology extensively used in psychology and medicine to evaluate the impact of interventions for behavioural change, is single case experimental research (SCER). SCER allows to study the causal relationship between an experimentally manipulated independent variable and an outcome variable for a single case with the outcome variable repeatedly measured under different levels of manipulation (Onghena, 2020). Different SCER designs exist, for instance the multiple baseline design (MBD) with a staggered implementation of the intervention across cases, and the alternating treatment design (ATD) rapidly alternating between different interventions across different conditions (Manolov et al., 2022).

Notwithstanding its long history in other disciplines, the usefulness of SCER for the field of PLD is unknown. A first step needed is gaining insight into the

challenges of its employment. With the experience from three empirical SCER studies in PLD, the following research question is answered: "Which challenges rise when using SCER in the field of PLD?"

Study 1 was a mixed-method MBD investigating the impact of a co-regulating intervention on the development of self-regulation of professional learning (SRpL) of five Dutch nurses. Study 2 was a mixed-method ATD with repeated measures of SRpL and teaching competencies of ten Flemish student teachers. Study 3 entailed a combination of a MBD and an ATD to study the effects of prompts for reflection to foster professional development and professional identity of seven German psychotherapy students. All the researchers' notes and articles related to the studies served as data, which were first analyzed inductively. Then, categorization in relation to the different research phases was performed. Peer debriefings ensure the trustworthiness of the process.

A variety of challenges are found. Although SCED is experienced flexible and versatile, designing SCER to implement PLD interventions, is challenging with many choices to be made. Keeping track of all these choices' argumentations is challenging, but important to identify optimal design components. Designing research including different SCED (ex. MBD and ATD, study 3) challenges its quality and (confounding) results. Further challenges lie in sampling participants for repeated measurements (study 2) and preventing drop-out (study 3), and in choosing the most appropriate analytic approach (all three studies). Moreover, multi-component interventions (study 2, study 3) enlarge the analytic challenge. Although SCED has the potential of moving the field of PLD further, many challenges were discovered. In a next step, existing empirical studies in the field of PLD that used SCED are systematically reviewed to gain insight in how to overcome challenges and which opportunities there are to further develop PLD research.

Onghena, P. (2020). One by one: the design and analysis of replicated randomized single-case experiments. In: van der Schoot, R., Miočevic,´M. (eds) Small sample size solutions, guide for applied researchers and practitioners. London and New York: Routledge.

Manolov, R., Tanious, R., & Onghena, P. (2022). Quantitative techniques and graphical representations for interpreting results from alternating treatment design. Perspectives on Behavior science, 45,259-294.

Teachers' use of digital technologies outside the classroom: A systematic review

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The changes brought about by digitalisation affect almost all professions and sectors (e.g., Harteis, 2018). Teachers are also affected by this in terms of non-teaching tasks that take up most of their time (e.g., lesson preparation and follow-up, lesson coordination and organisation, communication with interest groups; Baumert & Kunter, 2011; Hillman et al., 2019).

However, research on the use, type, and purpose of digital tools for tasks and competences of teachers outside the classroom is scarce and scattered. This study aims to fill this research gap by exploring and systematising the current state of research on this topic based on two literature reviews (typical tasks of teachers outside the classroom; behaviour and reasons for using digital technologies). Both the Technology Acceptance Model (Venkatesh & Bala, 2008) and the Human Agency Theory (e.g., Eteläpelto et al., 2013; Goller, 2017) are used as guiding framework to identify predictors of teachers' use of digital technologies outside the classroom; review approach: PRISMA (Liberati et al., 2009).

We expect first relevant results of the current review by the conference in July/August. In the subsequent empirical study, task mastery and the use of digital tools outside the classroom, the effects of digitalisation, the need for skills and the stakeholders' experiences of requirements and the influence on teachers will be examined to understand influencing aspects or predictors of digitalisation-related work behaviour and the agency of teachers outside the classroom.

The results should provide information on potential challenges (acceptance, use) as well as concrete starting points (training and further education, personnel, and organisational development) with regard to digital technologies in the extracurricular work of teachers and will be presented on the poster together with plans for future empirical studies.

Baumert, J. & Kunter, M. (2011). Das Kompetenzmodell von COACTIV [The competence model of COACTIV]. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss & M. Neubrand (Eds.), Professionelle Kompetenz von Lehrkräften: Ergebnisse des Forschungsprogramms COACTIV (pp. 29–54). Waxmann.

Eteläpelto, A., Vähäsantanen, K., Hökkä, P. & Paloniemi, S. (2013). What is agency? Conceptualizing professional agency at work. Educational Research Review, 10, 45–65.

Goller, M. (2017). Human agency at work: An active approach towards expertise development. Springer Harteis, C. (2018). The impact of digitalization in the workplace: An educational view. Professional and Practice-based Learning. Springer.

Hillman, S., Hillman, A., Neustaedter, C. & Pang, C. (2019). "I Have a Life": Teacher communication & management outside the classroom. In S. Brewster, G. Fitzpatrick, A. Cox & V. Kostakos (Eds.), Extended abstracts of the 2019 CHI Conference on Human Factors in Computing Systems (pp. 1–6). ACM Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. PLoS Medicine, 6(7), e1000100.
Venkatesh, V. & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences, 39(2), 273–315.

Understanding and measuring skill gaps in Industry 4.0 – A review

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Today, industry relies heavily on advanced technologies. A significant skill gap is one of the biggest hurdles for the sustainable and digital transformation of industry. Hence, industries are confronted with the lack of right-skilled workers, contributing to a slowdown in adopting key technologies and reaching key goals (Di Battista et al., 2023; González Chávez et al., 2023). Changes in working life, such as digital transformation, demand specific skills not necessarily taught by educational institutes or developed in the labor market. Fostering a work environment in which employees can continuously develop their potential is thus vital. Industries must understand the scope of the changes, the content of work requirements, and the skills needed from the workforce (Karacay, 2018). Although the need to address skill gaps is evident and more topical than ever, an in-depth understanding of the concept is lacking. The main challenge in identifying skill gaps is the blurred line between work–life needs, political recommendations, and empirical research results. Skill gaps can be defined in various ways, making measuring them difficult (Schwalje, 2012). The lack of clear and objective results, in turn, may lead to false arguments based on biased interest or little or no evidence of actual skill gaps (Cappelli, 2015), resulting in misdirected training resources.

There thus exists a research gap on the skill gap concept and the related measurement approaches. Our aim was to shed light on the skill gap concept and the approaches taken to understand and measure it. Using the PRISMA guidelines, we systematically searched and retrieved English records from the ProQuest, ScienceDirect, Scopus, and Web of Science databases in January 2023. In total, 40 articles met our predefined inclusion criteria, and we analyzed them descriptively and qualitatively using thematic analysis and constant comparisons.

We found that skill gaps certainly exist, and concerns about growing skill gaps have been raised worldwide. There was also a clear need for a common understanding of skill gaps. Considering this, we defined a skill gap as "a difficulty in providing the right skills to the right people at the right time in changing business realities." Since we found very few studies that employed different methods and perspectives to actually measure skill gaps in practice, more research is needed to map actual skill gaps. We believe converging data from multimodal and multiple approaches, systems, and sources with more traditional measures, such as surveys, could offer a more comprehensive understanding of the skill gap phenomenon.

Di Battista, A. et al. (2023), Future of jobs report 2023. World Economic Forum, Geneva, Switzerland. Cappelli, P.H. (2015). Skill gaps, skill shortages, and skill mismatches: Evidence and arguments for the United States. ILR review, 68(2), 251-290.
Chávez, C. A. G. et al. (2023). Analyzing the risks of digital servitization in the machine tool industry. Robotics and Computer-Integrated Manufacturing, 82, 102520.
Karacay, G. (2018). Talent development for Industry 4.0. Industry 4.0: Managing the digital transformation, 123-136.
Schwalje, W. (2012). Rethinking how establishment skills surveys can more effectively identify workforce skills gaps. Available at SSRN 2017556.

(Un)expected Emotions and Teamwork – Narratives of Early Childhood Education Practitioners

Essi Hanhikoski, University of Jyväskylä; Maarit Alasuutari, University of Jyväskylä; Eija Sevón, University of Jyväskylä

Teamwork in the Finnish early childhood education and care (ECEC) is an important context for the construction and sharing of emotions. From a narrative perspective, examining the expectations of ECEC practitioners allows us to understand the construction of practitioners' emotions. In this poster, expectations and emotions in teamwork are understood as narratively constructed, i.e. as social and dynamic processes situated in time and place (see e.g. Kleres, 2011). In this poster, we will address the question of what kind of expectations for teamwork ECEC practioners produce in their narrations about emotions related to teamwork.

The data of the study consist of video-cued interviews (see Tobin, 2019) with 15 ECEC practitioners collected as part of a larger research project. The data was analysed using the expectation analysis, i.e. by identifying the linguistic features of narrative speech indicating expectations (see Tannen, 1993). As a result, three types of narratives were identified about expectations and the emotions associated with them: 1) the narrative of inadequacy, 2) the narrative of injustice, and 3) the narrative of support. The narratives describe how the limited shared time, limited influence

and unexpected changes in the team structure challenge professionals' emotions and well-being at work, while the expected support of the team for each other evokes positive emotions and builds a sense of community within the team. Then again, the narratives illustrate a conflict between expectations of teamwork and prevailing organisational practices. The emotions constructed around expectations of ECEC teamwork are linked to contextual factors, such as organisational structures and the ways in which professionals can or cannot influence teamwork practices. The poster presentation illustrates the importance of team practices in fostering a compassionate and emotion-sharing work culture in ECEC, which in turn supports professional development and well-being at work.

Kleres, J. (2011). Emotions and narrative analysis: a methodological approach. Journal for the Theory of Social Behaviour 41(2): 182–202.
Tannen, D. (1993). Framing in discourse. Oxford University Press. Tobin, J. (2019). The origins of the video-cued multivocal ethnographic method. Anthropology & Education Quarterly 50: 255–269.

Who finishes and who drops out from early childhood education teacher training? Motivation for the training and experiences of it in focus

Elina Koivusalo, University of Jyväskylä; Ville Ruutiainen, University of Jyväskylä; Maarit Alasuutari, University of Jyväskylä

There has been public discussion about the work-related dissatisfaction of early childhood education and care staff and the lack of qualified early childhood education (ECE) teachers in Finland. At the same time, the number of the applicants to university-level ECE teacher training has decreased. It has also been claimed that some ECE teacher students do not want to work in the profession they are studying for. While the decreasing interest in studying early childhood education is relevant internationally, research on ECE teacher students' study paths is scarce.

At the end of their studies, ECE teachers are expected to have developed professional competence (Pažur et al., 2024), where the motivation to attend ECE teacher training plays a prominent role (Lumsden & Musgrave, 2023). Moreover, academic and pastoral support during the studies increase student teachers´ professional skills (Lumsden & Musgrave, 2023). Previous studies have also shown that the motivational factors related to applying to the ECE teacher training in the first place are connected to committing to the profession (Bruinsma & Jansen, 2010).

This study investigates the factors that motivate early childhood education (ECE) teacher students to apply for the ECE teacher training programme. Second,

the aim is to examine the associations between the ECE teacher students' experiences of the study programme and drop out of the programme. We consider, among others, the experiences of the adequacy of support and feedback during the studies, and perceived self-efficacy. Third, the study examines how the dropouts' motivational factors and experiences potentially differ from those of the students who became ECE teachers. As background factors we use the students age and previous working experience in the ECEC field or another field.

The research material consists of survey data collected in the Simo Project and targeted to the students who started in ECE teacher training programmes in Finnish universities in 2018 and 2019 (N = 1628). The survey data has been collected in January 2024. The data will be analyzed during the spring 2024 by using quantitative methods. As a preliminary result we hypothesized that motivation and students´ experiences of ECE teacher studies are connected to dropping out and becoming an ECEC teacher. The results will provide new information to develop ECE teacher training programmes to support students' commitment to their studies and future profession.

6 PAPER PRESENTATIONS

Agency of early career teachers during the three-year induction phase: its extensiveness, context and resources

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Teacher shortages and retaining teachers in the profession are urgent issues in education. To this end, induction programs are intended to support Early-career teachers (ECTs) in the initial stage of their career as a teacher. These programs gradually reduce in intensity so that the autonomy of the teacher can gradually increase and teachers experience an increase of professional agency. At the same time, induction programs pay attention to gradual increase in task complexity. In this study, agency is seen as the extent to which ECTs experience the possibility of consciously influencing their work through their actions (Imants & Van der Wal, 2020). We investigate how ECTs experience agency in the context of a three-year induction program, and how this experienced agency develops over time. We conducted a longitudinal qualitative study using online, semi-structured journals (Schaap et al., 2021). ECTs participating in an induction program in the south-east of the Netherlands were asked to participate in this study. A total of 14 ECTs completed the nine journals (three times a year over a period of 3 years), resulting in a final data set of 118 journals. These are coded with a previously developed coding scheme, in which extensive (a lot of space) and bounded (limited or obstructive space) agency are distinguished (Oolbekkink et al., 2022); different contexts in which this agency manifests itself (within classroom, beyond classroom and professional development) and resources that contribute to this. Results show that in the first two years, ECTs experience more 'extensive agency' than 'bounded

agency'. This means that they experience a lot of room to develop as an ECTs within their work in the school. In the third year, significantly more ECTs describe bounded agency. The journals show that task complexity in particular is increasing (e.g. exam classes, mentoring, difficult classes in terms of classroom management) and that less support is experienced from, for example, colleagues. Especially while in the first two years of the induction phase, ECTs often mention their direct colleagues as an important resource. In the transition from the second to the third year, the agency of ECTs increasingly manifested itself as more restrictive. This may be explained by the decreased supervision and the increasing complexity of work. ECTs also experience less support from their direct colleagues. From a practical point of view, the results give reason to focus induction programs more explicitly on agency in the second and third year.

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Barriers to learning as a dynamic construct in the context of workplace learning

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Theoretical Framework Factors facilitating learning at the workplace have been well investigated (e.g. Welk et al., 2022; Kyndt et al., 2018), less is known about barriers that occur when approaching a learning activity at the workplace (Boeren, 2016). Informal learning at the workplace can be defined as a process that is not organized, controlled or structured by individuals or an institution, thereby rendering it unintended learning from experience that occurs in a situation that is meaningful to the learner (Hager, 2019; Neaman and Marsick, 2018). Barriers to learning at the workplace form a holistic set of missing individual, team and organizational aspects. They are factors that hinder the initiation of successful learning, interrupt learning possibilities, delay proceedings or end learning activities much earlier than intended (Crouse et al., 2011). Based on an explorative interview study (Author, 2022a) and the development and validation of a measurement instrument of barriers to informal and formal learning at the workplace (Author, 2022b) a cross-sectional questionnaire

study with an online-based questionnaire was conducted to investigate barriers to learning as a dynamic construct in the context of workplace learning.

The online-questionnaire consists of the following scales: barriers to informal learning (Author, 2022b), informal workplace component scale (Decius et al. 2019), a scale on job satisfaction (Spector, 1985) and turnover intention (Kelly et al., 2015). 230 consultants from HR and organizational consulting (58 percent female; an average work experience of 12 years) participated in the study.

Factor analysis, analysis of Cronbach`s alpha, descriptive analyses, correlation analyses, structural equation modelling with a non-recursive model with feedback loops for barriers to learning were conducted to identify the dynamic aspects and interplay of barriers to learning with factors like job satisfaction and turn over intention. Non-recursive models with feedback loops can be used to analyze mutually directed variable relationships and therefor detect dynamics within the research design (Kline, 2015; Urban & Mayerl, 2014; Paxton et al., 2011).

For this presentation the focus is on the SEM and the non-recursive models with feedback loops The structural equation model shows an acceptable fit to the data with CFI .91 SRMR .06 and RMSEA.04. Results of the SEM show that structural learning barriers are related to team-related learning barriers ($\beta = .68$, $p < .01$) and technical learning barriers ($\beta = .24$ $p < .01$). In addition, the non-recursive model feedback loops, with CFI .98 and RSMSR .073 indicates the relationship between barriers to learning with its sub-categories such as individual components or organizational limitations and power relations are negatively related to job satisfaction and with an indirect effect to turnover intention.

These results show the complex relation between barriers to learning and learning activities and by this expand our conceptions on factors that influence informal learning at work. Furthermore, the results highlight the actual consequences of barriers to learning at the workplace. Learning barriers can be regarded as a dynamic concept with major influence on work processes.

Basic economic literacy and the concept of basic ideas on digital transformation – a new measurement approach for business education

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Since the 1980s, instruments for measuring economic literacy have been established in business education. A much-cited landmark is the test of economic literacy for US

high school students by Soper and Walstad (1987). Over the past decades measurement instruments have been continuously adapted to the academic discourses in economics and to changes in professional practice, vocational training and society (Welsandt & Abs 2023). The methodology, formats and technical implementation of the measurements have also been further validated and developed. They have become a standard for assessing the quality of education systems. However, they are even less useful for designing learning processes at the micro level of business education and for future curriculum development: First, the application of the tested knowledge to concrete business situations often remains unclear. Second, they provide less information about individual knowledge constellations. Third, digitalization, environmental and social changes and the multiple crises of recent years are changing economic knowledge and thinking. This presentation will address these challenges. We will present an approach to measuring economic literacy and basic ideas about the transformation of the economy and society. The concept of basic ideas originates from research in mathematics education (vom Hofe & Blum 2016) and has already been adapted for business education (Berding 2019). The concept of basic ideas is attributed a linking function; they serve to mediate between reality (concrete problems) and the concepts, procedures, and objects of economic theory with which the problems can be represented in abstract terms (vom Hofe & Blum, 2016). A key assumption is that the characteristics of learners' basic ideas have a strong influence on their understanding of terms and concepts, while at the same time they are assumed to have an action-guiding function. In order to validate the instrument, respondents who are active as crowdworkers in cloud-based platforms will be surveyed; they are very familiar with the transformation to the digital economy and represent a showcase of the future economy (cf. Becker et al. 2023). The surveys should be completed by June 2024, so that first results can be presented at the EARLI SIG14 conference in August 2024.

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Between Help and Hindrance: A Laboratory Experiment on the Impact of ChatGPT on Work-Related Learning

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Natural language processing tools using generative artificial intelligence (GAI) like ChatGPT have the potential to revolutionize work, learning, and professional development. Although the influence of GAI on learning and education is considered enormous (Lim et al., 2023; Zhai, 2022), discussions to date focus primarily on higher education (e.g., Bonsu & Baffour-Koduah, 2023; Fuchs, 2023) rather than work-related learning. Perspectives on ChatGPT's impact on learning is twofold: On the one hand, GAI tools could enable adaptive learning by providing learners with individualized, increasingly tailored learning support when solving problems (Baidoo-Anu & Ansah, 2023; Dai et al., 2023; Zhai, 2022). On the other hand, the potentially lower cognitive immersion of learning material could reduce or inhibit learning (Fuchs, 2023; Iskender, 2023; Qadir, 2023), in line with the concept of surface learning (e.g., Kirby et al., 2003). Thus, this study investigates how the use of ChatGPT—in comparison to "traditional" Internet research—influences learning when solving a work task. We use the classification by Kraiger et al. (1993) to investigate multiple levels of learning outcomes, i.e., cognitive, skill-based, and affective learning outcomes. Furthermore, based on the Work Design Growth Model (Parker, 2017) that posits the influence of work characteristics on learning and development, we examine how perceived time pressure influences the learning process. We assume that under time pressure the use of ChatGPT increases the short-term learning outcomes, but that Internet research is superior for medium-term outcomes due to higher cognitive involvement in the learning process. Method In a laboratory experiment, participants work on a previously unknown task in the statistics program R. We compare two supportive tools: ChatGPT and "traditional" internet research. An initial knowledge test regarding R and statistical knowledge is followed by an introduction to R, followed by a tutorial phase where participants must solve tasks in R. Further, participants must solve the tasks either with or without time pressure (2x2-between-subject design). Afterwards, we test learning outcomes in the transfer phase, in which they must solve tasks in R without support from ChatGPT/Internet. After one week, subjects take part in a follow-up. For the explorative analysis of usage behavior, we evaluate screen recordings.

Data collection is supposed to be completed by April 2024, so we can present final results at the conference. The planned sample size of 45 subjects per condition (N = 180) is based on an a-priori-power analysis for an ANOVA with four groups, α = 0.05, power = 0.8, expecting a medium effect size. For learning outcomes, we will apply a mixed ANOVA with repeated measures on learning outcomes. The study has been preregistered.

If our findings support that learning with ChatGPT is beneficial compared to traditional internet research, we could infer that GAI use may function as an important learning tool which is worth to be implemented into organizational structures. However, if we find the expected boundary conditions regarding time pressure, this will suggest that job demands may induce superficial learning while using GAI, offering implications for work design.

Brokers' facilitation of cross-organizational working and learning on wicked problems

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Issues like poverty, energy transition, climate change, and organized crime are often defined as wicked problems that require an integral and systemic approach in order to be resolved. Wicked problems are characterized by the involvement of multiple stakeholders with high value divergence, system complexity (i.e., multiple, interdependent systems) and issue uncertainty (i.e., difficulty or even impossibility to define the issue and determine how to act) (Head, 2008). Typically, brokers (consultants, program managers, project leaders, coaches, etc.) are invited to facilitate the interorganizational collaboration that wicked problems require through configurational boundary work (cf. Langley et al., 2019). Boundary crossing theory stresses how the development of new practices is most likely to happen at the boundaries between various practices or disciplines (cf. transformation, Akkerman & Bakker, 2011). Yet, boundary crossing theory tends to overlook the power dynamics that inevitably arise when stakeholders are confronted with ambiguity and conflicting stakes. In contrast, boundary work studies focus on the collaboration processes themselves and the power dynamics involved, yet seem to underexpose the learning involved (cf. Langley et al., 2019). Combining both bodies of literature affords a more comprehensive understanding of the dynamics of inter-organizational collaboration on wicked problems and how brokers can navigate

those dynamics. Research questions are: How do brokers address the wickedness of societal issues via boundary work and boundary crossing?

In this explorative interview-study we interviewed twelve purposefully selected brokers (senior consultants and project leaders) about the interorganizational collaborations they facilitated and how they themselves and the professionals involved, dealt with the wickedness of the issues at hand (in terms of boundary work and boundary crossing). All interviews were transcribed and analyzed using a matrices approach (Miles et al., 2014). Our preliminary findings show how brokers enact configurational boundary work to make value divergence productive (e.g. facilitating boundary crossing learning processes) and counteract competitive boundary work. Additionally, brokers manage system complexity by creating spaces where actors can collaborate with and learn from each other and by enlarging the permeability of boundaries between the organizations involved to create impact. By focusing on experimentation and reflection, stakeholders are supported in understanding and dealing with the uncertainty of the issue.

The findings extend our existing understanding of boundary work and boundary crossing and exemplify relations between these bodies of literature. Insights can be used to support brokers navigating power dynamics while supporting learning in interorganizational collaboration on wicked problems more effectively.

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Can nurse students' learning of infection prevention and control be promoted by applying principles of meaningful learning? A field-experimental study

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When teaching infection prevention and control (IPC), nursing education tends to focus on procedural knowledge ("rote learning") rather than promoting an understanding of the underlying reasons behind seemingly isolated pieces of

knowledge (“meaningful learning”). The starting point of the study relies on Ausubel’s insights on meaningful learning (Ausubel, 1968; see also Bryce & Brown, 2023). According to Ausubel, teachers can provide advance organizers for new material in order to promote meaningful learning. These are intended as bridges to connect what is already familiar to students and what needs to be learned. These are relevant introductory materials “presented at a higher level of abstraction, generality and inclusiveness (Ausubel, 1968, p. 148)”. Another critical aspect of meaningful learning is requiring students to take on an active role in the classroom (see Bryce & Blown, 2023). The aim of this study was to investigate if teaching of IPC could profit from applying these principles of meaningful learning. The study is situated in the context of Finnish vocational education: the training of practical nurses. The study is based on a field-experimental pre-post-test design involving a comparison group. Altogether 55 adult students provided written consent to participate in the study and participated in the pretest and post-test. Both groups were taking a mandatory course on IPC (i.e. two versions of the same course).

The students took an online test designed to tap understanding the basics of IPC before the course and at the end of the course. The content of the course was the same for comparison and experimental group, but the two conditions differed in several important ways. To promote meaningful learning, in the experimental condition (1) the teaching started with an introduction to microbiology in line with the notion of an advance organizer rather than starting with Standard Precautions; and 2) the students were expected to assume an active role during lessons. In addition, teaching relied on careful lesson plans (one topic per lesson).

As expected, performance improved from the pre-test to the post-test in both groups. As a result, improvement was more substantial in the experimental group. In the experimental group, test performance increased from M = 104.8 (SD = 11.9) to M = 117.6 (SD =10.3), whereas in the comparison group test performance increased from M = 111.5 (SD = 9.6) to M =119.0 (SD = 7.6). The interaction effect was almost statistically significant, $F(1, 53) = 3.6$, $p = .065$, eta2 = .06. It is worth noting that the comparison group started with a better understanding of the topic.

To conclude, the results of the study indicate that developing nursing education by applying principles of meaningful learning may support IPC learning. However, the main limitation of the study is that the two groups differed on pre-knowledge. A new study in which prior knowledge is used as a criterion for allocation to group is needed. Another direction for future research is conducting longitudinal studies spanning from the educational setting to the workplace.

Change in professional development of university teachers emanating from technology-driven changes in their work

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The Covid-19 pandemic changed the work of university teachers by demanding, innovative, digital teaching methods (Li & Wang, 2021). Changes triggered by technological developments can disrupt routines and complement the execution of work tasks which can lead to changes in work characteristics (Beer & Mulder, 2020). Van de Ven & Poole (2005) define change as differences over time which is driven by deterministic causation. Change can differ in direction (increase, decrease) and intensity (strong, none). To successfully deal with changes in work, professional development (PD) is required, which contains 'elaborating' learning activities which help making implicit knowledge explicit, 'expanding' learning activities which are useful finding gaps in knowledge and 'externalizing' learning activities which help developing the team or organization (Simons & Ruijters, 2004). PD may be fostered by individual aspects (e.g., affects, Saunders, 2013) and work characteristics (Evers et al., 2023).

PD's significance for teachers' performance (Borg, 2018), makes it crucial for universities to understand how changes in individual and work characteristics affect PD. Because empirical evidence is lacking the research question is: What changes in PD emanate from changes in the work characteristics of university teachers, their change attitude and their affects?

A cross-sectional survey was conducted with 350 German university teachers after the first semester under Covid-19 restrictions. The questionnaire contained: Self-developed 3x4-items Change in PD scale, capturing changes in 'elaborating', 'expanding' and 'externalizing' learning activities and five self-developed items measuring perceived change in autonomy, workload, complexity, responsibility and quality of interaction (intensity of change: 1=no change to 4=strong change, direction of change: 1=decrease, 2=no change, 3=increase). PANAS-scale (Breyer & Bluemke, 2016) to measure positive and negative affect, and a 14-item scale measuring change attitude (Oreg, 2006), with a six-point Likert-scale answering mode. All scales had satisfactory Cronbach's α (.71–.88.)

Descriptive statistics, correlations and SEMs were calculated, for intensity and direction of change. Descriptive analyses indicate an increase in all PD learning activities (M=2.31-2.72) but a slight change (M=1.81-2.3). The results of SEM

indicate an adequate fit for both models (intensity: $\chi^2/df=1.58$, SRMR=.04; CFI=.95; TLI=.92; RMSEA =.04; direction: $\chi^2/df=1.31$; SRMR=.05; CFI=.96; TLI=.95; RMSEA=.03;). The study provides insights into how changes can be measured adequately, what causes PD. The results can be used by universities to remain competitive in high quality teaching.

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Collaborative learning in nursing students' simulation teaching

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Collaborative learning and simulation are used widely in health studies (Aebersold, 2018). This study is based on the experiences of nursing students studying at a University of Applied Sciences about collaborative learning in simulation teaching. In this study, collaborative learning refers specifically to interactive social-technological situations created for students, where the goal is to learn new information and skills together with others (Lakkala, 2018). Interactive simulations in the health sector combine both traditional learning tools, anatomical dolls, as well as newer technology (Teräs et al., 2013). The core of learning is co-operation with others. The general goal of the simulation teaching was to prepare students for patient situations that occur in working life (Dincer & Ataman, 2022). The goal of the research is to produce information about collaborative learning in the context of nursing simulation teaching. The research answers the following questions: What kind of factors supporting collaborative learning do nursing students experience in nursing simulation teaching? What kind of challenging factors do nursing students experience in collaborative learning in nursing simulation teaching?

Online diaries (N = 56) written by students who participated in simulation teaching were used as research material, which were analyzed using thematic

analysis (Braun & Clarke, 2006). The research results describe the factors that support and challenge collaborative learning. As factors supporting collaborative learning, the students described factors related to the student themselves, such as acting in roles and maintaining motivation, as well as factors related to working in a group, such as receiving peer support, commitment to working together, and dialogic interaction. Unpleasant experiences, tensions of working in pairs, burdens related to roles in simulations and difficulties in learning discussions were described as factors challenging students' collaborative learning.

The results can be used in the planning and implementation of simulation teaching. Based on the results, it is particularly important to pay attention to the fact that students are allowed to act in different roles. Sufficient time should also be reserved for learning discussions held together, as they were perceived as significant. Also, according to Keskitalo's (2021) research, from the point of view of creating and maintaining a sense of collaborative, students' commitment to a common goal and teamwork were felt to be particularly important.

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Collective self-determination in group-learning situations

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Modern expert work seen as continuous learning and development requires autonomy and responsibility at the individual level (Noe & Ellingson, 2017). Continuous learning in modern expert work demands employees to be active, willing, able, and interested in learning – in other words, to have strong intrinsic motivation (Ryan & Deci, 2000). Thus, self-determination and fulfillment of the three basic psychological needs–autonomy, competence, and relatedness–are integral parts

and preconditions for learning at work (Willems & Lewalter, 2012). However, work tasks are rarely completed alone, especially in the contexts explored in this study, cooperation, sharing expertise and competencies, and learning together with colleagues in the work community are essential practices to ensure the completion of daily work tasks (Stabel et al., 2022). When teamwork, pair work, and multi-professional teams are utilized in daily work, the essential question is how the team will orient towards the common direction to achieve common goals and complete the daily work tasks. Therefore, this study investigates how collective self-determination is constructed in group-learning situations. We asked what kinds of speech sections in group learning situations support autonomy, competence, and relatedness in the group. The data is based on qualitative group learning situations (180 min.) collected from four development-oriented meetings consisting of employees from the ICT organization and the hospital organization. The data were analyzed using qualitative methods focusing on the nature, content, and purpose of the participants' speech sections. The preliminary results suggest that collective self-determination is constructed by participants' different speech sections, supporting basic psychological needs in the group, thus collective self-determination. The speech sections of autonomy, competence, and relatedness consisted of one or more phrases given to one or more participants. First, autonomy is supported in the group by bringing out one's own competence, providing relevant arguments, avoiding pressure, and providing choices and space. Second, competence is fostered by providing constructive feedback, structuring discussions, and creating concrete plans. Finally, relatedness is supported in the group by emphasizing shared identity and common fate, valuing others' views and differing perspectives, and building transparent and open communication. The results offer an understanding of collective self-determination and its construction in group-learning situations, which is essential in today's working life, where remote work and digitalization challenge cooperation, sharing knowledge and competencies, and working towards a common direction as a team.

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Constraints and Affordances for Transformative Learning in the Tourism Industry

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In this presentation we bridge the pedagogical applications into the scientific discussion and the systematic development of continuous, transformative learning that offers to exceed traditional boundaries of educational sectors and institutions. From the perspective of evolving regulations and practices regarding emergent themes such as sustainability, micro-credentials may open up multitudinous alternatives to develop educational provision (Halttunen et al., 2024). This qualitative study contributes to the understanding of upskilling and reskilling existing workforce in tourism. We extend the research on sustainability education from classroom contexts to less examined settings of workplace learning in Nordic coastal tourism. Semi-structured interviews were conducted from March 2023 to May 2024. The participants represented different actors in the tourism industry: tourism companies and destination management organisations (DMOs) encompassing different tourism services from two regional contexts. By adopting the theory of transformative learning (Laininen, 2019), we examined how tourism companies and DMOs understand updating tourism worker's competences in sustainable development, and what attributes they attach to transformative learning at the workplace. We used affordances and constraints to evaluate the use of new forms to document transformative competences in sustainable tourism education. We can conclude that micro-credentials and open badges permit development of advanced skills and expertise. Our findings accentuate the need to blend the different modalities of learning to accommodate learning in remote destinations. Regarding the preferred modality of learning, DMOs and companies claimed common proficiency goals as crucial frame of reference in facilitating transformative learning. Companies emphasised the importance of learning and instruction on-site for workplace learning. The role of open badges and MOOCs were recognised as flexible forms of validating existing and developing new competences. We agree with previous studies on the importance of examining the conceptualisations of sustainability underpinning course design, to accommodate transformative and holistic learning, allowing workers to rethink the existing frames of reference for their learning. However, our study broadens the views presented by contributing to the understanding of what constraints and affordances regulate development of sustainability education. Following Gherardi's (2009) view of organisational learning

and knowing, as a social activity in relation to particular workplace settings, we identified three qualitatively different perspectives to employee onboarding. Personal, organisational and structural constraints also regulate the use of micro-credentials and open badges in workplace learning. For instance, if learning is focused on organisational level by emphasising collaboration and supervisory work, this may prevent individuals' self-driven learning. Our findings highlight the sociocultural complexity of and barriers to organisational socialisation and onboarding.

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Continuous professional development inside and outside of the university. Suggestions from a Delphi expert panel

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In the current discussion on the reformation of higher education for continuous lifelong learning, there are several reports on the importance of opening up higher education. As highlighted by lifelong and work-integrated learning this is one of the main challenges in the rapidly growing knowledge society, where the Corona pandemic has acted as a catalyst for technology enhancement. One often-mentioned idea is that of work-integrated learning and to practice what is preached inside the university. Other emphasised ideas are flexibility, continuity, and the possibility to study anywhere and anytime (Rientes et al., 2023). However, there is no consensus on how professional development in higher education should be redesigned to best support continuous professional development. This study is part of the third phase in a modified four-phase Delphi study (Mozelius et al., 2023), building on suggestions by a global panel of experienced researchers in the field of lifelong learning. After a survey in the first phase, and a reading assignment in the second phase, data has been collected by structured interviews. Interview questions were partly created around the themes in the survey answers and the themes in the reading assignment literature. The aim of the study is to analyse and discuss the

Delphi expert panels' views on the need for reformation for quality lifelong learning in higher education. The research question that guided the study was: "What are the experts' suggestions for a redesign of higher education to create conditions for continuous lifelong learning?" Interview answers have been analysed according to the Grounded theory methods of Open coding and Axial Coding. In the initial Open coding phase, the focus was more on a general reformation of higher education for lifelong learning. Preliminary categories in the Open coding phase were later aggregated into 1) 'Digital literacy' 2) 'Multi-modal learning delivery' 3) 'Infrastructure' with the subcategories, 4) 'Quality considerations', 5) 'Pedagogical change', 6) 'Continuous lifelong learning', 7) 'Accessibility', 8) 'Equity, diversity, inclusion (EDI)' and finally, 9) Miscellaneous with the subcategories of 'Economy', 'Financial aspects' and 'The Corona pandemic'. In the Axial coding phase, the same data were reanalysed with 6) 'Continuous lifelong learning' ' as the central or axial category. Other important supporting categories in this study were found to be: 'Infrastructure', 'Pedagogical change and multimodality', 'Accessibility', and 'Financial aspects'. All of these categories, based on the experts' views, warrant deeper study for insight into possible formation of higher education. More research is needed to understand these crucial aspects of continuous professional development inside and outside of the university.

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To comply or not to comply – The roles of professionals' action regulation and personality traits in following cybersecurity policies at work

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As a result of the digital transformation, cybercrime is increasing year on year (ENISA, 2021). Attacks are becoming more sophisticated and target employees, who are considered the weakest link in the cybersecurity chain (Abawajy, 2014). In addition to employee's deficient knowledge about effective strategies against cybersecurity threats, a lack of willingness and motivation to apply appropriate measures pose greater weaknesses than inadequate hardware and software components (Herath & Rao, 2009). Accordingly, in-firm professional training aims to develop risk awareness

and abilities to take preventive action that follow standardized rules of the enterprise. However, Furnell & Rajendran (2012) postulate that professionals' cybersecurity behavior varies along a continuum ranging from commitment to an accepted security culture on the one hand to indifference and disobedience on the other. This assumption parallels the one of autonomous and controlled forms of action regulation that underlies the renowned Self Determination Theory of Motivation. Additionally, cybersecurity behavior at the workplace can be shaped by the professionals' personality traits. Pattinson et al. (2015) found that individuals with low scores in extraversion and high scores in agreeableness, conscientiousness, and openness were less likely to engage in risky cybersecurity behavior. With ample evidence on differing motivational qualities of workplace behaviors in general (Howard et. al, 2017) and first findings on the personality dependence of cybersecurity behavior, it seems vital to include both plausible predictors in contemporary research on professionals' behaviors against security threats.

Based on the Self-Determination-Theory by Deci & Ryan (1993) and the Five-Factor Model (John et al., 1991), the presented study uses a person-centered approach to examine how autonomous and controlled forms of action regulation together with personality traits predict compliance with cybersecurity policies among professionals. More specifically, it poses the question of main and interactional effects of these individual prerequisites on reported policy compliance.

To address this research question, we conducted a survey via Prolific among SME employees (n=181) with the common professional profile of office clerk, which is characterized by handling a multitude of sensitive data. Using an adaptation of the Multidimensional Work Motivation Scale (Gagné et al., 2015), we analyze the different forms of action regulation. Personality traits are measured using the short version of the five-factor model (Rammstedt et al., 2012). For measuring cybersecurity compliance, we use the Intention Towards Security Policy Compliance questionnaire (Ifinedo, 2012).

Preliminary descriptive results indicate that amotivated cybersecurity behavior correlates significantly moderately negative with self-reported policy compliance ($r=-,413$; $p<0,01$) whereas the identified form of regulating correlates moderately positive ($r=,370$; $p<0,01$). Moreover, conscientiousness ($r=,273$; $p<0,01$) and openness ($r=,301$; $p<0,01$) show a significant, moderately positive correlation with self-reported compliance. In addition, regression analyses will be conducted, the comprehensive results of which are available by the time of the conference.

The findings will shed light on professionals' motivational orientations and personality-dependent behavioral tendencies in adhering to or ignoring firm's cybersecurity policies. Considering the persistent trend of digitalization for most

workplaces, we use the findings to design job-specific training measures and targeted communication strategies to promote a culture of responsible action against cyberrisks.

Continuous professional learning throughout the career: Evidence from the technology industry

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The technology industry is characterized by a high rate of change. Continuous professional development is essential for professionals in this industry to remain relevant and thrive (Lemmetty, 2023). Previous studies on technology industry workers indicated that they learn a lot in the workplace in informal and self-directed manners (Ha, 2015; Lemmetty & Collin, 2020) and challenges stemming from their work are significant antecedents to these learning processes (Hirschmann & Mulder, 2018; Nerland, 2008). However, less attention was paid to employees' frequent transitions between jobs that characterize career paths of workers in this industry, a prominent theme in our study.

We researched tech workers' learning processes throughout their careers – past, present, and future. To this end, we interviewed 16 workers in various technological professions (e.g., programmers, product managers, and algorithm developers) from different companies in the Israeli technology industry. Interviewees' ages ranged between 30 and 35, indicating they gained industry experience while also having substantial career years ahead of them. Snowball sampling was used to obtain the sample. The interviews were analyzed thematically.

Similarly to previous studies, interviewees reported that their learning is mostly informal and self-directed (e.g., Ha, 2015; Lemmetty & Collin, 2020). Antecedents to this learning originate from challenges in daily work (Hirschmann & Mulder, 2018). Our findings add to this picture. Interviewees strategically seek to create a gap between their current abilities and job requirements, where the learning required to close this gap is likely to enhance their capacities and thereby their relevance and employability, not necessarily in the same role, company, or even field of expertise. Poell & Van Der Krogt, (2016) contend that workers today face a complex challenge: they must learn simultaneously to establish themselves in their current jobs while also learning to secure the future of their careers. Our study reveals a strategy used by technology workers to ease this tension by treating the current job as a training track for the next one.

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Co-regulation of Adaptive Expertise Development: Student Perspectives during Workplace Learning

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Professionals are expected to adapt to changes, work innovatively and creatively, and contribute to societal issues which requires Adaptive Expertise (AE) (Pelgrim et al., 2022). Previous studies suggest that higher education students can develop AE by working in an authentic environment on challenging and complex tasks, but evidence on how this can be guided is scarce (Groenier et al., 2023). This unique research considers the guidance of AE and the associated needs from the student perspective. AE particularly occurs in situations that require self-regulation (SRL), involving mechanisms such as goal-directedness, proactivity, and interaction with the environment (Bohle-Carbonell et al., 2014). SRL consists of the preparatory, performance, and evaluative phases and supervisors can act as co-regulators, participating in students' regulatory activities and contributing to the regulation of their learning processes (Bransen et al., 2020). When and how do higher education students experience co-regulation for the development of adaptive expertise during workplace learning?

12 transcriptions of focus group interviews conducted with students from five higher professional education institutions and five universities were analyzed that provided cases where students worked on authentic and complex tasks during workplace learning, assumed to stimulate AE. Through iterative processes,

researchers selected meaningful fragments from the interviews—those mentioning AE development and a guide according to the students. These fragments were coded for the type of adaptive expertise, the phase of SRL, how co-regulation occurs in AE, and student preferences for AE support. Constant comparison determined if certain units were interconnected.

Analyses reveal that students perceive that AE is addressed at various moments during workplace learning. During the presentation we will further elaborate on this with examples. It is noteworthy that students indicate that co-regulation in AE development mostly occurs during the performance phase and much less during their preparation. Three themes were identified, providing insight into what students need regardless of the SRL phase: (1) nature of guidance, (2) accessibility of the guide, and (3) creating space for appraisal. These themes are further elaborated during the presentation. Significance This research provides insight into supporting AE development from the student perspective. It supplements knowledge on SRL during workplace learning and has implications for education, with adaptive expertise at its core.

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Co-teaching in innovative learning environments, a case study in a primary school

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This paper presents an ongoing study that focuses on the implementation and cultivation of co-teaching in innovative learning environments (ILEs), and how the amalgamation of these is actualized in the classroom. The study takes place in a Finnish primary school that implements co-teaching comprehensively throughout the school. Collaborative teaching is commonly used in non-traditional learning spaces as the physical layouts of innovative learning environments, especially of an open learning spaces, does not usually fit the conventional single-teacher teaching

(Gislason, 2018). As such, the change of the physical learning space does not only affect teaching methods, but also the social interactions and decisions done in the classroom, e.g. teachers have to relinquish some of their autonomy to apply collaborative measures in their teaching (Niemi, 2021). This exploratory case study (Yin, 2018) aims to unfold how co-teaching emerges in everyday teaching within these new spaces through the lens of a Finnish primary school utilizing co-teaching in innovative learning environments that aim to diversify learning situations. The collected data, consisting of 1) observation data (teaching lessons), 2) group-pupil interviews and 3) teachers' documents for planning and reflection of co-teaching, is undergoing a data-driven thematic analysis that consists of qualitative coding procedures (Saldaña, 2016). Based on the collected empirical data and the preliminary analysis, the findings intend to answer these research questions: "(1) How does co-teaching emerge within the innovative learning environments?", and "(2) What part do the learning environment play in these collaborative interactions?".

As schools' learning environments are changing in many countries, it is relevant to research its implementation in actuality. Even in Finland, in 2021 there were 32 schools that had been built to follow the concepts of flexible learning environments (Niemi, 2021, p. 286). It is imperative to go to these new learning environments and study how they are actually used, and how co-teaching occurs in them, as well as how it is planned and advanced.

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Curriculum Autonomy as a Catalyst for Continuous Professional Development (CPD) among Teachers in Indian Schools: A Systematic Literature Review and Research Gaps

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The topic of interest in educational research is the increasing effectiveness of curriculum autonomy as a means of continuous professional development (CPD) for teachers in Indian schools. The article explores the concept of curriculum and teacher autonomy and its potential to enhance teaching and learning for key

pedagogical implementations like Phenomenon-based learning. The research involves the introduction of a Curriculum Development Chart (CDC) template to educators, which facilitates the design and planning of curriculum flow with a specific emphasis on integrating digital tools and collaborative methods in classrooms. Through this systematic literature review, the article analyses the studies and other research findings to check the impact of curriculum autonomy on teachers' practice, student learning outcomes, assessment and selection of teaching methods. The article identifies the research gaps and suggests future directions and suggestions for using CDC templates in the primary and secondary grades. The article aims to discuss the educational practices and its impact on Teaching and Learning process in the Indian context.

The research employs a mixed-methods approach, combining quantitative and qualitative data collection methods. A quantitative survey is conducted to assess teacher perceptions and experiences regarding curriculum autonomy and the use of the CDC template. The qualitative component involves conducting semi-structured interviews with teachers to understand their challenges while designing the curriculum and lesson plans.

The results of the quantitative survey demonstrate that educators who have embraced curriculum autonomy and the CDC template manifest heightened drive, contentment, and stewardship towards their profession. Moreover, they display an augmented propensity to explore novel pedagogical techniques while integrating digital resources and collaborative approaches in their instructional settings. The qualitative interviews further validate these conclusions, as teachers demonstrate excitement regarding the independence they have been granted and the constructive influence it has exerted on their instructional methodologies and student engagement.

The discoveries of this examination correspond with hypothetical structures that underscore the criticalness of educator self-governance and expert improvement in upgrading understudy learning results. Educational program self-governance agrees with constructivist learning hypotheses, which support student-centred methodologies that enable understudies to build their own insight effectively. The utilization of the CDC format corresponds with self-guided learning hypotheses, which recommend that giving instructors organized systems can bolster their capacity to structure and execute powerful learning encounters.

The discoveries of this research have critical ramifications for instructive practices in Indian schools. By enabling educators with educational program self-governance, schools can cultivate all the more captivating, customized, and versatile learning situations for their understudies. The presentation of the CDC format gives

a viable device to instructors to control their educational program improvement and incorporate digital solutions and synergistic techniques into their instructing rehearses. The exploration proposes that educational program self-sufficiency can be an amazing asset for CPD among educators, prompting improved pedagogical practices, more noteworthy instructor commitment, and improved understudy learning results. The CDC format fills in as an important asset for supporting educational program self-governance and advancing advancement in the Indian instructive scene.

Debriefing as epistemic engineering: conversational remembering and socially distributed metacognition in healthcare simulation

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Healthcare simulation affords students, educators, and professionals with opportunities to create models of clinically relevant events in safe conditions, and to use these to interrogate their own performance and understanding of relevant clinical phenomena. As activities designed for learning, healthcare simulations are often divided into three phases: an introduction to the event known as briefing, the simulated scenario, and a post-simulation discussion known as debriefing. Advocates of simulations have long argued that it is really the nurturing of participants' abilities to scrutinize and reflect on their own thinking and activity-patterns in the debriefing-phase that is the essence of simulation-based training [1]. In the words of educational theorist Donald Schön, such vehicles for reflexivity are practicums, or "practice worlds" [2]. From an interactional, embodied, and enactive perspective on learning, practicums enable "epistemic engineering" [3], situations where professionals and trainees can attempt to augment and improve their own informational environments through concerted cultural activities for social learning.

This study aims to advance the theoretical foundations of debriefing in simulation-based pedagogy through an analysis of debriefing as an instance of distributed, epistemic engineering. The study is based on video-recordings of simulation exercises for second year nursing students at a Norwegian university, using a debriefing after a training exercise for diabetes management as our analytical case. Drawing on a framework from cognitive anthropology known as socially distributed cognition (DCog) [4] we examine the structural characteristics of

debriefing and identify generative processes that transform simulation experiences into learning events.

As a result, we propose that debriefing conversations function as a coordination device for two generative cognitive processes: joint conversational remembering and distributed meta-cognition. According to this model, debriefing conversations help synchronize different representations of events, allowing participants to collectively reflect on past actions. The structure of these conversations, guided by facilitators, plays a crucial role in regulating these representations and aligning everyone's efforts toward learning. Looking at debriefing conversations through the lens of DCog emphasizes both their cognitive impacts and potential downsides due to their highly social nature. It's important to note that these conversations don't solely serve intellectual purposes; they also fulfil relational needs by fostering connections among community members. However, fostering shared memory recall and collaborative thinking might inadvertently lead to weaknesses in group knowledge and memory systems, such as collaborative inhibitions, retrieval-induced forgetting, and other forms of audience tunings. Facilitators must handle these challenges in debriefings to secure desired epistemic outcomes.

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Development of competence in hybrid work interaction situations

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Hybrid and remote working have increased drastically after the removal of COVID-19 restrictions. Research has indicated remote working having both benefits and challenges (see e.g., Barrero et al., 2023). There is less research on interaction in context of remote and hybrid working, and even less in terms of learning and competence development. Thus, this study aimed to examine factors associated with competence development in interaction work situations (e.g., client meeting) of expert workers in the context of hybrid working. This research is part of “Hybrid

work of experts (HYBRIDI)" project, which was funded by the Finnish Work Environment Fund. The data were collected in 2022. White collar workers from three companies (n=76) answered an online survey (background information) before a two-week research period during which they wore smart rings that measured objective physiological arousal (electrodermal activity, EDA; Boucsein, 2012) and answered short questionnaires before and after interaction situations (n=839). The questionnaires examined development of competence, autonomy and relatedness satisfaction (Ryan & Deci, 2017), achievement emotions (Pekrun, 2006), and goal fulfilment during interaction work situations. The two-level data (level 1: daily EDA and LT-responses, level 2: participants) were analysed using Bayesian linear mixed-effect multilevel modelling. Mixed-effect regression analysis with varying intercepts and slopes were used. Dependent variable was self-reported development of competence during interaction situations, which was reported after the situation. The independent variables were situation mode (face-to-face/hybrid/online), goal fulfilment, achievement emotions related to the situation and to the fulfilment of the situation's goals, EDA, and autonomy and relatedness satisfaction. The results showed that within-person situation mode was negatively associated with competence development (β = −0.30, 95% credible interval (CI) = −0.60 – −0.02), whereas goal fulfilment (β = 0.47, 95% CI = 0.21 – 0.74), valence of goal fulfilment related emotions (β = 0.63, 95% CI = 0.09 – 1.18), emotional arousal of situation related emotions (β = 0.71, 95% CI = 0.32 – 1.11), autonomy satisfaction (β = 0.22, 95% CI = 0.03 – 0.43), and relatedness satisfaction (β = 0.45, 95% CI = 0.21 – 0.71) were positively associated with competence development. Between-person autonomy satisfaction was positively associated with competence development (β = 1.06, 95% CI = 0.08 – 2.05). Based on these results competence development in interaction situations is related to fulfilment of situation's goals, activating emotions, and satisfaction of basic psychological needs of autonomy and relatedness. In addition, face-to-face interaction seems to be fostering experience of competence development. The results enlighten the link between competence development and goal fulfilment and demonstrates the importance of face-to-face interaction in times of increased remote work.

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Diamonds are born under pressure? Vocational teachers between education and the world of work

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Cooperation between vocational institutions and workplaces is crucial to ensure high-quality, relevant and attractive vocational education and training (VET) (Bouw et al., 2019; Rintala & Nokelainen, 2020). VET institutions have made efforts to increase the share of work-based learning and to promote connectivity between school and workplaces (Tynjälä, 2009), but the role and activities of vocational teachers are not covered in existing models promoting connectivity (see Guile & Griffiths, 2001; Guile, 2018). In practice, however, vocational teachers are often the ones that are expected to build closer relationships between education and work (Lehtonen et al., 2018; Mårtensson et al., 2019). By focusing on cooperation between vocational institutions and workplaces in Finland, the study answers the following research questions: RQ1) What expectations are placed on VET teachers collaborating with workplaces by policy documents, guidelines and system-level evaluations?, RQ2) What expectations do employers set for the VET teachers and how they do position teachers in relation to working life? The study uses documents and interview data. The interview data (N=24) was collected in 2021 and 2023 from employer representatives covering different vocational sectors. The data is analyzed using thematic analysis (Braun & Clarke, 2006) and actantial analysis (Greimas, 1983).

The findings reveal the diversity of cooperation between school and work; at its best, collaboration is reciprocal, based on the active commitment, up-to-date knowledge and mutual trust of both teachers and employers. However, many expectations are also placed on vocational teachers. The analysis of interviews and documents shows that vocational institutions and teachers are expected to take a more active, competent, and expansive role towards businesses. Collaboration with workplaces should also be more systematic, closer, and goal-oriented in a variety of ways.

Students' learning should be based on close collaboration between teachers and workplaces: discussing the goals and contents of the qualification supports workplace guidance, close monitoring by the teacher supports learning, and finally, it is important to critically assess competence together with employers. Furthermore, teachers are expected to convey actively information and constructive feedback on students' experiences and the implementation of workplace training to the

workplaces. In addition to supporting and guiding workplace training, teachers are expected to participate in activities such as anticipating skill needs and engaging in development activities with workplaces.

Proactive and closer contact with companies is encouraged, with the goal of establishing regular dialogue and offering suitable training solutions, for example. Increasing the attractiveness of VET is also considered by employers as an important task for teachers. Vocational institutions should provide opportunities for workplaces to be visible in the institutions and vice versa, with the shared goal of enhancing job opportunities and increasing the attractiveness of professional fields. Teachers are also expected to be more active in marketing companies to students as potential places for studying and practicing. Overall, this study provides practical suggestions for promoting such collaboration between education and work that serves both the development of working life and education, and the comprehensive professional development of students.

Digital Communication and Collaboration in Office Workplaces: Challenges and opportunities for informal learning

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Digitalisation, remote work, and distributed teamwork have transformed communication and collaboration in office work. These trends require new work practices and sustained learning especially in the context of work (Harteis et al., 2022). Such learning can occur unintentionally and even unrecognised or it can be planned beforehands (Watkins & Marsick, 2023). Furthermore, learning outcomes can range from acquiring knowledge that is already known to others to establishing new work practices (Hodkinson & Hodkinson, 2004). However, the shift towards digital communication is often regarded as a barrier to informal workplace learning (Amenduni et al., 2022). Concurrently, digital tools are also considered to facilitate communication and informal workplace learning (Lee & Tan, 2022; Littlejohn & Pammer-Schindler, 2022). In an ongoing interview study with employees from back-office departments of various companies, we explore the challenges and opportunities of increasingly digitised communication and collaboration for opportunities to learn in office workplaces. At the time of submission, 32 interviews had been conducted and fully transcribed. Most participants worked in large companies with more than 250 employees in various industries. The interviews

lasted 60 minutes on average. Participants were asked about typical communication situations, communication channels and tools, as well as connected (dis)advantages related to their work. Preliminary thematic analysis shows that typical communication situations were – in decreasing order – questions and co-ordinations on working practices, knowledge transfer, errors, innovations, support, problems, feedback, etc. The majority of communication was digital, with a relatively balanced perception of the advantages and disadvantages of digital and face-to-face communication. Regarding the opportunities to learn, collaboration platforms with various chat channels were perceived as helpful for asking short questions and getting quick responses. However, informal conversations during remote work were missed as a learning opportunity. Analysis of this extensive data corpus is not yet finished but will be completed till the conference. All findings will be critically discussed with a focus on learning and professional development.

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Digital technology as environment for informal workplace learning

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Workplaces are essential learning environments for adults (Billett, 2004), where a large part of learning takes place, often informally while working (Eraut, 2011). Digitalisation changes workplaces (Harteis et al., 2020), and workplace often includes not only the physical settings but also digital environments. Therefore, it is important to better understand how digital environments at work can support informal learning. Research has revealed double-edged effects of digitalisation on

workplace learning (Yu et al, 2023). Digital technology offers new possibilities for learning, but simultaneously it brings constraints, such as information overload. To shed more light on these effects, we explore how digital technologies at work serve as environments for informal workplace learning in knowledge work. We take a novel approach to see the workplace as a combination of social, physical and digital environments and focus to study the role of digital technology in this versatile environment. We use digital ethnography (Pink et al., 2016) to investigate digital environments of one public sector workplace. The data includes observations, interviews (N=15), and participant diaries (N=7), and was analysed with ethnographic qualitative content analysis (Hammersley and Atkinson, 2019). We analysed expansive and restrictive features of the digital work environment (Fuller and Unwin, 2004). The ethnographic accounts portray digital work environment consisting of a complex network of technologies and people connected to them. The findings reveal both expansive and restrictive features of the digital environment for informal learning. While digital technology extended learning opportunities by providing flexible possibilities for learning on the go, the complexity and constant change in digital environments presented challenges that could potentially restrict learning. The detailed accounts of this study contribute to the understanding of workplace as a learning environment.

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Digital workplace learning in crowdwork

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Digital transformation changes how we live, learn and work, which requires a continuous development of skills through lifelong learning (Castells, 2017; Laal, 2011). To address these challenges, workers depend on workplace learning, which has gained both practical and scientific significance but empirical evidence on digital learning contexts is still scarce (Harteis et al., 2017; Ifenthaler, 2017). Therefore, this study seeks to examine working and learning practices in crowdwork from a praxeological perspective to contribute to digital workplace learning research. Crowdwork describes "paid crowdsourced work [via platforms] where the delivery of service occurs entirely online" (Margaryan & Hofmeister, 2021, p. 44). It encompasses various trends in digital work like flexibilization, individualisation, and the dissolution of boundaries (Ashford et al., 2018). Initial research suggests that crowdwork can be "learning intensive" (Margaryan, 2017, p. 1). Besides technical and platform specific skills, crowdworkers develop organisational, analytical and learning skills (Cedefop, 2021). This study aims to contribute to this research examining the following questions:

- How is knowing and learning embedded in digital work practices in crowdwork?
- What are the educational implications?

The study employs Netnography, an inductive and iterative approach for digital ethnography (Kozinets, 2020). Ethnography is particularly useful for workplace learning studies to provide "valuable insights" (Eraut, 2004, p. 248) combining qualitative and quantitative methods (Breidenstein et al., 2020). The research design consists of case studies on a testing platform and a freelancing platform. In 2023, a total of 24 crowdworkers participated in an interview and diary study. They sent voice messages describing work and learning practices for up to six weeks and participated in online interviews. The data was analysed using coding and interpretation (Kozinets, 2020) with qualitative content analysis (Kuckartz, 2016) and documentary method (Bohnsack et al., 2013). The findings suggest that crowdworkers can interpret social indices, integrate tasks into complex life arrangements, practice self-guidance, and cope with complexity and contradictions while navigating the digital, market-driven sphere. Learning practices that refer to the self and to digital artefacts are more common than interactive practices deviating from most workplaces in which interaction plays a more important role in learning (Eraut, 2004). The knowing incorporated in crowdwork practices is often implicit and learned through practice

sometimes leading to wrong conclusions. Some crowdworkers pursue personal learning goals in line with the findings by Margaryan (2017).

The study indicates that digital work contexts, such as crowdwork, are more contextualised and connected to other areas of life than offline work arrangements. Furthermore, especially crowdworkers are less qualified beforehand. Therefore, digital workplace learning could benefit from a more holistic and inclusive perspective, also targeting semi-professional groups. The study demonstrates that practice-based approaches can broaden scientific perspectives, leading to valuable insights on how digital work practices could be part of an education for a "new world of work" (Ashford et al., 2018, p. 6). It provides a foundation for educational measures such as improving social interaction to correct false assumptions or recognising practically acquired skills to reduce skilled labour shortage.

Dilemmas in second-hand ethnography: Lessons learned from two organizational research projects

Soila Lemmetty, University of Eastern Finland; Sari Vanhanen, Migration Institute of Finland

Although organizational ethnography is not a new concept, as seen in Selznick's work (1949), in recent decades it has gained recognition as a research method and even a paradigm (see John van Maanen, 2011; Rouleau et al., 2014). The increased use of ethnographic research in organizational studies is linked to changes in work life. Organizational practices have become more complex due to intensified competition, changes in the temporal and spatial forms of work, and the proliferation of various technological tools and platforms (van Maanen, 2011; Yanow, 2009). Along with an intensified global labor migration, work communities turn to be more diverse (Prasad 2006). This brings synergy and innovations but also unfortunate forms of structural or everyday discrimination in work which may remain silent or invisible. Simultaneously, the rise of social media and virtual channels has compelled researchers to explore and analyze these new digital landscapes (Murthy, 2013). This shift requires the study of online environments and the use of digital tools but also a comprehensive re-evaluation of ethnographic research practices and processes. In the organizational context, ethnography has typically relied on physical presence and the researcher's firsthand interpretation. The starting point has been that the researcher physically enters the organization to observe and examine activities, practices, and interactions to gain (objective) understanding of culture and operations. New forms of ethnography, such as mobile

ethnography, digital ethnography, and participatory ethnography, challenge these fundamental assumptions. This involves redefining some of ethnography's basic premises, concepts, and practices, understanding the researcher's role in these new contexts, and addressing ethical concerns associated with new forms of ethnography (Rouleau, de Rond, and Musca, 2014). In this study, we introduce the concept of "Second-hand Ethnography" (SHE), which specifically draws attention to novel forms of ethnography emphasizing the co-production of knowledge, collaborative research, or new roles and tasks for researchers in the context of mobile ethnography. The production of ethnographic data in the presented two research projects has been carried out in collaboration with organizational actors, either by using various technology-assisted mobile ethnographic tools or by involving key personnel from the organization (co-researchers) in observation, reflection and reporting their everyday work. In this collectively constructed ethnography, the significance of different actors forming interpretation levels and frames is emphasized, changing the fundamental nature of ethnography, and serving as the foundation for describing the used research strategy as SHE. Through two research projects, focused on learning and development of different organizations, we highlight several dilemmas related to SHE that researchers should be aware of. We establish four dilemmas associated with SHE that are essential to understand in future research: co-production dilemmas (considerations of roles, responsibilities, trust, and boundaries of actors), instrumental dilemmas (process management, planning, and tools), ethical dilemmas (reliability of information, anonymity, and responsible practices), and epistemological dilemmas (the multi-layered nature of knowledge formation and interpretations). This presentation is a description of the lessons we have learned through two SHE projects and an opening of the discussion on what SHE means as a concept and a methodological approach.

Documentary method to investigate commitment to become a teacher and teacher education

Jan Boehm, University of Education Upper Austria; Eeva Kaisa Hyry-Beihammer, University of Education Upper Austria; Heidi Krzywacki, University of Helsinki; Katriina Maaranen, University of Helsinki; Katariina Stenberg, University of Helsinki

Teacher education has recently been under pressure to address conflicting demands of the field. There is a shortage of qualified teachers, even student applicants in many countries (see Huber/Lusnig, 2022) and a tendency of teachers to leave school work (Ingersoll, Merill & May, 2014). In addition, teachers face fluctuating demands

in their work and thus, prospective students should be as educatable and suitable as possible for the teaching profession (Sinclair, 2008). It seems especially crucial to recruit teacher applicants who commit to their future occupation and who have well-rooted motives for becoming a teacher. Mostly research conducted on motives rely on questionnaires embedded on the possibility to provide clear and rational choices for manifesting one's own motives. There are also one-time interviews which allow participants to discuss the motives they are aware in the very moment. Irrespective of the problem of the social desirability of the answers, such studies assume that people can verbalize and conceptualise their specific motives for certain decisions. Assumption is to see motives as something conscious and identifiable. Aim of the study We assume that in addition to these expressed motives some of which sound very stereotypical, there are deeper and usually unconscious driving forces towards choosing education. We engage with reconstructive social research to explore these underlying attitudes and aim at making unconscious motives visible and bring them under reflection. The first research question is 'In what ways does documentary analysis help to understand social constructions behind commitment to becoming a teacher?' The second research question is about manifesting motives of teaching occupation in Austria and Finland: 'How do student teachers affirm their commitment to teacher education and becoming a teacher in Austria and Finland?' Methodology The Becoming a Teacher (BAT) is a qualitative long-term study (2017-2023) that follows student teachers' processes of becoming a teacher throughout their teacher education in Austria and Finland.

In this paper, we analyse three cases from both regions by using reconstructive social research starting with documentary method approach (Nohl 2010; Bohnsack 2010). This approach allows us to explore beyond the verbalised motives discussed by the participants. Findings and discussion We identify the following typologies that allow us to understand commitment to becoming a teacher: 1) direct pathway, 2) second choice, 3) lucky incident, 4) safe choice, 5) late enlightment and 6) fluctuation. Our findings reveal that in addition to the motives often found in quantitative studies, there are deeper attitudes towards teacher training. these motives are also found in our research, but without specific motives for our categories.

Does specificity matter? Fostering collaborative diagnostic problem solving using worked examples with self-explanation prompts of varying specificity

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Collaborative diagnostic problem solving (CDPS) is critical in fields such as medicine and automotive technology. CDPS requires collaborative efforts, such as identifying malfunctions (Radkowitsch et al., 2022), and places collaborative and diagnostic demands on diagnosticians, that are cognitively very demanding (e.g., Kirschner et al., 2018). Especially novices often engage in irrelevant (learning) activities because they lack appropriate problem-solving strategies (Renkl, 2014). Teaching appropriate problem-solving strategies therefore has the potential to optimize cognitive load. Learning to solve problems can be effectively improved through worked examples (Paas & van Gog, 2006). Worked examples have also been shown to effectively support the learning of (collaborative) problem solving (Rummel & Spada, 2005). Worked examples are particularly effective when learners actively actively process them. Self-explanation prompts (SEPs) are suitable for stimulating deep elaboration of worked examples (e.g. Schworm & Renkl, 2007). There is conflicting evidence as to which design of SEP is most effective; the specificity has been varied in different studies, leading to different results (e.g., Glogger et al., 2009). The present study investigates the effects of worked examples with SEPs of varying specificity on the learning process and outcomes of CDPS. The study, which used a pre-post design, involved 77 dyads of automotive technician trainees in a computer-mediated learning environment. The environment realistically replicates CDPS of automotive malfunctions and allows for text-chat interaction during the process. All groups were instructed a CDPS strategy, which they trained in three conditions: with worked examples and (1) high-specific SEPs or (2) low-specific SEPs and in the control group on unscripted CDPS cases without worked examples and SEPs. To assess the effectiveness of the training, all groups performed an identical CDPS task before the strategy instruction and after the group-specific training. Evaluation focused on CDPS process (relevance of exchanged contents), diagnostic outcome (accuracy), and cognitive load. With worked examples, significantly more relevant content was exchanged in dyads in the posttest ($F(2,74) = 3.82$, $p = .026$). No significant effect was observed based on the specificity of SEPs ($p = .732$). Diagnostic

accuracy did not change significantly overall (p = .190), but an unexpected positive trend in the control group was noted. Surprisingly, the control group reported a significantly higher intrinsic cognitive load ($F(2, 151) = 4{,}66$, $p = .011$, $\eta^2 = .06$). There were no significant differences with regard to extraneous (p = .106) and germane (p = .415) cognitive load.

The worked examples with SEPs had a positive impact on the CDPS process by increasing the focus on relevant content. No difference was found with regard to specificity of SEPs, suggesting that the high demands of CDPS do not generally require a higher level of specificity. However, the use of worked examples with SEPs was not associated with improved diagnostic accuracy. The unexpected tendency of the control group indicates a need for additional practice opportunities. We expect that a greater focus on relevant content will lead to an improvement in diagnostic accuracy and a reduction in cognitive load in the long term.

Elaborating learning 'on the go' across working life: Educative experiences and personal curriculum

Stephen Billett, Griffith University

In an era of constant change in what constitutes occupational competence and workplace performance requirements, understanding how these can be learnt and worklife transitions negotiated across working life has perhaps never been more important for working age adults, their workplaces and communities (OECD 2006). For these adults, the kinds and frequencies of changes in occupational and workplace requirements necessitates on going learning, much of it necessarily 'on the go', to sustain their employability and sense of self as workers. Moreover, the evidence suggests that much if not most of the 'on the go 'learning arises through work activities and interactions, and through engagement with familiars (Author et al 2021, Author et al, 2023). Indeed, it is often only major occupational transitions that are mediated by tertiary education provisions and certification. All this is becoming more important as public and private sector workplaces now require workers who can adapt what they know, can do and value, for workplace viability and communities' economic and social wellbeing. Governments also want skilled, adaptable workforces able to sustain their employability. So, for both individual and societal purposes elaborating the goals for and processes of that learning, what constitutes educative worklife experiences, and ways of viewing it in terms of curriculum are now particularly salient.

Drawing on a three-phase national investigation of Australian adults' worklife learning, the kinds and qualities of the educative experiences (Dewey 1938) directly or indirectly guiding, supporting and extending individuals' learning and development were identified and elaborated. This includes pathways of experiences across working life: personal curriculums. Accordingly, this paper reports and discusses the data from: i) worklife narratives and follow-up interviews of 66 working age Australians, ii) 15-month monitoring of work and learning of a cohort of workers; and iii) national survey which includes samples of age, gender, migrant status and indigeneity (Author et al 2023).

The practical findings build further the case for viewing lifelong learning and lifelong education as being distinct and separate phenomena, and highlight the interdependence among the contributions of adults, their educational experiences and those provided by familiars and their communities. That is, to acknowledge and elaborate on the important contributions that support worklife learning arising from learning 'on the go' in work settings and through engagement with familiars within local communities to remain employable. It also, however, points to the importance of educational provisions and certification in assisting individuals negotiate significant transitions in worklife history. Together, these findings make helpful contributions to learning across working life that is central to current personal, workplace and national imperative. Moreover, and conceptually, the findings are both informed by and highlight the importance of two explanatory concepts: personal curriculum (Author 2023a) and educative experiences (Author 2023b, Dewey 1938) to illuminate and elaborate learning and development across working life. It is these that will be presented at this forum.

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An embedded view of educational professionals' agency in relation to quality of education

Merel van der Wal, Radboud University Nijmegen

Quality of education in Dutch primary school is currently assessed by the Dutch educational Inspectorate, based on test scores at the final exam of their primary school period. Schools and school boards are increasingly advocating to assess quality of education from a broader perspective, including for example wellbeing of pupils and professional agency of their educational professionals (EPs). The

assumption is that pupil learning and development is affected by how the EPs are able to work within a school organization. However, teachers, schools and school boards are often unaware of how professional agency relates to a broader perspective on quality of education, since teaching is a multifaceted, complex profession (Mooney Simmie et al., 2019).

In this study we assume agency to be interactional and contextual, inherently calling for a comprehensive complex system approach. Depending on interpretation of the work context and intended goals, education professionals continue or change their working environment through their actions (Weick, 1995). Agency thus forms the link between the professional development of education professionals and quality of education in a dynamic interaction (Imants & Van der Wal, 2020).

Together with a school board of 25 primary schools in the Netherlands, we conducted participatory action research on the perspective on quality of education. Five participatory modelling sessions, each attended by 10-15 representatives of EPs from five schools, resulted in a systemic map of the EPs' view on all important aspects of quality of education, and the interrelationships between these aspects. System analysis showed how professional agency is related to pupil learning. The initial results showed important endogenous factors such as transparency within and across schools (of this school board) and ability to engage in professional development activities are important dynamics that influence pupil learning and eventually the quality of education. Additionally, exogenous factors such as parents' expectations, societal discussions on teacher valuation have an indirect but crucial effect on the quality of education. We preview how these results are currently being translated to the next steps of our action research: improving the across-school understanding of quality of education, identifying indicators for the qualitative aspects, to be able to incorporate these aspects in the assessment of quality of education.

This study showed that the role of professional agency plays a vital role in creating quality of education. From participatory research perspective, the value of this study was that it showed that the non-linear relationships between the EPs' agency and quality of education. This type of complexity is difficult to grasp in every day practice, but visually presenting it with the EPs resulted in deeper understanding of their own practice.

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Emotional terrain of work-related learning: What kinds of emotions matter and how?

Katja Vähäsantanen, Häme University of Applied Sciences, Finland; Susanna Paloniemi, University of Jyväskylä, Finland

Recent research suggests that emotions are powerfully present in workplace settings and relationships and are part of leaders' and employees' thinking, acting, decision-making, and collaborating (Ashkanasy 2015; Riforgiate & Komarova, 2017). Furthermore, the emotional dimension of students' learning has been emphasised in educational contexts (Postareff et al., 2017; Tynjälä et al., 2022). However, the academic community lacks a comprehensive understanding of emotions as they pertain work-related learning. Only a few scholars have addressed the role of emotions in workplace learning, including learning from errors and team learning (e.g. Rausch et al., 2017; Watzek et al., 2019). To contribute to the discussion on emotions and work-related learning, this study investigated the meaning of emotions in work-related learning in the context of a leadership coaching programme. This group-based programme lasted one year and was intended to support leaders in crafting their professional identities and work practices. The data comprised thematic interviews with leaders working at the middle management level in the professional fields of education and healthcare. The interviews were analysed by applying thematic analysis.

Our findings show that emotions make a significant contribution to work-related learning, since they have multiple meanings and functions through learning processes. First, the findings revealed that both pleasant and unpleasant emotions (e.g. safety, curiosity, envy) advanced work-related learning, but unpleasant emotions (e.g. outsiderness, confusion) seemed to constrain learning. Emotions appeared to have a direct influence on learning, but they may also have an indirect influence. By this, we mean that some pleasant emotions eliminate the potentially negative meanings of certain emotions in learning environments. For example, safety and trust dispel the feelings of shame and anxiety experienced about one's participation in a group. Second, the findings showed that emotions such as lenience and frustration emerged from work-related learning. Additionally, enthusiasm and courage developed through learning processes supported the renewal of one's own work practices beyond the coaching context. The theoretical contribution of this study highlights the mutual and reciprocal relationship between emotions and work-related learning. From a pedagogical perspective, we emphasise that it is necessary to recognise the presence and functions of different (un)pleasant emotions to understand and encourage learning

processes in work and training settings. In practice, it seems that individual curiosity and courage, as well as a safe and confidential environment, are especially needed to support work-related learning. It is also essential not to avoid all negative emotions but to understand their power to promote work-related learning. At best, negative emotions (e.g. envy, confusion) can support individual and community learning in working life. On the other hand, it is essential to focus on how to learn to recognise emotions and how to support the processing of certain negative emotions in learning and work environments. For example, transforming the feeling of inadequacy into lenience towards oneself enables one to see oneself and one's work in a more positive light and increases well-being.

Employee's continuous learning and its support in previous research in the context on non-profit organizations (NPO)

Nina Karuneva, University of Jyväskylä

To enable continuous learning, there is a need for structures and practices that support learning in the organizations (Billett 2004). It is also known that although the importance of continuous learning is understood in organizations, the resources of how to support learning are not necessarily sufficiently known (Postareff et al. 2022; Lizier & Reich 2020). Clearer guidance practices, for instance are thus needed (Lee & Edmondson 2017). In NPOs requirements focus, for example, on the effectiveness of reporting requirements and tightened financial support policy (Chang, Huang & Kuo 2015; Harju et al., 2022; Heimonen 2019; Selander 2018). As Chang et al (2015) has found that financial environment affect employee training formats, and according to Bentley (2007) lack of financial resources can prevent NPOs from providing training for staff. Maintaining the skills of the workforce is increasingly important, and at the same time continuous learning has become an issue (Chang, Huang &; Kuo 2015).

My presentation is based on a literature review of employee continuous learning and its support in NGOs. I will present what has been found and proposed in studies from 2003 to 2023, as well as what further studies are proposed. The aim is to produce a broader understanding of the nature of continuous learning and how to support it in these organisations, as well as the challenges related to continuous learning and its support.

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Selander, K. (2018) Työhyvinvoinnin paradoksit kolmannen sektorin palkkatyössä. Jyväskylän yliopisto. JYU dissertations 13. Väitöskirja

Empowering Online Teachers: Assessing the Influence of an Online Professional Development Program on Technical and Social Competences of Synchronous Online Teachers

Maaike Grammens, Ghent University/d-teach; Fien De Smedt, Ghent University; Bram De Wever, Ghent University

In the era of growing digitization, the educational landscape is undergoing continuous transformation. An emergent and promising form of online education is synchronous online learning, in which teachers and learners engage directly through real-time video, audio, or instant messaging (Martin et al., 2017). Buth, while the demand and supply of this online instructional method have experienced a strong upward trend in recent years, there is a noticeable disparity in the availability of professional development (PD) initiatives. This is cause for concern as the majority of teachers assert to be unprepared to teach synchronously online and express a perceived deficiency in their understanding of the essential competencies, especially the necessary technical and social competences (Authors, 2021). However, teachers acknowledge that they gain valuable insights from each other. Despite the inherent opportunity of synchronous online education for self and peer observation, facilitating targeted feedback both for oneself and others due to its location independence, it is noteworthy that, as of now, no research has been undertaken in this domain. Nevertheless, research indicates that both peer modeling, wherein teachers learn from each other through observational learning, and the exchange of

feedback among teachers are effective methods for learning and advancing their PD (Bandura, 1977, Topping, 2009).

This study aims to assess the influence of an online video-based PD program, consisting of focused observation of synchronous online teaching (SOT) using a competence-based instrument to provide and receive self, peer, and expert feedback, on synchronous online teachers' (1) technical and social competences and (2) their perceptions of the PD.

A pretest-posttest design was set up with N=17 qualified in-service online teachers with experience across various educational levels and disciplines, and different years of online teaching experience (M= 4.35, SD= 3.92, range: 0-13). All teachers participated in a 7-week online video-based PD that focused on the technical and social competences of SOT teachers. The PD was structured into different modules enriched with expert videos, good practices, tips, and personalized feedback. During the different modules teachers needed to (re)develop an online lesson. To map teachers' technical and social SOT competences a competence-based instrument, previously developed by the authors, was used on a lesson given by the teachers during pretest and posttest. Additional data was collected through logbooks, questionnaires, and semi-structured interviews.

A Wilcoxon signed-rank test showed that all teachers' technical and social SOT competences improved significantly after PD ($Z=-3{,}637$, $p<.001$; M_pretest_technical=72.50; M_posttest_technical=87.41; M_pretest_social=77.65; M_posttest_social=89.42). Furthermore, results (on a 9-point Likert scale) indicated that the teachers are highly satisfied with the PD program (M=8.41, SD=0.71). Teachers indicate that: the instructional materials were clear (M=8.71, SD=0.59), the assignment was valuable (M=8.29, SD=0.85), and the program strengthened their technical (M=8.29, SD=1.05) and social (M=8, SD=1.06) competences. Further, they experienced watching good practices of peers (M=8.35, SD=0.93) and receiving feedback from peers (M=8.41, SD=0.80) as highly effective. More detailed results and qualitative findings of the study, will be presented at the conference.

The evolution of teachers' professional identity during their first year of implementing team teaching

Dries Mariën, University of Antwerp; Ruben Vanderlinde, Ghent University; Elke Struyf, Unversity of Antwerp

Team teaching, a collaborative teaching model in which two or more teachers collaborate in the planning, teaching and/or evaluation of courses (Baeten & Simons,

2016), is often put forward as a tangible answer in education for the increasing student diversity and so on (Livingston, 2017). Equally, team teaching is often perceived as a promising professional development strategy where teachers learn from one another by collaborating and exchanging expertise (Walsh, 2020). How teachers interact and learn with each other can determine the quality of their collaborative teaching practice, thereby significantly influencing their professional identity (De Backer et al., 2023). Professional identity pertains to how teachers see themselves as teachers based on their interpretations of their continuing interaction with their context (Hanna et al., 2020). Four components can be distinguished: teacher job satisfaction, occupational commitment, self-efficacy, and motivation (Canrinus et al., 2012).

To date, there is limited understanding of how teachers perceive the experience of closely teaching with colleagues and the subsequent impact on their professional identity. Furthermore, research on teachers' professional identity tends to concentrate on isolated moments rather than adopting a longitudinal approach, despite the recognition that professional identity is influenced by context and evolves over time (Canrinus et al., 2012). Additionally, the first year of team teaching is often crucial in determining the success and sustainability of this approach (Simons et al., 2019). Therefore, this study investigates professional identity evolution to shed light on how teachers adapt to the collaborative nature of team teaching, helping to identify factors that contribute to effective implementation or potential barriers that need to be addressed.

Thirteen teachers participated in three individual in-depth interviews during the school year 2022-2023, exploring the impact of team teaching on the four components. Data collection involved 39 interviews, which were transcribed and analyzed using thematic cross-case analysis.

Findings indicate that a majority of team teachers experienced uncertainty about their own competencies, i.e., self-efficacy, at the beginning of the school year when they started team teaching. This uncertainty arose from concerns related to opening their classrooms to colleagues and dealing with challenges ranging from classroom management to differentiation. However, after a few months, the team teachers reported that they felt more secure with each other. This newfound confidence was attributed to their collaborative learning environment, where they shared teaching strategies and learned valuable tips and tricks from one another.

In terms of motivation and job satisfaction, teachers did not mention significant differences in the first half of the school year. Nevertheless, as the year progressed, more than half of the teachers reported an increase in job satisfaction due to the successful implementation of team teaching, leading to a heightened sense of

fulfillment. However, four teachers experiencing difficulties in collaboration reported a decline in job satisfaction due to a 'mismatch' of the teaching team.

Finally, teachers indicated that their occupational commitment remained stable throughout the school year, with no discernible impact from team teaching.

In conclusion, the findings underscore the significant impact of team teaching on the teachers' professional identity.

Examining power relations in simulation-based education within healthcare for interprofessional learning from a sociomaterial perspective

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Simulation-based education is a method of interprofessional learning used to target and develop specific skills needed at the workplace by practicing in guided, true-to-life environments (Nestel, 2018). Examining simulation-based education in the age of rapid digitalization of organizational practices can be done through theory-based approaches such as sociomateriality (Sy et al., 2023). Sociomateriality is a term originally introduced in the field of organizational studies to address the intertwined relationship between work practices and materials (Orlikowski, 2007), but has gained increasing attention in other fields such as healthcare because it "decenters the human subject" and "theorizes medical education as expansive, unpredictable, and located in provisional networks of people, activities, and things rather than in individuals' heads or bodies" (MacLeod & Ajjawi, 2020, p. 854). Indeed, a recent review of literature on professional learning in healthcare suggests that power relations have a material foundation that is normalized through work culture (Sy et al., 2023). Our research aims to examine this point further but specifically simulation-based education in Finnish healthcare. Our data is based on six video recordings of simulation-based education sessions at a Finnish hospital (totaling 5 hours, 20 minutes), collected in part for a university research project, whose aim is to generate novel solutions for improving the wellbeing and technological skills of professionals such as doctors. We will utilize theory-driven (i.e., sociomateriality as discussed by Sy et al., 2023) content analysis to answer the following research question: What does a sociomaterial perspective tell us regarding the power relations in simulation-based education within healthcare for interprofessional learning? It is hoped that our research can allow simulation-based education designers as well as participants to better understand how materiality and

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Expectations of, and initial experiences with flexible learning pathways at the PHBern

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Teacher education operates in the context of social, technological and educational policy developments. This creates the challenge of anticipating and setting up innovative educational formats. According to the current trend, learning should no longer be restrained to specific times, places or learning modalities, but is increasingly individualised, mobile and flexible. Universities are responding to this trend by developing their curricula in such a way that the offered learning pathways take account of students' needs and interests (OECD, 2020; Li & Wong, 2018). Two institutes of the University of Teacher Education in Bern designed two different curricula enabling more individualised and flexible learning paths according to the students' motivation and needs (Brenner, 2022). The presented research project examines the implementation and initial experiences of the new curricula. In particular, it aims at finding out what the potentials and challenges arise for students and lecturers from operating within more individualised and flexible structures? This research would gain new insights into flexible learning pathways that serve the further development of teacher education. To address this question, among other things two rating conferences (N=24) were held with students and lecturers of the two institutes. The rating conferences provide important insights into the experiences of the more individualised and flexible curricula (Hascher et al., 2020). The participants first fill out a short questionnaire and then transfer their answers

to a larger, joint, and shared questionnaire using sticky notes. These provide the basis for the following group discussion. This method of data collection allows different perspectives to be made visible and creating opportunities for discussion about eventual discrepancies. In addition, it allows to validate communicatively the answers given in the short questionnaire. The discussions will be recorded, transcribed, and analysed by using qualitative content analysis (Kuckartz & Rädiker, 2020). The results show that different challenges are perceived depending on the degree of flexibility and individualisation. However, the openness of the students and lecturers with regard to the innovations and to each other is an important prerequisite for the implementation of the curricula.

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Exploring Co-Design Partners' Roles in the Development of Epistemic Games for Teacher Professional Identity

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This study aimed to investigate how different co-design partners participate in the co-design process during the development of two epistemic game scenarios aiming to support teacher professional identity development. This study, using a participatory design research framework, explored the co-design of two epistemic game scenarios. Data were collected through semi-structured interviews, online video recordings of co-design sessions and whole class discussions, open-ended questionnaire, and researcher field notes. Data were analyzed using reflexive thematic analysis. Convenient and purposeful sampling methods were used for participant recruitment.

The co-design process consisted of four successive phases. In the first (needs analysis) phase, student teachers (n=9), in-service teachers (n=8), and teacher educators/researchers (n=8) were interviewed individually which lasted around 70 minutes each. In the second phase, the first co-design session was completed with in-service K-12 teachers (n=2), and two individual co-design sessions were conducted each lasting around an hour and a half. In the third phase, 60 (35 and 25 student teachers participated in the implementation of the first and second epistemic game scenarios, respectively) 3rd-grade student teachers were included. After each session, a whole class discussion was held, and an open-ended questionnaire (resulting in 46 responses) was implemented. Also, researcher field notes were taken. In the last phase, three online co-design sessions, which lasted for one hour, were conducted with the participation of student teachers (n=12) and in-service teachers (n=3). In all phases, 3 researchers, took active roles in the design processes.

Two themes were identified at the end of the first phase: topics essential to cover during preservice teacher education, such as inclusive education, dealing with misbehavior, navigating relations with the administrators and colleagues, etc., and bridging theory and practice in teacher education through methods like case studies, simulations, role-playing, and creative drama. In the second phase, the in-service teachers were key to the co-design process, sharing their teaching experiences and resources like school images and audio records for authenticity.

They offered insights into school culture, climate, and stakeholder perspectives which guided the development of scenarios. Their input on game structure included real-life procedures and sequencing for realistic scenarios. In the third (implementation) phase, analysis of researchers' field notes and class discussions primarily focused on game structure, emphasizing issues such as 'time management' and suggestions for 'group formation.' Questionnaire data further supported this, revealing student teachers' main concern was game structure. In the last (evaluation) phase, all design team members shared experiences and then engaged in diverse design aspects. Mainly, student teachers focused on game structure, providing user insights, while in-service teachers concentrated on the nature of the game topic.

We observed that co-design process offers significant learning opportunities for all co-design team members by breaking down traditional roles encouraging collaborative, mutual learning, and integrating diverse stakeholder perspectives. In this study, student teachers primarily assumed 'user and tester roles', whereas teacher educators and in-service teachers took on the 'informant role' (Druin, 2002). Their roles diversified throughout the co-design process, but deeper engagement should be facilitated for effective co-design.

Exploring the dynamics of participation, motivation, and emotional states in VET teacher training: A multi-level longitudinal study

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Self-determined participation holds exceptional significance, not only for individuals but also within social practices. It is particularly valued in the educational context as it supports the cultivation of autonomous judgment and action competence. The degree of influence of trainee teachers ranges between perceived heteronomy (trainee teachers believe that decisions relevant to their training are made by others) and autonomy (trainee teachers believe that decisions relevant to their training are made by themselves) (Heid et al., 2023). The differentiation between these categories is reflected in the internal perspective of learning and working in different types or qualities of motivation. Possible reasons for the initiation, execution and maintenance of intentional behavior can thus be located on a continuum between intrinsic and various forms of extrinsic regulation (Ryan & Deci, 2020). External conditions of learning and control over them as well as internal qualities of action regulation determine emotional responses (Sembill, 2010). As emphasized by Pekrun and Perry (2014), a person's inclination towards future learning and engagement with tasks can be significantly shaped by their emotional states. Control-value theory postulates that the occurrence of learning and performance emotions depends on whether a person feels that he or she has (or does not have) control over activities and outcomes (e.g., through participation), especially if these have an attributed value (extrinsic and/or intrinsic origin), i.e., are of personal significance (Pekrun et al., 2011). Pekrun (2021) points out that previous research on the processual interplay of emotional states and motivation in teachers has too often focused on interindividual differences (between-person level) in experience and behavior and calls for broadening the perspective to examine intraindividual processes (within-person level) in order to obtain more meaningful research findings.

Our study therefore aims to investigate inter- and intraindividual effects of trainee teachers' perceived opportunities of participation in VET teacher training on their emotional states. Additionally, it is examined whether the subjective value as in intrinsic and extrinsic motivation affects the relationship between perceived participation and the resulting emotional states.

On the basis of a longitudinal design with a total of 75 trainee teachers in Germany and a maximum of 58 survey time points during 18-months of teacher

training (in total 1790 individual measurements), we traced the weekly perception of participatory opportunities, intrinsic and extrinsic motivation as well as emotional states. Multilevel modeling allowed us to examine both between- and within-person effects. The results of our multilevel models indicate, among other findings, statistically significant within- and between-person effects of perceived participation opportunities on enjoyment, hope, pride, as well as anger, anxiety, shame, and hopelessness. Furthermore, the attributed subjective value, i.e., the intrinsic or extrinsic motivation, moderates the relationship between perceived opportunities to participate and emotional states. The findings, which are consistent across different emotions of the same valence and for the two different types of motivation, indicate that those trainee teachers who report low values for intrinsic motivation (or high values for extrinsic motivation) in a given week react more responsively to changes with regard to opportunities for participatory influence.

Exploring situated, social, and informal learning environments during school internships: A study on the professional growth of German vocational student teachers

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This study explores the professional development (e.g., Pylväs, Li & Nokelainen, 2022) of vocational student teachers during their school internships in North Rhine-Westphalia, Germany (MSW, 2016). Specifically, it investigates the learning situations perceived by student teachers in terms of situated, social, and informal learning environments (Lave & Wenger, 1991). The research answers the following question: What types of learning situations contribute to the professional growth of vocational student teachers during their school internships?

To address the research question, a sample of vocational student teachers (n = 16) maintained event-contingent diaries for one week during their school internship, documenting all activities undertaken. Within these diaries, participants assessed their competence development across a total of 187 activities. Following this measurement period, guided interviews were conducted to gain insights into the students' professional growth within the workplace settings. The qualitative content analysis method was applied to analyze the interviews, incorporating both deductive and inductive approaches. Findings The findings reveal that out of a total of 187 activities, 154 occurred in situated learning settings, with 117 taking place in the classroom. Competence development was reported in 161 cases. According to

the interview results, students attribute their professional growth significantly to their interactions with pupils, particularly in dealing with disruptions, motivating pupils, building relationships, didactic design, and the use of media. The lesson observations provide student teachers with insights into classroom management, specifically in how teachers handle disruptions and how pupils respond to various forms of communication. These observations contribute to shaping the student teachers' own approach to managing disruptions. Furthermore, insights into didactic design and relationship work are gained from observing pupil engagement in lessons. The use of media in lessons and pupil motivation are highlighted in this context. Student teachers learn from both successful school activities and situations that could be improved, emphasizing a holistic understanding of effective teaching practices. Implications The study delves into the perceived forms of professional growth during workplace learning among student teachers. Notably, professional growth is closely associated with interactions within learning groups. Concurrently, the significance of theoretical pedagogical knowledge appears diminished compared to the personal, subjective schemata of teaching held by student teachers (Marton & Booth, 1997). The introduction of a practical phase within the Master's program serves to counteract the 'practice shock' phenomenon. However, it is crucial to emphasize the integration of situated, informal learning from the workplace into the subsequent formal, theory-oriented study period. This integration is essential for the development of a scientifically grounded action scheme for student teachers.

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Facilitation of reflective practice and critical reflection in Specialisation Education Programs

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Reflective practice and critical reflection are key elements in workplace learning. Following Fook and Gardner (2007), the ability to reflect upon practice in an ongoing and systematic way is essential to understanding professional learning and development. In education, critical reflection has encouraged a move away from

knowledge transmission toward knowledge transformation (Carrington & Selva, 2010). This approach is significant in educational contexts where social justice is a concern. Work in services related to migration is one of such contexts, as migrants are often not aware of their rights in their access to education and employment.

In educational research, the relations between education and integration have been studied mostly with the focus on migrants' learning language, culture and society of the host country (Klages & Mustafa, 2023, Hadjar & Scharf, 2019). The authors have identified a research gap in understanding development of professional agency and identity of professionals working in services related to migration. In this study, the arena for professional development is the Specialization Education Program on Multiculturalism (40 ECTS). In this Program, designed for a duration of 18 to 24 months of study, professionals from diverse educational and professional backgrounds developed their intercultural competences. Following a blended learning design with online and face-to-face instruction, the Program facilitated reflective practice and critical reflection of experienced professionals working with migrant-related services and questions of two-way integration. The research data consisted of participant autobiographies, reflection texts and semi-structured interviews, collected from March 2018 to May 2024. We performed a qualitative content analysis to this data to understand what learning affordances in the Program facilitated development of professional agency and identities.

Our findings suggest that organising social participation in educational programs is crucial for development of professional agency and identities. Following Fook and Gardner (2007), we conclude that critical reflection encourages deconstruction and analysis of personal or professional experiences, revealing assumptions, relationships and influences embedded in professional practices. Corresponding to Yan (2020), we suggest further research employing narrative approaches, to better understand how professionals can work with transnational life experiences of migrants.

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Factors Explaining the Development of Wisdom in University Students

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Dealing with complex problems requires of professionals more than knowledge, skills and expertise; it requires wisdom. Most theoretical models of wisdom include cognitive, affective-social, ethical-existential and action dimensions. The aim of this study is to examine 1) whether the four-dimensional theoretical structure of the wisdom concept can be empirically validated, and 2) what kind of pedagogical practices explain the development of features of wisdom in university students.

Building on studies of wisdom (e.g. Ardelt, 2020), 47 items describing features related to wisdom were formulated. Based on a five-point scale, third-year university students (n=535) representing several disciplines were asked to assess their development of these features during their studies. Students were also asked about pedagogical practices used. These were examined by 57 items based on learning research (e.g. Kember, 2009). Conceptual structures of the features of wisdom and students' perceptions of pedagogical practices were examined using explorative factor analysis (EFA). Based on the results of the EFAs the corresponding aggregated variables of wisdom dimensions and pedagogical practices were formed, and a regression analysis was conducted. While the wisdom literature suggests a four-dimensional wisdom model, the empirical data produced five factors: cognitive dimension (α=.82), ethical–existential dimension (α=.94), affective dimension (α=.92), social dimension (α=.88), and action dimension (α=.85). EFA of pedagogical practices yielded nine factors, which are named with alfa values in the following account on the results of the regression analyses: Activities related to scientific thinking (α=.91), Sharing experiences (α=.88), Flexible course arrangements and possibility to influence them (α=.76), and Peer assessment and feedback (α=.87) explained 50% of variance of ethical-existential dimension. Integration of theory and practice (α=.85), Sharing experiences, Flexible course arrangements and students' possibility to influence them, and Activities related to scientific thinking explained 47% of the variation of the development of action dimension of wisdom. Of the variation of the development of affective dimension, the regression model explained

41% with the following explanatory scales: Sharing experiences, Activities related to scientific thinking, and Feedback by teachers (single variable). The regression model of the cognitive dimension explained 36% of the variation, and the explanatory factors were Activities related to scientific thinking, Flexible course arrangements and possibility to influence, and Traditional and individual forms of teaching and learning (α=.60). Finally, social dimension was predicted by Sharing experiences, Collaborative forms of learning and teaching (α=.71), Activities related to scientific thinking, Self-assessment (α=.71), and Positive learning atmosphere (α=.86). The regression model explained 34% of variation. The findings contribute to the construction of a new theoretical wisdom model and practical development of university teaching for educating future professionals. They suggest that wisdom can be seen as a five-dimensional phenomenon, and that diverse pedagogical approaches are important for developing characteristics related to wisdom.

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Finding the key competencies of teaching technology to young learners with multidimensional adapted process model of teaching

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Rapid development of technology and digitalization forces the teaching of technological and digital skills to begin at young age. At the same time, the Finnish National Education Evaluation Center stated that craft, design, and technology (CDT) in early childhood education and care (ECEC) was the least represented content area within skills and art subjects. In the Finnish National Core Curriculum for Primary Education technology is a key part of the CDT education. Instead, the National Core Curriculum for ECEC and pre-primary education do not directly include CDT as subjects. In these, technology is integrated in transversal competencies, such as taking care of oneself, managing daily life, and ICT competence. The study examines the key competencies of teachers needed in teaching technology to young learners. The young learners comprehend children participating ECEC, pre-primary education, or first two years of primary education. The theory of this study is based on a multidimensional adapted process (MAP) model of teaching that examines teachers'

competencies needed to fulfill their teaching profession. The MAP model presents different knowledge and various skills required for effective teaching. The teacher's competence is divided into two areas: individual competence and teaching competence. These areas are further divided into sub-areas of different skills and practices found relevant in teaching profession. In this study, the MAP model is applied to investigate teachers experiences of teaching technology to young learners within development project of young learners' technology education.

The study uses phenomenological approach. The material consists of interviews with teachers (N=11) from two schools and four ECEC centers participating the project. The interviews were held in the end of the project after the teachers have integrated technological content into their work. The teachers were novices in technology education. They participated in-service training of teaching technology in ECEC and primary education. The interviews were analyzed using content analysis based on the MAP model. The analysis was conducted in two phases. The transcriptions of the interviews were classified either in individual competence or in teaching competence of the MAP model. The material was further analyzed in sub-areas of MAP-model. Total of 823 units of analysis revealed that both individual competencies (n=419) and teaching competencies (n=404) are needed rather equally in young learners' technology education. In the individual competencies, teachers' knowledge base for teaching and learning of technology were highlighted. Especially pedagogical content knowledge was found as the key competence. In the teaching competencies teachers' professional practices were found relevant. Professional practices included key competencies of pedagogical development and community involvement. According to teachers, in-service training and involvement of researchers working at the project were found relevant. These results indicates that teachers who were novices in teaching technology need personal orientation towards technology, pedagogical approach to technology and guidance to break the boundary to try different technological projects in their teaching. For that, research and good practices of the pedagogy of technology education is needed. The MAP model may be valuable tool for both pre-service and in-service training of technology education for young learners.

Finding the right blend: Designing professional development for tutors in an active learning environment

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This study looks at how a Dutch university is training tutors on implementing active learning methods in the classroom. Courses at this university are taught using a specific active learning method, in small tutorial groups and with the teacher/ tutor taking up the role of a facilitator. This requires specific training both for course coordinators and tutors. Intervention Following our experience during the pandemic, and based on a needs analysis we conducted in our Faculty, we redesigned the previously fully in-person training into a blended programme.

The course has three parts:

- A one-week online module on the basics of active learning pedagogical approaches, including four short assignments;
- Two face-to-face sessions: the first one focuses on preparing tutors for the first week of tutorials; the second one uses role plays to support tutors in engaging with situations encountered in the classroom;
- Peer tutorial observation and reflection.
- This study uses a mix of qualitative research methods. We interviewed tutors and analysed their course submissions and reflections. The data collected was analysed using thematic analysis, with the aim of finding patterns and better understanding how each component in turn, as well as their combination impacts tutors' learning experience.

This blended design provides a higher degree of flexibility and enables us to use contact time in a more effective way. Tutors can revisit the online resources at any time. The face-to-face sessions allow participants to put their experience into context and exchange ideas with their peers. The peer observation enables them to learn from each other and get inspired. By using a mix of learning modalities and environments (instructor-led/ peer learning, online/ face-to-face) and practising structured reflection, tutors gain knowledge, train their facilitation skills and increase their confidence in the classroom.

While the literature on teacher professional development is extensive, there is still a need for more nuance concerning the skills related to specific pedagogical approaches. By focusing on tutors implementing a specific active learning pedagogy, as well as including a mix of learning modes and media, this study contributes to filling this gap. Understanding how the various learning modalities impact tutors'

learning experience can support educational developers in designing programmes that balance different learning methods and environments to maximise their impact.

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Finnish primary teachers' perceptions of themselves as media users and media educators in in-service education and afterwards

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Recently, the importance of developing teachers' pedagogical skills and knowledge in the area of new technologies as part of their professional development is emphasized. Teachers' digital competencies and their development in the contexts of work and teacher education have been widely examined (Fernández-Batanero, 2022). It has been recognised that there is lots of need for improvement in teachers' use of technology. For example, teachers are not necessarily aware of pupils' digital environments and do not utilise them in their teaching practices (Kulju et al., 2020). It has also been noticed that teachers largely play the role of media education gatekeepers: for example, their media use and attitudes towards media (Hankala, 2011) and their educational beliefs concerning ICT (Hermans & al., 2008) affect their instruction. However, we lack a detailed understanding of the meaning of teacher in-service education for teachers' professional development in terms of developing their digital competencies and use of new technologies in their work. Thus, this study explores teachers' perceptions of themselves as media users and media educators, how these two aspects are related and developed after the in-service education during the changes of the educational environments of the COVID period. The research context consists of a long-lasting in-service education programme aiming to support teachers' professional development in terms of the new environments of Finnish language and literature education. The programme was

grounded in phenomenon-based, practice-based and co-operational learning (see Kauppinen et al., 2020). One goal of the programme was to encourage teachers to renew their pedagogical practices concerning the use of media and new technology in innovative ways.

Our research questions are as follows:

1) What are primary teachers' perceptions of themselves as media users and media educators?
2) How are these two aspects related?
3) What are the differences and similarities between teachers' perceptions of themselves as media users and media educators in in-service education and four years afterwards?

The research data consists of 42 essays written by 21 Finnish primary teachers who each wrote two of them. The teachers participated in the in-service education during the year 2018, and as a part of their studies, they wrote an autobiographical essay in which they reflected on themselves as media users and media educators. In 2022, they were invited to write another essay in which they reflected on which aspects of their media usage and media education had either remained or changed and for why. Both essays were analysed utilizing qualitative content analysis (Hsieh & Shannon, 2005).

Our preliminary results from research questions 1 and 2 revealed 5 different teacher profiles varying from narrow to advanced media users and media educators. The preliminary analysis of the data for research question 3 shows, for example, that the teachers learned courage to adopt new digital tools during the in-service education, which helped them in the challenges they faced during the COVID period. This study contributes to the discussion on the importance of long-term in-service education that supports the meaningful use of new technologies in education.

Guided reflection as a tool to support higher education teachers' professional learning and well-being

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Engaging in reflective practices is considered important to professional learning and development (Schön, 1983). Reflection and reflective practices also have their place in higher education, where they can promote quality teaching and development as a teacher (Mälkki & Lindblom-Ylänne, 2011). In general, reflection can be defined as "a cognitive process carried out in order to learn from experiences through individual inquiry and collaboration with others" (Leijen et al., 2014, p. 315). In this presentation, we focus on higher education teachers' reflections on teaching situations and their well-being during teaching. In this study, we seek to understand what factors relate to teacher development and well-being at the level of teaching situations.

This study is a part of a wider research project investigating the relations between teaching processes and well-being. The data utilized in this study is based on the modified procedure of guided reflection (Husu et al., 2008). In the first phase, each participating teacher (N=59) video-recorded a teaching session. During this session, they wore a smart ring that measures electrodermal activity (EDA) that is associated with unconscious emotional reactions and stress (Boucsein, 2012). In the second phase, researchers combined and synchronized the datasets (video-recording and smart ring data). In the third phase, the teacher participated in the guided reflection session organized and led by the researcher. In these recorded guided reflection sessions, teachers described critical incidents and their arousal episodes (low, high, shifting) and reflected on the meaning and importance of these in a wider context and in relation to future actions. The guided reflection sessions are analyzed via thematic analysis (Braun & Clarke, 2022).

As learning from mistakes is often emphasized, experts' reflection often focuses on challenges and difficulties (see also Allas et al., 2020). However, teachers could also describe a variety of empowering teaching situations. Regarding well-being, preliminary findings suggest that teachers' high or increasing arousal episodes were related to cognitively challenging situations, such as difficulty or unfamiliarity of the subject, challenging teacher-student interaction (e.g., difficult questions,

instructing, motivating and providing feedback, waiting for response) or unexpected situations (e.g., interruptions, technical challenges) but also positive situations in which teachers got excited about something during teaching (e.g., telling about own experiences or being able to activate students). Low or declining arousal episodes were related to relatively easy, undemanding situations (e.g., familiar topic, self-introduction, introducing course-related practices) and encouraging teacher-student interaction. Interestingly, lecturing appeared in both low arousal and high arousal teaching episodes. The relations between teaching, teachers' learning and well-being and the experienced benefits of guided reflection will be further discussed in the presentation.

Higher education lifelong learning initiatives in the tension between organisational and continuous professional development

Jimmy Jaldemark, Mid Sweden University; Marcia Håkansson Lindqvist, Mid Sweden University; Peter Mozelius, Mid Sweden University; Peter Öhman, Mid Sweden University

Higher education institutions' collaboration with organisations in the surrounding society includes education, research and development initiatives. Such initiatives are often discussed in terms of lifelong learning and should, in an ideal situation, include the continuous professional development of individuals as well as organisational development (2). Such an ideal embraces the dissolving of boundaries between individual and organisational development and the idea that successful continuous professional development should occur at both individual and aggregated levels. Based on a networked mode, higher education institutions are closely linked to their surrounding society, embracing a two-way relationship with a hybrid character, including multiple connections with branches and/or organisations (3). Formal education and informal work-related tasks are blurred and emphasised as equally important (1). This paper aims to analyse and discuss the tensions that occur when higher education lifelong learning initiatives intersect with initiatives for employees' continuous professional development and with organisations' goals. The following research questions are posed: 1) Which tensions between individual and organisational goals emerge when higher education lifelong learning initiatives aimed at providing continuous professional development are implemented? and 2) How can the intersection between employees' continuous professional development in terms of higher education courses be understood from an

organisational perspective? The study is based on a higher education initiative planned and performed in collaboration with eight organisations belonging to an established network of bank and insurance companies. A case-study-inspired approach was conducted. Data were gathered from professional development courses and embraced conversations with leading representatives of participating organisations, e-mail interviews with teachers, e-mail conversations between teachers and course participants, and course evaluations (open-ended and Likert scale questions).

The findings show that while participants in the courses found the courses to contribute to continuous professional development, the organisations did not have the same view. Thus, tensions in the intersection between professional development for individuals and organisations were identified. Bringing organisation-relevant data as input to the courses was identified as a key to providing the establishment of solid links between theoretical perspectives and work-related practices. In focus were collaborative features and the idea of linking theoretical reasoning to authentic organisational problems. The study suggests that a crucial barrier breaker to reduce or eliminate the main barrier is a course on strategically managed professional development for leading representatives of participating organisations. A combined focus on individuals and organisations could also stimulate leading representatives to take a holistic approach to continuous professional development. This includes increased responsibility to ensure that investments in continuous professional development are beneficial for organisations.

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Mlambo, et al. (2021). Lifelong learning and nurses' continuing professional development: A metasynthesis of the literature. BMC Nursing, 20, 1–13.
Nørgård, et al. (2019). Networked learning in, for, and with the world. In A. Littlejohn, J. et al. (Eds.), Networked professional learning: Emerging and equitable discourses for professional development (pp. 71–88). Springer.

How mature are your learning efforts?! : A framework for maturity assessment of professional development function in companies

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Maturity models have grown exponentially in the last three decades. They help companies assess the current effectiveness of their functions and support figuring

out what capabilities they need to acquire next in order to improve their performance. Despite the rich literature on maturity models in many areas (project management, knowledge management, software engineering …), "training and development" as a professional field suffers from a dearth of models conducive to its functions. Hence, this study aims at developing a framework for assessing the maturity level of training and development function in various organizations. To gather the necessary data, open-ended questionnaires were sent to 62 state-run and private companies. Besides, ATD annual reports on the State of the Industry (2018 to 2021) and LinkedIn Workplace Learning Reports (2019 to 2022) were analyzed. To analyze the data, a taxonomic strategy was used to shape the levels. Based on the research synthesis, a 4-level framework was constructed and evaluated by experts for its credibility. According to the developed framework, training and development efforts in companies can be assessed in four levels namely Ignored (no attention to workplace learning), Documented (major processes are documented and followed), Accepted (training events are planned systematically and welcomed by other departments), and Strategic Partner (workplace learning solutions become parts of the company overall development plan). The assessment is based on major processes named performance needs analysis, instructional design, development strategies, and evaluation plans.

I expected more from you: Identifying social discontinuities between the school and workplace in dual partnerships in secondary education

Steffi Sassenus, University Antwerp; Piet Van den Bossche, University Antwerp; University Maastricht; David Gijbels, University Antwerp

Dual learning is a learning system in which students alternately acquire competencies in school and the workplace (Verhaest et al., 2018). Schools and companies are together responsible for organizing and facilitating students' learning in this system (Broek, 2020). To successfully establish this learning, the school and the workplace must share personnel and materials efficiently (Nouwen et al., 2017), have a common curriculum, and successfully design and align powerful learning and work practices across locations, cultures, time schedules, and priorities (Virtanen et al., 2014; Stenström & Tynjälä, 2009). Therefore, the school and the workplace must become strong collaborative partners in which tasks, roles, and expectations are transparently distributed and complemented (Bouw et al., 2021). Only then can

actors on both sides effectively work together, building strong and complemented learning environments and experiences for their students.

However, discrepancies between legislation and the actual practice can lead to discontinuities in role expectations and opinions. Although legislators have legally anchored the roles, tasks, and responsibilities in a legal framework, there is still much space for interpretation (Emmenegger et al., 2019; Aprea en Sappa, 2015). Consequently, differences in beliefs regarding who should take up which roles, and how partners should interact with themselves and their students' ideas will arise between partners (Bouw et al., 2021). Tyson (2016) explained how opposite social expectations between dual partners can also lead to a disconnect between theory and practice in vocational education. Lastly, Gessler (2017) warns that a lack of collaboration between the school and the workplace in vocational education can eventually result in a structural imbalance in the power dynamics between the school and the workplace. For this reason, it is essential to investigate social discontinuities within dual partnerships. This study examines how schools and companies view their partner and what role expectations they set for themselves and others in their dual partnership. We analyzed this by conducting and coding 23 in-depth interviews with workplace mentors, learning mentors, coordinating school personnel, HR personnel, technical directors, and company leaders active in 14 secondary dual learning trajectories in Belgium, Flanders. We revealed critical social discontinuities within the partnership by comparing social beliefs, ideas, and expectations between the school and the workplace and describing the consequences respondents foresee or experience. Results indicate that companies are skeptical about the ability of the school to teach vocational skills. Hence, companies argue that retraining students at the workplace is necessary without regard for what is already taught at school. In addition, this study also highlighted structural differences in how partners view the students' role. Companies expected schools to treat students more like company employees, while schools highlighted the companies' responsibilities to give enough opportunities to help students learn and grow. Finally, some workplace mentors mentioned they wanted more to say about how students were assessed as they felt a mismatch between the evaluation and reality at the workplace. Having insight into these social disconnections is vital as we want to build sustainable dual partnerships that can organize and facilitate students' learning across borders.

The importance of considering the directions of dropout when analyzing the dropout intentions of trainees in dual vocational education and training

Anke Braunstein, University of Mannheim; Viola Deutscher, University of Göttingen

While vocational education and training experiences significant dropout rates in numerous countries and research has extensively explored potential reasons for dropouts, there remains a limited understanding of how different dropout directions influence trainees' dropout intentions. There is a scarcity of research on diverse influencing factors of dropout and their relationship with different directions of dropout intentions, as indicated by Krötz and Deutscher (2022). Research indicates that the majority of dropouts occur during trainees' first year of training (Cully & Curtain, 2001). The decision to drop out is recognized as a gradual process influenced by various reasons (Jonker, 2006; Lamamra & Masdonati, 2008). These reasons and their influencing factors can be categorized into six dimensions: learner, professional, company, school, activity, and context (Böhn and Deutscher, 2022). Additionally, when examining dropout intentions, it is crucial to distinguish between four directions: upwards, downwards, company change, and occupation change, as each is influenced by different factors (Krötz and Deutscher, 2022). This study aims to examine the relationship between the six dimensions of dropout reasons and each of the four directions of dropout intention, considering potential variations in influencing factors across the directions of dropout intention.

Trainees as industrial and office management clerks (n=559) were asked to solve a supplier selection task (to assess the competence of the trainees) and further fill out a questionnaire regarding socio-demographic information as well as scales assessing different dimensions of dropout causes and dropout intentions. Linear regression modeling was used to analyze the relationships between the six dimensions of dropout causes and the four directions of dropout intention as well as their different influencing factors. Findings The results show that the four directions of dropout intention are influenced by different factors of the six dimensions of dropout reasons. Different influencing factors of the context dimension play a role in each of the four directions of dropout intention while different influencing factors of the learner and company dimension play a role in three of the directions of dropout intention. Significance The distinction between the directions of dropout intention is particularly important as each direction is influenced by different factors. Being aware of the different influencing factors of

each direction enables practitioners to intervene more effectively and thus prevent potential dropouts .

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Cully, M. & Curtain, R. (2001). Reasons for new apprentices' non-completions. Adelaide: NCVER.
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Krötz, M. & Deutscher, V. (2022). Dropout in dual VET: Why we should consider dropout direction when analysing dropout. Empirical Research in Vocational Education and Training, 14, 1.
Lamamra, N. & Masdonati, J. (2008). Wer eine Lehre abbricht, hat dafür oft mehrere Gründe. Panorama, 22(6). 13–14.

In pursue of a meaningful teaching career - a 2-year investigation on identity tensions and professional agency in the Hong Kong context

Josephine Lau, University of Jyväskylä

Teacher is a profession that is fundamental to a prosperous society and a better world, as their work potentially inspire the next generation to prepare for and shape the future. Amidst the speedy technological advancement, societal and global challenges, teachers nowadays are expected to be career-long learners and active change agents who could versatilely engage in diverse learning and devise creative ways for student development. Teachers' roles and work are in constant negotiations with the surrounding environment and the new expectations. Existing teachers' live research highlights the importance of professional identity in relation to career development, and the significance of professional agency in realizing reforms and implementing innovations.

Teacher identity tensions and professional agency are, thus, the core issues in understanding teachers' career development in the changing world. However, there is a scant of research in understanding the issue from the perspective of 1. different career stages, 2. hierarchical Confucian socio-cultural context, 3. In the flow of time.

The presentation demonstrated a 2-year longitudinal investigation in the teachers in Hong Kong, which represents a non-Western social-cultural context striving to be competitive economy and facing diverse challenges. The studies recruited 21 teachers in 2018 and followed up 14 of them in 2020. Deductive thematic analysis and narrative methods were adopted. The studies touch upon 1) identity tensions at different career stages, as well as the 2) manifestation, 3) the change and continuity of professional agency over time in the situated context. The

findings reinforce the previous studies on teachers lives. Teachers at different career stages demonstrated diverse identity tensions and affordances in enacting agency in the situated context. Hence, differentiated support is needed for early career and experienced teachers on the careers. Besides the career stages and professional experiences of an individuals, the study argues social factors within and beyond the immediate school context are critically affecting teacher identity development and agency enactment, particular in the hierarchical working environment like schools in Hong Kong. Trusting and collaborative leadership and work communities within the school organisation, as well as democratic open channels connecting frontline teachers with the centralised policy support identity and agency development, and in turn the professionalism and societal status of teachers. Yet, restricted participation and authoritarian enforcement of policies within the organisation and in society, poses negative impact on the identity negotiation and agency enactment to teachers regardless of their career stages. Also, it is detrimental to their well-being and commitment to the profession for positive changes, even teachers do not show strong resisting agency to the top-down orders.

The investigation presents different implications for the research community, as well as contexts beyond Hong Kong. One of them is the importance of continuous teacher identity tensions and professional agency research in devising appropriate measures to tackle the burning issues such as recruitment and retention problems in teachers.

Integrating working life in classroom learning - the primary teacher perspective

Kaidi Nurmik, Tallinn University, Inge Timoštšuk, Tallinn University

The ecological view of learning emphasises learners' active participation in a rich learning environment. Learning environments are shaped by teachers who enable learners to construct their knowledge and understanding in real-world situations and involve other social, technological and natural environments (Jackson & Barnett, 2020). Contemporary perspectives on learning and working acknowledge a more holistic view of learners and their lifelong learning (Malloch et al., 2022). Involving various environments, such as authentic working environments, contribute to richer learning experiences and the development of competencies and personal agency (Working Paper, 2023). For example, the Estonian Education Strategy 2021-2035 highlights the importance of integrating general education and working life. However, learning in general education schools tends to be subject-centred (Valk,

2019), and pedagogical practices involving authentic environments, such as subject integration or theme-based learning, are implemented rather inconsistently (Praxis & Centar, 2019). As children's first school experience starts with primary school, where a solid foundation for learning and whole-person development should be created (Lightfoot et al., 2013), it is necessary to learn which aspects of primary teachers' understandings and experiences support integrating working life and classroom learning and which do not. Primary teachers teach most subjects up to 4th or 6th grade; thus, it can be assumed that they can integrate subjects and authentic environments into the learning process more efficiently. We aimed to explore Estonian primary school teachers' understandings and experiences of integrating working life into the learning process. Specifically, we intended to answer two research questions: (1) How have teachers integrated working life into classroom learning? (2) What limitations do teachers perceive in integrating working life and classroom learning? Methodologically, we implemented an ecological approach, as it enabled us to examine learning, connections and meanings of contextual factors that may not be revealed in narrower approaches (Brown et al., 2013). More specifically, the policy ecology framework was applied (Weaver-Hightower, 2008). We conducted interviews with 20 primary school teachers. Preliminary analysis results indicated that teachers involve mostly their students' family members' working lives in the classroom learning. For example, parents conduct lessons or workshops related to their professions; parents' workplaces are also visited as part of the learning process. These results are consistent with previous results highlighting that primary school teachers see parents as significant cooperation partners in the learning context (manuscript, 2024). Further, teachers perceive the national curriculum and information about students' family members as prerequisites in integrating working life and classroom learning. However, integrating working environments from local communities into classroom learning is an opportunity that could be given more focus. This study was part of a larger study to illuminate the teachers' understanding of the factors shaping learner agency and preparedness for the next steps of education.

Integrating workplace learning in migrant education: A case of Finnish vocational education

Katarzyna Kärkkäinen, University of Jyväskylä

The paper focuses on migrant students' learning at workplaces in Finnish vocational education context. It examines opportunities and challenges related to integrating

of workplace learning into vocational studies and how these are related to migrant students' learning and integration to Finnish work communities. The presentation is based on individual interviews with migrant students (11) and vocational teachers (13), and one group interview with six migrant students.

The theoretical framework utilises 3-P Model of Workplace Learning (Tynjälä, 2013) and integrative pedagogy (Tynjälä, 2021). In 3P model factors meaningful for learning at workplace have been divided into presage (e.g., learners' motivation, previous knowledge and skills, atmosphere at workplace), process (e.g., pedagogical practices) and product (outcomes of learning visible in improved skills and work performance) aspects of workplace learning. Integrative Pedagogy has promoted strengthening connections between different areas of knowledge (conceptual, practical, self-regulative and socio-cultural) through careful choice of pedagogical solutions to integrate workplace learning with theoretical studies and self-reflection. Participation, interaction with co-workers, adequate guidance, and emotions has been recognised as important for learning in workplaces (Billett, 2004; Filliettaz 2011; Virtanen, 2017). The actions should ensure becoming a valued member of work community (Lave and Wenger 1991; Wenger 1999). The theory guided content analysis (Schreier, 2016) showed that learning at workplace was perceived as beneficial for migrant students' learning of vocational matters and managing their professional and everyday lives in Finland. In experience of migrant students and some trainers learning at workplace offered education relevant to working life and contributed to students' gaining a self-confidence in their vocational skills. However, some students pointed out to existence of a disconnect between this what is learnt at institute (explicit knowledge) and at workplaces (tacit knowledge). The results suggest that learners' motivation, previous knowledge and skills, workplace organization and atmosphere were related to adult migrant students' outcomes of learning at workplaces. The migrant students (as perceived by students themselves and their teachers), enjoyed learning at workplaces and acknowledged the benefits of it. The students had, though, different staring points for learning at workplace, and this was related to their previous set of experiences, skills, personal and professional histories and the workplace itself. The outcomes of migrant learning at workplaces may differ depending on the practices (eg. guidance) and atmosphere at workplaces (e.g., are migrants welcome as valued members of workplace and vocational field or not). The cases of migrant learners being perceived as difficult to be guided and difficult colleges have been reported among students' and teachers' interviewees alike. At the same few teachers provided examples of migrant students' skills and outcomes of workplace learning being appreciated, which resulted in

becoming a recognized member of a work community and a permanent staff member.

The results suggests that there should be paid an attention in migrant education to adequate balance between the theoretical components and learning at the workplace with recognition of 1) advantages of learning at workplaces for migrant students' learning and becoming a valued members of work communities, and 2) existence of stereotypical views.

Knowledge and Attitudes of Teachers, Students (SNE and Elementary Schools) and Special Education Assistants

Dagmar Festner, Paderborn University; Katrin B. Klingsieck, Paderborn University; Désirée Laubenstein, Paderborn University

In times of inclusion not only students and teachers for special needs education (SNE), but all (pre-service) teachers should possess basic knowledge about behavioural disorders. Study programs should ensure that all (pre-service) teachers are prepared to teach and take care of all children. On the other hand, the ability to connect knowledge and theories learned at university to future teaching practice is a challenging task for many students. Therefore, teacher education should strengthen the link between theory and practice (Feiman-Nemser, 2001) and foster students to act as reflective practitioners (Schön, 1983). In addition, study programs should foster a positive attitude towards research-orientation (Bolin et al., 2012) and the competence to reflect and challenge their own (professional) behaviour (Kirk et al., 1981).

The aim of the study is to evaluate potential group differences in basic knowledge according to four behavioural disorders – (1) attention deficit hyperactivity disorder (ADHD), (2) autism spectrum disorder (ASD), (3) inclination to aggression, (4) anxiety disorder – as well as differences in (5) the experienced link between theory and practice, and (6) the research-orientation.

Five different samples – n_1 = 106 students (SNE), n_2 = 106 students (primary schools, not SNE, n_3 = 81 teachers (SNE), n_4 = 63 teachers (teaching degree, not SNE) and n_5 = 20 special education assistants –filled in an online questionnaire (items according to knowledge, link between theory and practice, research-orientation). Difficulty index, one-way ANOVA and Turkey-Kramer post-hoc-tests were conducted to assess potential group differences.

Against the assumption that students (SNE) and teachers (SNE) have significant higher knowledge than students and teachers (not SNE) and special education

assistants, mostly only the difference according to students (primary schools, not SNE) is significant. Against the assumptions that both groups of students rate their research-orientation and their experienced theory-practice-link significantly higher than the other subgroups there are no significant differences. High ratings in all samples are a quite satisfying result, but of course they can be caused by social desirability, too.

The study shows that additional content should be implemented in the primary school teacher training program so that all teachers learn how to teach and take care of all children in inclusive settings.

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Knowledge, expertise, care and practice: becoming and being an educator of students from refugee backgrounds in distance higher education

Koula Charitonos, The Open University UK; Neil Graffin, The Open University; Marie Gillespie, The Open University; Shannon Martin, The Open University; Olwyn O'Malley, The Open University; Fidele Mutwarasibo, The Open University; Ahmad Al-Rashid, IOM; Colin Wilding, N/A

Quality higher education (HE) is not easily accessible by forcibly displaced people (FDP): only 6% of refugees participate in HE. As HE institutions 'open their doors' to accept FDP, either in their on-campus or distance education programmes, there is an expectation from universities to create environments and provide experiences that are inclusive and offer bespoke support to FDP in their educational trajectories. A growing body of research examines the experiences of FDP when studying on campus and at a distance (Halcick & Arnold, 2019), but only a limited body of this work focuses on university educators. Their work practices and needs can differ greatly from those of other groups of educators, whilst many additional challenges have been identified that are specific to teaching in contexts of forced displacement.

The aim of this paper is to explore, through the lens of the university tutor, the practices developed towards the implementation of a major university programme that set-up a mechanism for UK-based FDP to access a distance university. The paper draws on a study that investigated the concept of transition (Baker & Irwin, 2021; Quinn, 2009), focusing on students from refugee backgrounds as they enter distance HE. In the study, we adopted a dynamic conception of transition that moves away from a fixation on fixed moments of change and instead normalises multiple movements into and out of university. To investigate this in more detail, the study involved ethnographic approaches, including observations in drop-in sessions with students, monthly academic support sessions with students, one-to-one meetings with key institutional stakeholders, email communication with students and tutors, and multi-stakeholder workshops (n=3), as well as semi-structured interviews with students (n=8; repeated) and with tutors (n=11). This paper primarily draws on data generated in tutor interviews (average duration: 46').

The findings emphasise the relational aspects of work in HE that helped tutors recognize, and devise strategies to respond to, student needs, and anticipate issues that may arise. Evidence suggests that the programme's structures and approaches offered a form of professional development but favoured the 'expert' tutor. Our research proposes that more emphasis needs to be placed on inter-professional opportunities for tutors to feel supported in dealing with the emotional labour of working with vulnerable students, and developing forms of expertise that are deemed appropriate (i.e. trauma-informed practice). This paper contributes to the growing body of research examining the challenges of transition to HE for diverse groups, and pre-requisites for enhancing access and participation to HE for displaced students.

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Halkic, B. and Arnold, P. (2019). Refugees and online education: student perspectives on need and support in the context of (online) higher education. Learning, Media and Technology, 44:3, 345-364.

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Knowledge sharing in a hybrid work context: A social network perspective

Sofie Vermeiren, University of Antwerp; Eva Kyndt, Swinburne University of Technology; David Gijbels, University of Antwerp

With the development of the global knowledge-based economy, knowledge has become a strategic resource and a performance driver for organisations (Asrar-ul-Haq & Anwar, 2016; Baker, 2018; Grant, 1996). It is a key determinant of a firm's competitiveness and innovation capability as it empowers workers to create and deliver value to the organisation (Gao et al., 2017; Li et al., 2017). As a result, organisations have adopted knowledge management to enable them to utilize their knowledge resources more effectively and efficiently (Castaneda et al., 2016; Gao et al., 2017). Among the many processes of knowledge management, knowledge sharing has been identified as the most significant (Aslam et al., 2018; Muqadas et al., 2017; van Dijk et al., 2016). It is through knowledge sharing that employees can contribute to knowledge creation, knowledge use, innovation and, as such, the competitive advantage of the organisation (Aslam et al., 2018; Muqadas et al., 2017; Wang & Noe, 2010).). Although the importance of knowledge sharing is recognized by organisations and research, many organisations fail to facilitate an effective knowledge flow in their organisation (Tangaraja et. al., 2015; Webster, 2008; Welschen et al., 2012). While there is some knowledge on how individuals share knowledge, the existing research does not take the social complexity of today's organisations into account. One of those complexities is the challenge hybrid work imposes on knowledge sharing as workers are reporting that sharing knowledge has become more difficult (Kyndt et al., in prep). As such, this study aims to generate insights into the differences between virtual versus face-to-face, as well as synchronous versus asynchronous knowledge sharing.

To answer the research questions, a two-wave social network study was conducted within a large public sector organization. More specifically, all 120 employees from a central department were invited to complete an online questionnaire in February 2023 and June 2023, respective response rates were 76% and 64%. The network questions were based on the interaction questionnaire of Retsch (1990) and research of Borgatti and Cross (2003) and asked participants to nominate the colleagues they sought advice from as well as the form of communication to classify interactions according to medium and time. Preliminary results show that in the online knowledge-sharing network, a higher number of employees are connected, and employees seek advice from more people online as

opposed to when they do so face-to-face. Furthermore, the comparison showed that employees who seek advice in 'real-time' (synchronous communication) do so mostly to colleagues from the same department or of the same gender. Sharing knowledge through direct and personal contact is also more reciprocal. In sum, the findings of the study indicate that there are differences in knowledge sharing in a hybrid work context based on medium and timing. While face-to-face conversations offer opportunities for more in-depth discussions, virtual and asynchronous interactions enable employees to reach out to more diverse colleagues. This diversity offers the potential to create new knowledge that is conducive to innovative projects and therefore also increases the competitiveness of the organization.

Learning communities as building blocks for human capital innovations: pre-, sharing- and challenge-based learning communities

Myrthe Lubbers, Saxion University of Applied Sciences; Lotte Jansen, Saxion University of Applied Sciences; Marleen Bosch, Saxion University of Applied Sciences; Amber Kornet, Saxion University of Applied Sciences; Stijn Visschedijk, Saxion University of Applied Sciences; Koen Nijland, Saxion University of Applied Sciences; Paul Preenen, TNO & Saxion University of Applied Sciences

Introduction Societal challenges, such as the energy transition, increasingly call for the support of technological innovations. However, their implementation in the workplace has proven to be challenging. The availability of skilled individuals who can effectively adopt, learn to use, and apply (technological) innovations in practice is often lacking. Hence, continuous development and improvement during work are crucial for both (new) employees and companies. Learning communities (LCs), which are public-private partnerships guided by professional facilitators, appear highly suitable for stimulating this kind of employee development by integrating learning, working, and innovating. This approach enhances the likelihood that innovations are effectively implemented in practice. Nonetheless, there is limited understanding regarding this process within the three types of LCs and the connection to the observed outcomes. In our presentation we examine how three types of newly designed learning communities – the pre-learning community, the challenge-based learning community, and the sharing learning community – can be utilized as learning and innovation accelerators in the construction sector. Approach All participants of LCs deal with a specific issue in their own work and collaborate to

understand the implications of technology implementation for their work and that of others. LCs excel in sharing knowledge and experiences, which facilitates that accumulated knowledge is systematically disseminated, both within the learning community and beyond. To support this, three types of learning communities have been designed: the pre-learning community, the challenge-based learning community, and the sharing learning community. Researchers observed the meetings using an observation form. Additionally, participants completed a brief questionnaire before each meeting regarding their interim activities and outcomes. There was also a pre- and post-assessment through a questionnaire on learning and innovating in the LCs. Subsequently, interviews were conducted with participants and facilitators. The data were mostly analysed qualitatively. Results This research provides insights into three types of LCs that currently exist in the construction sector. In the presentation, each type of LC will be discussed with examples, including its goals and outcomes, the structure of the meetings, applicable working methods, what happens between meetings, and the facilitator's role. Overall, participants in a pre-learning community conduct a comprehensive problem analysis from various perspectives, aiming to develop a well-defined and collectively supported execution plan for the follow-up LC. If it is a knowledge issue, where employees from multiple organizations with similar roles seek to exchange information for informed decision-making, then the pre-learning community is succeeded by a sharing learning community. Alternatively, if the issue involves implementation challenges within or between companies, requiring participants to collectively explore how they can collaborate more effectively or differently to achieve shared goals, then the pre-learning community is succeeded by a challenge-based learning community. Based on the results, practitioners can choose which LC is suitable for them and get started using the lessons learned.

Learning-from-failure culture – a novel approach for effective workplace training

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In today's fast-paced and technologically driven environment, continual adaptation is crucial for building resilient and future-proof organizations. Embracing failures as learning opportunities helps to adapt to changing environments continuously. Numerous studies highlight the positive impact of a learning-from-failure culture on performance, leadership, and organizational dynamics (van Dyck et al., 2005; Putz

et al., 2014; Oliveira et al., 2022). Despite the acknowledged benefits, there exists a notable gap in the literature concerning the systematic and effective implementation of a learning-from-failure culture within organizations. I contribute to closing this gap by developing a novel, evidence-based training concept to boost the learning from failure competency (LFFC) at the individual level and to evaluate its effectiveness. In the first step, the LFFC training is developed drawing on current best practices in effective training design (e.g. Uslu et al., 2022). Then, with the public city administration in Germany, the LFFC training was implemented, conducting three workshops with 31 participants. To evaluate the effectiveness of the LFFC training, we measure error orientation before and after the workshop based on the Error Orientation Questionnaire (EOQ) using a retrospective pre-post-test design (Rybowiak et al., 1999).

The results show significant effects for 6 out of 8 dimensions of the EOQ. The dimensions of error risk-taking, error strain, and error communication exhibited statistically significant increases of about 7 to 9%, indicating the strongest training effects at the 1% or 5% level. Overall, the findings suggest that the LFCC training positively affects participant's willingness and ability to cope with and learn from failure. The significance of this research lies in providing practical and accessible methods for organizations to cultivate a learning-from-failure culture based on workplace training.

In conclusion, LFFC training, as suggested in this study, has the potential to strengthen a culture embracing learning from failure, with implications including the need for sustained training efforts, the importance of viewing failure as a natural part of the process, and the positive impact of training on organizational flexibility and willingness to accept failure.

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Learning organisation and the uptake of new technologies in the framework of Industry 4.0

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The implementation of Industry 4.0 comes with many new technologies and is expected to deliver safety, quality, and sustainability benefits in addition to economic and operational benefits (Sony & Naik, 2019). However, the uptake of Industry 4.0 by the workforce lags behind and sustainability goals are not reached or reached in slower pace. In this regards, scholars particularly highlight the importance of continuous learning, training and education to help employees (i.e., operators and their managers) adopt Industry 4.0 technologies (Bonekamp & Sure, 2015). Whereas many studies focus on training or competencies needed to work with these innovation and take the stance to prevent employees' resistance, we took the organisation as the level of analyses. Based on the findings of Vegter and Wesselink (2021) in the field of Industry 4.0 and Osagie et al. (2020) in the field of sustainable development, this research adopts the concept of the learning organization (LO; Watkins & Marsick, 1993) and explored to what extent exploitation and/or exploration, as operationalization of LO (Dutta & Crossan, 2005) support the adoption of Industry4.0. Whereas Vegter and Wesselink (2021) pinpointed that co-creation of new technology is crucial for implementation, Osagie et al. (2020) point at the direct influence of teams, leadership for learning, embedded information systems and system connection on the implementation of sustainable performance. By means of four case studies in the process industry in the Netherlands in which data was collected with the help of mix methods, we measured the level of exploration and exploitation (quantitatively) and asked employees (qualitatively) to what extent they are invited to come up with new ideas or co-create solution in the framework of Industry4.0 and/or sustainability? We link these outcomes with the actual adoption of new technologies, which are developed in these same case organisations. The data collection is running and during the presentation the outcomes will be presented and shared with the audience.

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Learning to make impact: a tool to identify and enhance the impact of educational innovations in professional higher education

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Higher education is increasingly playing a strategic role in the region by forming collaborations within and outside the sector (Bowman et al., 2022) through innovative open-ended learning modules (Hoeve et al., 2021). These modules not only aim at improving learning and collaboration between (future) professionals, but also strive for making positive contributions to the (work) practice. We were assigned to develop an impact instrument to identify the impact of such training modules. The central question was: in what way can stakeholders self-assess their impact during the process of the module, so they can learn on the move?

First we reviewed scientific impact literature, particularly in regard to the objectives of Universities of Applied Sciences (UASs) and conducted four expert interviews. This resulted in design principles which were tested by students of an educational innovation on a Dutch UAS. Secondly, we did an inventory of the perceived impact by stakeholders of this educational innovation. Thirdly, we designed a prototype instrument. In a validation round with member checks and critical reflections of experts, the tool was modified. Findings Literature analysis showed: varied concepts of impact; the scope of impact is critically examined; and little is known about how impact is created and can be increased in innovative educational modules with multiple goals. Thematic analysis of the expert interviews confirmed these insights and added that impact should not only be expressed in numbers but as well express how people learn from each other; the significance of the formative function of impact measurement; importance of both intended and non-intended effects; and importance of stipulations as reflexive monitoring and/or impactful development.

Reflecting on these outcomes we formulated the following design principles: (a) the instrument functions to facilitate a process of leaning (reflexive and formative)

to make impact and to evaluate impact, (b) the instrument should grasp intended and non-intended effects and interactions and (c) the instrument can be used by multiple actors of the module. Therefore, we integrated work of Spaapen & Van Drooge (2011) and Van Vliet (2022) in which impact is gained through productive interactions. Interactions are productive when they lead to behavioral change induced by particular actions of the stakeholders. These interactions constitute the mechanisms for societal impact. We used the work of Munneke et al., (2022) to formulate indicators of productive interactions. The model of Impact at Core (2023 inspired by Backman et al., (2019)) was used to detect 5 fundamental fields of impact. In the prototype instrument, the 5 fields were presented on a canvas. At all the 5 loci, the activities, the locations and the outcomes were examined. In a validation round with member checks and critical reflections of experts, we modified the tool. Stakeholders were positive about the tool which is currently implemented in a broader context.

Significance of the research Grounded in both a scientific and empirical basis the tool is a promising way to identify and enhance the impact of educational innovations in higher education.

Longitudinal Associations between Child Behavior and Parental Depressive Symptoms: A Random Intercept Cross-Lagged Panel Model

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Longitudinal associations between child behavior and parental depressive symptoms were examined through Random Intercept Cross-Lagged Path Models (RI-CLPM) at the child's ages 4,6 and 9 in this study. Participants were 200 Finnish children and their parents, who had been followed from birth in the Jyväskylä Longitudinal Study of Dyslexia (JLD). Both fathers and mothers reported their own depressive symptoms with Beck's Depression Inventory (BDI) and child behavior by Behavior Assessment System (BASC).

The aims of the current study were twofold:

1) Are the development of child's behavior (externalizing behavior, internalizing behavior and adaptive skills) and parental depressive symptoms associated at the between-person level? That is, do parents with higher depressive symptoms also have children with more behavior problems/less adaptive behavior and vice versa?

2) Do child's behavior (externalizing behavior, internalizing behavior and adaptive skills) and parental depressive symptoms predict one another at the within-person level? That is, do increased parental depressive symptoms at the subsequent time point predict increased behavior problems/less adaptive behavior and vice versa?

The results showed that there are significant between – person correlations between maternal depressive symptoms and child internalizing behavior, between maternal depressive symptoms and child adaptive skills, and between paternal depressive symptoms and child internalizing behavior. That is, a father or mother with higher depressive symptoms also have children with more internalizing behavior and vice versa, whilst a mother with higher depressive symptoms has children with less adaptive skills and vice versa.

No significant within- person cross-lagged associations were found which indicated that increased parental depressive symptoms at the subsequent time point do not predict increased behavior problems/less adaptive behavior and vice versa. However, at the within-person level the age 9 residuals were correlated in the following models: the ones with maternal depressive symptoms and child internalizing behavior, maternal depressive symptoms and child adaptive skills, and paternal depressive symptoms and child externalizing behavior. These findings suggested that child age 9 might be an important time point in speculating potential intervention, precaution and promoting family well-being in further studies.

Managers' Encounters with Socio-Cognitive Conflicts in Collaborative Learning Processes

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Despite the extensive research on collaborative learning and socio-cognitive conflict, their impact on executive education and managerial learning is less understood. This study focuses on socio-cognitive conflicts in managers' collaborative learning. The aim is to identify manifestations of verbalised socio-cognitive conflicts and the topics associated with them during the initial stages of managers' collaborative learning in a small-group setting.

Within managerial development, the exchange of experiences, group interactions, and learning from peers are considered pivotal (Barber, 2018; Curşeu, Janssen, & Meeus, 2014). However, there is a recognised gap in managerial training that does not entirely meet the demands of modern management (Jäppinen & Ciussi,

2016). To bridge this gap, there is a need for research-based development to equip managers for ever-evolving environments that emphasise collaboration (Shantz et al., 2023; D'Alessio, Avolio, & Charles, 2019; Barber, 2018; Wuestewald, 2016; Han & Liang, 2015; Karakas, Manisaligil, & Sarigollu, 2015). Despite its importance, the professional growth of managers in collaborative learning has been largely overlooked (Lee & Bonk, 2014).

In collaborative learning, individuals aim to learn within a group setting by engaging in interaction, problem-solving, or creative endeavors (Malmberg et al., 2019; Zhang et al., 2019; Le, Janssen, & Wubbels, 2018; Wismath & Orr, 2015; Laal & Ghodsi, 2012; Hämäläinen & Vähäsantanen, 2011; Arvaja, 2005; Dillenbourg, 1999), forming a dynamic learning community (Davidson & Major, 2014). Socio-cognitive conflict involves expressed disagreements among individuals engaged in dynamic interaction, aiming to find acceptable solutions (Perret-Clermont, 2022; Chang, Wiewiora, & Liu, 2021; Zaharia, 2013; Doise & Mugny, 1984). It plays a fundamental role in nurturing collaborative learning, naturally emerging in social learning settings (Malzahn et al., 2022; Näykki, Isohätälä, & Järvelä, 2021; Buchs & Butera, 2004; Doise & Mugny, 1984).

The research data comprised 4.5 hours of recorded video material involving 15 managers distributed across three small groups. The video material was analysed qualitatively using thematic content analysis (Braun and Clarke (2006). The analysis was guided by previous research on collaborative learning, especially on socio-cognitive conflict.

The findings demonstrate that, in small-groups, socio-cognitive conflicts arise at both 1) the group and structural level as well as 2) at the individual and peer level. Group members challenged the group task, group's actions, group leadership, their own actions or opinions, and another group member's actions or opinions. These socio-cognitive conflicts are seen as verbalised challenges that can foster learning and group development. The study also introduces a novel Socio-Cognitive Conflict Challenge (SCCC) visualization to illustrate different types of socio-cognitive conflicts.

In this study, we identified manifestations of socio-cognitive conflicts managers encounter during initial stages of collaborative learning process. The study opens avenues for further research on managerial learning and offers ideas and viewpoints that by leveraging socio-cognitive conflicts can be utilised to develop managers' collaborative learning.

Mapping the main streams and foci of competence-based education research: A review with direct citation network analysis and topic modelling with latent semantic analysis

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Competence-based education is a current and debated reform trend in education that affects millions of learners around the world. We present the first comprehensive overview of competence-based education research. We applied direct citation network analysis with mapping, clustering and visualization, topic modelling with latent semantic analysis, and careful qualitative screening to 1090 competence-based education journal articles to identify the main research streams and foci of this emerging research domain. We found three main streams: The Higher Education Stream, the Vocational and Professional Education Stream, and the General Education Stream. We present six research topics related to each of the research streams. We show that competence-based education is a highly fragmented research domain and discuss the implications of this finding for future research. The results of our study form a competence-based education research knowledge map that serves multiple purposes for researchers, policymakers and practitioners as discussed in the presentation.

The narrative mediation of teachers' emotional experience: identifying predictive narrative structures

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Teachers' emotional experience in their job has important implications for educational systems, such as impacts on students' emotion, learning, and motivation, or issues related with teachers' turnover, attrition, and health (Frenzel, Daniels and Buric, 2021). It has been argued that, although influenced by their working conditions, teachers' emotional experiences are mediated by how they understand the situations they face in their practice, i.e. by how teachers appraise these situations. Research has shown that these appraisals function as narratives -that is, teachers narrate to themselves (and to others) what is happening in their situations,

and different narrativizations of the same situation may lead to different emotional experience and practice by teachers.

This paper aims to identify how different narrative structures predict teachers' emotional experience. A differential aspect of this study is that we analyzed natural appraisals, expressed by teachers as conversational discourse, through structural semantics. We interviewed 73 teachers, through a non-structured interview instrument, and analyzed the narratives generated by each teacher. The analysis was based on Greimas (1989), as developed by author (2020): with help of a structural notation called modal syntax, we identified relationships between any aim or duty of the teacher and any action, by the teacher or by others, that fulfills or contradicts this aim or duty. Each of these relationships is called a Narrative Nucleus (NN). 15 types of NN were identified, based on the kind of relationship (congruence or contradiction) and the actant ("me" or others) and modality (duty, possibility, capability, or performance) of the contradictory or congruent action. Inter-judge reliability processes were conducted for this analysis, with coefficients running between .70 and .97. Then we computed indices of prevalence of each type of nuclei in each teacher narrative. Together with the interview, we administered four questionnaires to each teacher, to measure working conditions (COPSOQII) and indicators of teachers' emotional experience: emotional exhaustion, depersonalization, personal accomplishment (MBI), well-being (SWEMBS), and bounce-back resilience (BRS). We then conducted robust hierarchical regression analysis to check whether the prevalence of the different narrative nuclei predicted the different indicators of emotional exhaustion, while controlling the effect of the working conditions. We found that, in addition to the variance predicted by the working conditions, the narrative nuclei significantly predicted 13.9% of additional variance for emotional exhaustion, 4.9% for depersonalization, 6% for well-being, and 9.9% for bounce-back resilience. Protective structures were congruent "they know how", "they can", and "I do", and risky structures were contradictory "they don't want", "they don't do", "they can't" (risky for depersonalization but protective for bounce-back resilience), and "I don't do". These results have great significance for teacher professional development, since they provide information about which narrative structures should be fostered and avoided when (re)narrativizing teacher's experience, what can be especially useful within processes of collaborative reflection or mentoring.

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The need for personalized professional development and recognition of talents in health care professions

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Healthcare faces severe personnel shortages but digitalization can relieve the burden of the high work pressure.1 Digitalization can be considered as one of the solutions to attract and retain qualified professionals. Simultaneously, the digitalization of healthcare may change jobs and professional development needs. For example, e-health takes over patient monitoring and fosters self-management, which changes not only the interaction between patients and health care professionals but also the required professional skills. Healthcare institutions need to reconsider their HR policy and adapt to the needs of employees. 2-3 Deci and Ryan's Self Determination Theory posits that fulfilment of needs for competence, autonomy and relatedness contributes to the intrinsic motivation to perform.4 For example, generation X (born the late 80s-90s) prefers more challenges and career opportunities.2, 5 This raises the following research question: What are healthcare professionals' working values, attitudes and professional development needs in the context of digitalization in healthcare, and how do younger (< 35) and older professionals (⩾ 35-67) differ in this respect? The aim is to better understand these factors and their contribution to professionals' intention to stay in the profession. Method. Thirty healthcare professionals participated in semi-structured interviews about their working values, attitudes, and professional development needs. Participants worked mainly in hospitals and home care. The majority were female (26) and younger than 35 years old (16). Results. Almost all participants expressed a need for more individual recognition. Most participants experience insufficient training opportunities fitting their interests and talents. Particularly younger healthcare professionals prefer individualized development trajectories with a personal budget. They emphasize the importance of pursuing additional education and the subsequent adjustment of tasks to apply their acquired knowledge. They advocate for combination jobs that integrate non-care tasks (e.g., research) with care-related responsibilities. Furthermore, digitalization of care changes professionals' routines and practices and thus demands professionalization efforts. However, limited career opportunities and rejected combination job proposals, due to scheduling constraints, are driving healthcare professionals to consider leaving or taking roles without bedside responsibilities. Discussion and Conclusion. The field needs to rethink the healthcare profession with more individual recognition, and

flexible career path opportunities. Supporting the diversity of talent contributes to the retention of healthcare professionals and further development of the profession.

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New opportunities for continuous teacher development through online self-study courses - Findings of a research and development project

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There has been an increased interest in online teacher professional development (oTPD) in the last decade. This is because of perceived benefits such as improved access, flexibility, and lower costs for participants. Due to the COVID-19 pandemic, the need for - and consequently the creation of - online courses has been strongly accelerated (Lay et al., 2020). Although oTPD have spread rapidly in recent years, there is still relatively little high quality research (Lay et al., 2020). Little is known about best practices for the design and implementation as well as the perception and learning outcomes of oTPD models (Dede et al., 2009).

Against this background, online courses for teachers and mentor teachers were designed, produced, and comprehensively evaluated in the context of the project "project name". A mixed-method design is used to gain insights into the development as well as the perceived benefits and learning success. In this paper, we focus on the evaluations of the teachers and mentor teachers (N = approx. 200) who have completed the courses. Their answers are collected with an online

questionnaire. The survey is conducted between December 2023 and March 2024 and includes three measurement times: the first time is before beginning the course (T1), the second is immediately after course completion (T2), and the third around 4-6 weeks after completion (T3). This approach allows to collect information on participants' prior experiences and expectations (T1), perceptions of the courses (T2) and their benefits for teaching practice and mentoring (T3). The questionnaires were designed based on existing instruments and scales (e.g. Rzejak et al., 2014). Initial results of the T1 survey show that the study participants (N=193) are looking forward to working with the online courses. On a scale of 1-5 (5=strongly agree), the mean rating is over 4.5 (M=4.52, SD=0.65). The participants expect that working with the online courses will reduce their workload elsewhere (M=3.84, SD=1.07), and over 38% of respondents expect the online courses to provide more personal benefit than traditional face-to-face TPD (these respondents ticked 4 or 5 in the corresponding item; M=3.11, SD=1.13). The analysis will be completed by the time of the conference, and they will show whether participants' expectations were met and reveal reasons why. The results of may contribute to a better understanding of the requirements of oTPD, and this can be helpful in ensuring that teachers and mentor teachers can benefit from more sensible oTPD in the future.

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Opportunities for improvement of organising workplace learning in vocational education: systematic analysis of theories and empirical evidence

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Changes in society, such as digitization at work, put demands on vocational education (Beer & Mulder, 2020). The focus of this study, commissioned by the Dutch Education Council, is on how high-quality workplace learning can be organised to provide high-quality secondary and higher vocational education. Quality, (i.e., meeting the objectives of vocational education (Harvey & Green,

1993)), here means to prepare for a job, for future studies, and for good citizenship. The aim to find as many new insights as possible, resulted in the research question: what opportunities can be derived from relevant theories and empirical studies to, from the perspective of the students, better organise workplace learning in vocational education? First, a framework was developed: The meaning of workplace learning is discussed (e.g., Cunningham et al., 2004; Eraut, 2000) and defined here as 'learning processes, of students in learning and work environments in the work organisations in the context of formal vocational education'. Different meanings of practice and theory, the role of the school and work organisations, and the (complexity of the) vocational education system in the political and societal (dynamic and complex) context (e.g., Nieuwenhuis et al., 2004) are discussed.

The first part of the study consisted of the selection and analysis of theories of which opportunities can be derived. This required a wide variety of relevant starting points such as the (future) vocations and professionalism (e.g., on professional identity, Wenger, 2000), learning environments (e.g., Cognitive Flexibility Theory, Spiro et al., 1994), learning and motivation (e.g., Situated Learning, Lave, 2011; Self-Determination Theory, Deci & Ryan, 1985) and organisational development (e.g., Learning Organisation, Argyris & Schön, 1996). The second part of the study consisted of a systematic literature review of peer reviewed journal articles (ERIC, Web of Science, ProQuest, EBSCOHost), to find empirical evidence for opportunities for improvement. Key words were derived from the theories (e.g., 'communities of practice', 'professional identity', 'boundary crossing'). Content analysis of the 2052 studies found led to 27 useful empirical studies. Futhermore, for this domain important journals (e.g., JWL, JVET, Vocations & Learning) were systematically screened. Close analysis of the 6087 hits led to 68 empirical studies. Studies conducted outside vocational education were excluded. Empirical evidence was found (e.g., in: Aderibigbe et al., 2019; Baartman et al., 2018; Cattaneo & Motta, 2021; Eteläpelto et al., 2013; Virtanen et al., 2009), but the findings were very scattered, and many topics lack high-quality empirical research. All findings are integrated and structured in different parts (e.g., 'characteristics of the jobs and learning objectives', 'process of workplace learning', 'organising workplace learning') and are used as basis for formulating concrete opportunities for better organising workplace learning in vocational education. More detailed information on the outcomes of this study cannot be revealed before the official launch by the Dutch Education Council (Spring 2024). All findings, including the opportunities to be used by work and school organisations as well as policymakers, will be presented. Moreover, the quality of the research, identified gaps and need for future studies will be discussed.

Organizational Feedback Norms: Scale Development and Analysis of Their Influence on Employees' Feedback Seeking Behaviour

Akvilė Bouwens, University of Twente

The question of how to create an organizational context in which employees feel comfortable and open to seeking feedback is central to the contemporary organizational psychology literature. Despite suggestions in the conceptual literature that a strong feedback culture can encourage employees to seek feedback, we know little about how organization-level factors, such as feedback norms, accomplish that task. The paucity of knowledge in this area can partially be attributed to the lack of validated measurement instruments for assessing organizational feedback norms. This paper aims to address this gap in the literature by conducting two studies with 7 samples in total (N total = 2264). In Study 1, we develop a measure that assesses perceptions of organizational feedback norms by following a rigorous scale development methodology. In Study 2, we rely on the integrated self- motives theoretical framework for feedback seeking and use supervisor-employee dyads to test a parallel mediation model of the indirect relationship between perceived organizational feedback norms and individuals' feedback-seeking strategies of feedback monitoring and feedback inquiry via the perceived value of feedback and the perceived risk of seeking feedback. We find partial support for the proposed hypotheses. Specifically, we find that perceived organizational feedback norms shape the individual's feedback monitoring only through the perceived value of feedback and not through the perceived risk of seeking feedback. We also found that perceived organizational feedback norms shape the individual's feedback inquiry only through the perceived risk of seeking feedback and not through the perceived value of feedback, such that stronger perceived organizational feedback norms are related to a lower perceived risk of seeking feedback, which in turn is related to higher feedback inquiry. This suggests that organizational feedback norms can diminish the risk associated with the desired learning behavior in organizations. The paper concludes with future research opportunities that this new measure of perceptions of organizational feedback norms offers.

Paths and tensions of physical education teachers' professional identity learning

Jukka Virta, University of Jyväskylä / Department of Teacher Education

Research on professional identity (PI) has seen vast expansion during last twenty years and PI is now regarded as a fundamental concept in understanding teachers' work. Teacher professional learning has traditionally been viewed in terms of learning professional competencies. However, learning professional competencies that do not resonate with one's perceived image of a teacher one wants to be is not necessarily very efficient or motivating. So far, the inter-relations and processes between professional learning and PI development have not been examined in detail. Recently though, Beijaard et al. (2022) have proposed a model that combines both the processes of PI development and professional learning. When these processes converge, PI learning occurs. The aim of this study is to examine the PI learning of physical education teachers. Research questions are: What kind of paths of PI learning can be identified? What is the significance of tensions in the process of PI learning?

This study is based on three published papers. The original data comprised of thematic interviews of a total of 24 physical education teachers. The individual results of each three original articles were re-analyzed applying thematic qualitative analysis and using PI learning (Beijaard et al. 2022) as a theoretical framework.

The analysis yielded five paths of PI learning and various tensions embedded in them: In the first PI learning path (1) learning experiences encouraged teachers to examine their PI and in consequence to learn corresponding professional competencies, hence resulting in PI learning. The second path (2) concentrated on learning professional competencies that were in line with the teachers' existing PI, thus, also leading to PI learning. In the third path (3), the teachers integrated the professional competencies into their existing professional identities with minor adjustments – PI learning occurred. The fourth path (4) underlines the cyclic nature of PI learning. Multiple learning experiences in various contexts were merged into the cycle of PI learning allowing professional competencies, that were initially not experienced relevant, to be integrated into the process of PI learning. In the fifth path (5), PI learning did not occur. Professional competencies that were not in line with the teachers' existing PI, were rejected. Different kinds of tensions resulting from learning experiences were also discovered and found relevant for the process of PI learning. The tensions were created between various reflections on PI: Who am I as a teacher? What kind of teacher do I want to be? Am I the teacher I think I

am? Am I the teacher I should be? These tensions appear to have an important role in initiating, maintaining, or obstructing the process of PI learning.

Based on the results, it seems that PI and professional learning are tightly interconnected. Further, the role of existing PI appears to be highlighted: it is present when interpreting various learning experiences and deciding the direction of dynamics in the cycle of PI learning. Also, the existence of tensions can either enhance or hinder the process of PI learning.

Personalized Prompts to Support Problem-Solving in the Digital Office Simulation LUCA

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Workplace simulations provide learners with authentic tasks and tools and encourage active engagement and self-regulated learning. However, learners may sometimes feel overwhelmed and frustrated due to the complexity of the simulations. Learning simulations enriched with personalized prompts can help learners overcome these challenges (Rausch et al., 2021). Prompts are hints in the form of questions, suggestions, and feedback that appear during learning and are intended to promote self-regulated learning and problem-solving (Wirth, 2009). Despite their potential benefits, personalized prompting has received little attention so far (e.g., Munshi et al., 2023). This study examines the effectiveness and perception of a prompt design developed to foster problem-solving skills in the digital office simulation LUCA in the business domain. During a 65-minute learning session on the working scenario “supplier selection”, 222 vocational education students received either no prompts (n = 109, control group) or a selection of three types of prompts based on individual log data (n = 113, experimental group) and completed a questionnaire afterward. Learners must explicitly select prompts from the internal mail system to view them. In the experimental group, learners received an average of 5.84 prompts and opened 5.24 of them (90%). They spent a total of 72.82 seconds on prompts, averaging 13.90 seconds per prompt. The paired t-test showed a significant difference in the mean final scores of task performance between the experimental (M = 17.41, SD = 6.98) and control group (M = 15.03, SD = 7.25); $t(222) = -2.50$, $d = 0.34$, $p < .013$. This suggests that prompts improved the overall scores of learners. However, not all individual prompts (23%) showed a significant effect on task performance. Log-data analysis is ongoing and will be finished before the conference. High cognitive load, particularly for learners with

lower general ability, could be an explanation of why prompts did not lead to higher positive outcomes (Eckhardt et al., 2013), which will be tested with available learner data. Additionally, learners can feel disturbed by too many prompts or prompts that contain too much information and additional calls for action. Although the design of the prompts was rated as neutral and rather understandable, they were still perceived as somewhat distracting and too many. Respective hypotheses will be tested in a structural equation modeling framework. The results illustrate that log-data-based prompting is not per se always conducive to learning achievement. Learner characteristics, content, and learning objectives need to be considered when designing prompts.

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Practices on integration of workplace learning into upper secondary education

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Multiple new cooperation forms to integrate workplace learning and school education have been developed during the recent years by Estonian employers and general education schools, likely to improve the general competencies of the students. However, the educational purpose and effectiveness of the various initiatives in the context of the development of the general competencies according to the curriculum are unknown. The main aim of the research is to explore what kind of pedagogy is applied in Estonian general education schools for integrating formal educational programmes and workplace learning in the development of general competencies of the students. The research question focused on the current survey is following: What is the practice (including pedagogy, cooperation forms, reasons for integration, learning aims, division of responsibility) of integrating school-based- and workplace learning in Estonian upper secondary schools, and what is the experience and needs of employers there? The theoretical framework is based on the Integrative Pedagogy Model (Tynjälä, 2008, Tynjälä et al, 2021) and the

definition of Key Competences for Lifelong Learning. The empirical study will be based on individual and focus group interviews, which are being conducted with upper secondary teachers, head teachers, and employers. In the research, phenomenological approach and inductive content analysis method is used to analyse the current practices. As the result of the survey, the clusters of the forms of integration and their organization, learning aims and pedagogy implemented will be detected at schools and the experiences and needs of employers will be clarified.

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Professional Development emerging from using New Technologies at Work – Results and Implications of an Interview Study

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Technologies provide employees with opportunities for learning when engaging with new tools and experiencing changes in their work (Pargmann et al., 2023). Professional development (i.e., continuously developing competences at and through work by engaging in elaboration, expansion, and externalization; Simons & Ruijters, 2004) may emerge from using new technologies (i.e., tools or systems that complement or replace the execution of work tasks; Autor et al., 2003) and the associated changes at work (i.e., changing tasks or conditions of task completion). The relationships between these concepts and the form they take is largely unexplored.

Consequently, this study answers the research question: What forms of professional development emerge from using new technologies and the associated changes in work characteristics?

This exploratory interview study using the Critical Incidents Technique (Flanagan, 1954) aimed at generating hypotheses for quantitative testing. A theoretical framework building upon Piaget´s (1977) notion of cognitive disequilibrium was developed, including categories of technologies (Autor et al., 2003), work characteristics (Beer & Mulder, 2020), and professional development (Simons & Ruijters, 2004). A semi-structured interview guideline was developed and used to gather data from eight employees within the finance domain up until

theoretical saturation was reached. Interviews lasted 45 minutes on average (M=44,2; SD=16,2). Theory-driven content analysis including the creation of a system for categorisation and incorporating deductive and inductive coding of the previously transcribed material was conducted (Schreier, 2014). The interrater reliability between different coders was Cohen´s $\kappa = .82$ ($p < .001$). Results reveal relationships between new technologies (i.e, task-supporting, task-replacing, communication), changes in work characteristics (e.g., work comfort, external demands), and professional development. For instance, using robotic process automation (i.e., task-replacing technology) resulted in information seeking behaviour (i.e., expansion), the meaning of which was to manage the novelty associated with the technology by fostering understanding of the technology itself but also identifying additional opportunities for applying the technology in one's own area of responsibility. It also increased work comfort, but this notably did not lead to professional development.

The final hypotheses resulting from this study (to be tested in future research) display the dynamics of professional development – e.g., that some technologies lead to professional development and some changes in work characteristics do not – and will be discussed conclusively.

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Professional Learning as an Antidote to Automation Bias?

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When professionals form judgments and decisions with the help of automated tools, they tend to trust such a tool more than themselves, even when the tool is wrong. This phenomenon, the automation bias, has been well-established in high-reliability domains like aviation (i.e., autopilots) and healthcare (e.g., medication dispense

systems; e.g., Grissinger, 2019; Lyell & Coiera, 2017). In the short term, the bias can lead to faulty judgments affecting, for example, hospital patients, air travellers, and participants of financial markets (e.g., Gsenger & Strle, 2021). In the long-term, being subject to automation bias can lead to knowledge atrophy: professionals may rely less on their established expertise so that it becomes less available in critical decision moments, and young professionals may not develop the required in-depth understanding of tasks, preventing them from building up relevant and applicable expertise in the first place (e.g., Sutton et al., 2018; Sutton & Holt, 2022).

In this systematic review, we synthesize insights into the role of professional learning, including post-graduate education, professional development, workplace learning, and learning interventions, as a potential antidote to automation bias. Past research has predominantly focused on understanding the conditions under which automation bias affects individuals, such as system features or time pressure (e.g., Bond et al., 2018; Gsenger & Strle, 2021). Yet to date, little is known about interventions that equip professionals with the necessary knowledge to adaptively use automated tools and to become competent professionals in an automated world (e.g., Schaffer et al., 2019; Zerilli et al., 2019). Currently, empirical research on interventions and mechanisms of knowledge atrophy is scarce (e.g., Sutton et al., 2018).

Reviewing 34 selected records from domains such as information management, management accounting, pharmacology, and educational research, we identified a series of learning-related interventions are ineffective for mitigating automation bias, including: making individuals accountable for tool-based judgments, providing contextual information on tool reliability, providing performance feedback, training on performing tasks manually before using an automated system, exposing users to automation failure, bias training, and using groups/teams to engage with automated tools (e.g., Parasuraman & Manzey, 2010). Instead, these studies suggest a series of avenues for future research. In the short term, research suggests exploring whether training designs that allow users to accurately assess system reliability themselves through monitoring and verification, training attention strategies, catch trials, focusing on declarative knowledge development for novices and adjusting procedural knowledge for experts, as well as interactive data analytics (e.g., Grissinger, 2019). In the long term, research to date proposes the redesign of (post-)graduate learning and professional development activities that allow professionals to develop the necessary knowledge more efficiently than through the performance of routine/preparatory work in the first years of professional development, as well as adapting lifelong learning activities to teaching professionals to collaborate effectively with automated tools in a continuous

manner (e.g., Goddard et al., 2014; Susskind & Susskind, 2015). The professional learning lens therefore offers a valuable perspective for addressing a problem likely to increase in magnitude with recent and future developments of, for example, generative AI.

Reflective Practices in Vocational Training: A Video-Based Approach to Student Evaluation and Teacher Engagement

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Reflection and self-assessment play crucial roles in vocational education and training (VET), fostering critical thinking and professional development among students (Cattaneo & Motta, 2020). Despite their importance, many students lack the necessary meta-cognitive skills for effective self-assessment and reflection on their performance. Supporting students in these activities is vital but poses a challenge to educators (Jossberger et al., 2010; 2020).

To address these challenges, technological support, such as video-recording and reviewing the recorded performance, can be instrumental. This approach allows students to assess their performance, providing a tangible representation of their skills in action (Schwendimann et al., 2015). However, beyond technical tools, additional support and human interaction are essential for fostering meaningful reflection (Cattaneo & Motta, 2020; Kori et al., 2014; Panadero et al., 2018). Often, support for reflection comes in the form of prompts embedded in a tool, aiding students in evaluating and reflecting on their performance. Subsequently, students engage in conversations with teachers about their performance enhances the significance of these reflections (Cattaneo et al., 2020). The combined effectiveness of these tools and their embeddedness in the teaching has, however, seldomly been studied. Therefore, this study explores the impact of embedded supports in a video-based platform on VET student reflections. Additionally, it investigates how these reflections influence subsequent student-teacher conversations.

The study involved 32 VET students in a technical domain, each recording a task performance in a workplace setting. Students used a video-annotation platform to review their performance, engaging in think-aloud activities. The experimental group (16) had access to a prompting tool, employing a prompt to encourage evaluation and explanation. The control group (16) did not have access to this support. Aside from the annotation content, we also included a process oriented

element in this study. Students were recorded during their review and asked to think aloud. Subsequently, students discussed their recorded and annotated performance with their tutor. These conversations were also recorded. The annotations and recordings of student think aloud and student-teacher interactions were analysed. Overall we saw that students created 339 annotations in total. Of these, 158 were descriptive, 120 explanatory and 61 evaluative in nature. Compared to the control group, the experimental group showed more evaluative and less descriptive annotations. No differences were found in the total amount of annotations generated. We were able to record 15 think-aloud and 16 student-teacher interactions, but unequally distributed across conditions, and thus were unable to compare conditions. Thematic analysis of student think-aloud revealed that students identified more mistakes afterwards than during their performance. Interestingly, students often reflected more than they ended up writing down for various reasons. Regarding student-teacher interactions, annotations frequently influenced student-teacher interactions, with approximately 29% of topics being related to annotations.

We conclude that the supportive measure facilitated increased evaluation and reflection among students, surpassing mere descriptions of their work. Moreover, annotations played a role in structuring student-teacher interactions. However, further research is essential to comprehensively understand the role and effects of specific annotation types on these conversations.

The relationships between uncertainty and innovative work behaviour – A systematic literature review

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Research has shown that technological developments in society change work, which leads to new demands concerning the development of employees' competences (Ciarli et al., 2021). Professional development activities that are needed to deal with changes at work, in particular innovative work behaviour (Messmann & Mulder, 2014), might be hindered by perceived uncertainty, for instance in terms of being unsure about how aspects of their job might be changed, what impact these changes have and what response option to choose (Milliken, 1987). So far, insight into the relationships between perceived uncertainty and innovative work behaviour is lacking. Therefore, the research question is: What are the relationships between

perceived uncertainty and innovative work behaviour? A systematic literature review in eight databases from various disciplines (e.g., Web of Science Core Collection, APA PsycArticles, ERIC) is being conducted. To provide the required insight, operationalisations of uncertainty at all levels need to be considered. Therefore, a theoretical framework was developed integrating conceptualisations of uncertainty at the societal and organisational (e.g., Transaction Cost Theory; Williamson, 1981), work (Milliken, 1987) and individual level (i.e., job insecurity; De Witte et al., 2010). This was used to identify relevant search terms, such as complexity, creativity, and proactivity. The original hits (N=13.822) are currently being structured and analysed. At present, 133 empirical studies qualify for inclusion based on the technical (e.g., peer-reviewed) and content-related (e.g., professional context) eligibility criteria. So far, various positive and negative relationships between perceived uncertainty and innovative work behaviour are found. For instance, "quantitative job insecurity" is negatively related to innovative work behaviours, and "task complexity" is positively related to innovative work behaviour. Definitions across studies differ; "task complexity" is defined as how challenging the work is in one study, and how pre-determinable and variable tasks are perceived as in another study. Overall, the integrated findings indicate a complex picture which will be elaborated on during the presentation. A categorisation of all relevant variables, all the relationships between them, and the implications of the results for research will be presented. The results have substantial implications for professional development in a world where large-scale societal developments make feelings of uncertainty a day-to-day challenge.

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The Role of Collaborative Design Methods in Boundary Crossing: Exploring Learning Processes of Design Boundary Objects in a Case Study

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To arrive at effective learning technologies that meet professionals' needs, domain representatives, designers, developers, and learning theorists need to develop these technologies in collaboration, i.e. they need to participate in co-design (Dennerlein et al., 2020). A co-design process ranges from framing the project's goal over developing the solution to trialling the outcome in the field and it offers a plethora of co-design methods (e.g., personas, scenarios, or mock-ups) (Iniesto et al., 2022). Stakeholders with different professional backgrounds leverage these co-design methods to consider and coordinate each other's perspectives in the iterative design starting from a rough idea resulting in a matured solution with high chances of adoption in practice. Co-design asks all stakeholders to continuously work across professions, disciplines and organisations, enter other social worlds and face communication, coordination, and collaboration difficulties, so-called boundaries (Iniesto et al., 2022; Islind et al., 2019). For crossing such boundaries, boundary objects play a crucial role as they are artefacts serving as bridges (Star & Griesemer, 1998). Akkerman & Bakker (2011) claim that four learning mechanisms can take place at the boundary to foster boundary crossing: i) Identification – identifying the own expertise and perspective, and the one of other stakeholders, ii) Coordination – organising and facilitating effective collaboration across boundaries, iii) Reflection – perspective-making and taking between different practices and learning from each other's perspectives, and iv) Transformation – co-creating new practices. Co-design methods are understood as design boundary objects (Islind et al., 2019; Mark et al., 2007), but lack an understanding of underlying learning processes at the boundaries. Therefore, we explore which boundary learning processes can be supported by which co-design methods. We present the first results of an explorative case study related to an Erasmus+ project (Author, et al., 2024). A one-year co-design process

involving different co-design methods was conducted to design a mobile technology that supports students' learning during their clinical practice placement. An interdisciplinary research team coming from different countries and domain representatives with different professions (e.g. students, clinical mentors, link teachers, and academic tutors) participated in the co-design process. Seven interviews have been conducted to explore the perceived effects of co-design methods on learning in the light of boundary crossing. Each interview consisted of two parts, a semi-structured part and one in which participants answered artefact-mediated questions (Gulikers & Oonk, 2019) to reflect on the co-design methods used. We transcribed the audio recordings that were subsequently coded by two researchers resulting in 472 codes for the deductive qualitative analysis. The results include the definition of the co-design process and the reasoned co-design methods used for framing the project's goal and developing the mobile technology. Second, the results provide insights into participants' perceptions of boundary learning processes supported through the used co-design methods. Finally, the study aims at specifying the four boundary learning processes and provide insights into their temporal unfolding. These insights contribute to empowering designers and practitioners to consider boundaries in their design teams and the intentional selection of suitable co-design methods for boundary crossing.

The role of experimentation and reflection in changing organizational routines: via Learning Communities

Britt Wiefferink, University of Twente; Mireille Post-Hubers, University of Twente

To keep up with the energy transition, the installation sector is required to adopt innovative solutions, leading to significant changes in the work practices of installation professionals (Van Rees et al., 2020). In this study we focus on the learning process during Learning Communities (LCs), wherein learning, working, and innovating is smartly combined around such an innovation. We examine LCs through the lens of organizational routines because it gives insight into standard ways of doing things and how, if at all, these change in response to the LC (Wolthuis et al., 2021; Spillane, 2012). The experiential learning process within the LC gives rise to a learning cycle going back and forth between reflection (during ten weekly meetings) and action (in-between meetings) (Schön, 1983; Kolb, 1984), which is expected to reconstruct professionals' understanding of the routine under investigation and, in turn, their performances (Fiol & O'Connor, 2017). We aim to further identify enablers in the experiential learning process of LCs for intentional routine change.

To do so, a qualitative case study was conducted in two installation companies, each hosting its own LC. One consisted of ten professionals, including financial-, managing-, planning-, and engineering roles, whereas the other included seven professionals, including planning-, engineering-, and maintenance roles. Both LCs were focused on redesigning their project management routine by integrating the innovative Building Information Modeling (BIM) system. All ten meetings were recorded on video, and all members of the LC were interviewed before and after the LC. Existing coding schemes were integrated with each other (Hubers et al., 2017) to code reflective practice (Schön, 1983) and organizational routines (Feldman & Pentland, 2003), and applied to both the interviews and the transcripted meetings. The interrater reliability of the scheme was satisfactory.

Findings show that LC X mostly spends its time reflecting on their problems with the current routine and articulating the potential impact of a future BIM project management routine. Case Y also starts off reflecting on their problems, but also commences problem solving by experimenting with BIM solutions. During the last meeting, these experiments are evaluated by their managers and more experiments are identified. Additionally, we find that LC X invoked a change in professionals' understanding of the project management routine, whereas LC Y invoked a change in both professionals' understanding and performances. Previous research started to point out that combining action and reflection can help to reorient the understandings and performances of organizational routines (e.g. Feldman et al., 2016; Dittrich et al., 2016). The present study deepens those insights by showing how such combinations can take place and what effect that can have on the LC outcome. This can help enhance the effectiveness of the design of LCs. Additionally, our insights and recommendations can support professionals in changing work practices bottom-up, which is crucial considering the innovations that keep following up and continue to demand organizational change.

The Role of Self-efficacy, Language Proficiency, and the Length of the Training in Language Teacher Conceptual Change

Polina Kordik, Helsinki University

Continuous professional development and training are integral parts of the teaching profession. However, the effectiveness and success of it depend on numerous factors which may foster or hinder conceptual change.

The PhD research project I would like to present aims at clarifying the role of some of these factors: self-efficacy beliefs (SEB), the length of training and the language proficiency of language teachers in the process of conceptual change, using the theoretical framework of Language Teacher Conceptual Change (LTCC) in a longitudinal study (Kubanyiova 2012).

The participants of this study are non-native/L2 English teachers, who make 80% of English teachers worldwide (Canagarajah, 2005). Their SEBs have been neglected by researchers, even though they have been the fundamental pillar of language teaching (Selvi 2019).

Research has established a link between self-efficacy of L2 language teachers and their language proficiency (Choi & Lee 2016; Hiver 2013). However, it is not clear from previous studies, which factor influences the other. The role of SEB in concept change is even less clear, as SEB is generally considered to foster change, while strong SEB may create intolerance for it (Pintrich 1999, Sinatra 2005). Finally, the length of the training has proved to be significant for the robustness of change in university teacher training (Postareff et al 2007). This finding has not, however, been tested on wider audience and in the context of language teaching. The results of this research may contribute to:

- The theorization of LTCC by clarifying the role of SEB in concept change in a longitudinal study.
- The practice of teacher education by exploring the interrelation between language proficiency, SEB, and the length of training.

This knowledge may help educational stakeholders make informed choices on training trajectories.

Globally, the project may positively influence the low retention rates of English teachers worldwide (Ulvik et al 2009) and high-quality educational practices. In my talk, I would like to present the research outline and preliminary results of the first year of my PhD study.

Scaffolded interaction in interprofessional healthcare simulation: How does it address professional identity formation?

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Background and purpose: Professional identity formation (PIF) is an essential process for becoming, being and remaining a professional (Beijaard et al. 2022). In recent years, educational innovations promoting PIF have increased (Jarvis-Selinger et al. 2019; Tien et al. 2019). Referring to the social-contextual approach of PIF (Mount et al. 2022), we assume that practical knowledge and skills ("ways of acting") are learned in the simulation training as well as how to be a doctor or nurse ("ways of being"). Thus, interprofessional simulation training can serve as a catalyst for participants to look at the situation through a PIF lens (Jarvis-Selinger et al. 2019). Scaffolding plays a significant role in that. It offers trainers a good way to observe and assess the trainees' skills and target scaffolding interaction according to the observations. Scaffolding research has not been conducted from the perspective of PIF in the healthcare context (Masava et al. 2023). Our purpose is to examine scaffolded interaction in terms of PIF in interprofessional healthcare simulation debriefing. We aim to answer the question: How does scaffolded interaction in simulation address the professional identity formation of trainees? Methods: The study is based on interpretive perspectives and a case study approach. The authors analyzed six video and audio recordings of high-fidelity simulation debriefings using qualitative content analysis approach. Findings: The authors identified eight different ways in which trainers scaffolded trainees' professional identity formation. These categories were i) assessment of performance, ii) assessment of professional roles, iii) assessment of emotions, iv) teamwork management and cooperation, v) the flow of information in the team, vi) expanding the discussion, vii) sharing stories and viii) open questions. Conclusions: Our findings confirmed that scaffolded interaction can be a catalyst for trainees' self-perceptions as professionals (Jarvis-Selinger et al. 2022). It can encourage reflection at a deeper level concerning how the simulation may shape trainees' views of themselves and their roles (Tien et al. 2019). Thus, our assumption that professional simulation can be an effective learning tool for PIF was confirmed. Based on the findings, we recommend that professional identity should be considered more strongly in the design and implementation of simulations, especially in the simulation debriefings and scaffolding interactions.

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Serious Games for IT Security Awareness Training: A Case Vignette Study on Transfer Effects

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Digitalization poses new challenges for professional development, especially in the field of IT security. The high number of IT security incidents (Ponemon, 2016) show the urgency of promoting IT security awareness. Serious games as a form of professional development focus on the active decisions and contextualized learning of participants (Plass et al., 2015). Serious games can improve the perception of risks, the knowledge of IT security and behavioral intentions of the learners (Hänsch & Benenson, 2014; Plass et al., 2015; Haan & van der Voort, 2018). Previous studies, however, have focused primarily on the knowledge effects of educational games (Assenza, 2019) and less on the transfer of schemata and scripts. As a result, there is a need to identify the ways how serious games may lead to transfer of perceptional schemata and scripts regarding IT security awareness.

The study is based on ecological approaches from transfer research (Lobato et al., 2012; Pugh et al., 2017) as well as extensions of frame analysis (Dohn, 2021; Pietraß, 2017). Participants construct meaning from serious games and will use that knowledge intentionally, if this results in a perceived value (Pugh, 2011). Therefore, measuring transfer becomes challenging since learners might construct knowledge that was not intended in game development (Lobato, 2008). Congruent framing can explain the perceived value of knowledge application in game-external situations. Individuals recognize the difference between real-world and in-game events (Pietraß, 2017). When a new learning situation and a serious game situation seem connected, learners transform existing knowledge to take advantage of these different situational affordances (Dohn, 2021). In this study we explore how individuals transfer IT security awareness from gaming to situations outside the game, framing everyday office situations differently.

Therefore, we conduct a qualitative study design. The target group are offices workers from different companies in Germany. The participants play a serious game about IT security in supply chains. A subsample is randomly selected for participating

in case vignette interviews before and after the game (approx. n = 15). The case vignette describes an everyday office situation containing security-related events with texts and photographs. In that regard, this study uses case vignettes as an innovative methodological approach which is already well-established in other educational domains like medical didactics (Haan & van der Voort, 2018). The interviews are evaluated with an inductive and deductive content analysis, comparing situational framing and behavioral intentions before and after gaming. When data collection is going to be finished, results are going to outline different forms of learning transfer based on how individuals frame in-game and real-world situations. From a practical point of view, the study evaluates how well the developed serious game is suitable for professional development. In addition, possible approaches are shown, how serious games should be integrated and moderated in the event context (expansive framing; Engle, 2006). In academic regards, the case vignette interview is tested as an enriching method of professional development evaluation. Hypotheses for further transfer research are generated.

Simulation training in WBL through the lens of contingent scaffolding

Minna Ylönen, University of Jyväskylä; Pauliina Rikala, University of Jyväskylä; Paavo Räty, University of Jyväskylä; Raija Hämäläinen, University of Jyväskylä

Simulation training has become a common training and teaching method within work-based learning (WBL) in healthcare (Granheim et al. 2018). Despite documented added-value benefits, simulation training requires time, specialized equipment, and a trainer to design and facilitate the simulation process. Thus, it is critical to understand simulation training (Ahn & Nyström, 2020). We investigated simulation debriefings by analyzing trainer-trainee-interactions regarding contingent scaffolding by adopting the method created by Hermkes et al. (2018). Contingent scaffolding based on constructivist learning theory is defined as dynamic assessment and procedural facilitating (Hermkes et al. 2018) – i.e., appropriate support regarding amount, content, and intensity.

The data consisted of video material during six healthcare simulations as part of the organizations' high-fidelity simulation training in 2021. The participants (N=22) in the simulation training were divided specialist doctors (n=5), doctors in training (residents) (n=4), midwives (n=4), and nurses (n=14). The trainers were both a specialist doctor and a nurse in each simulation training. The debriefing recordings of the six simulations lasted a total of 1 hour and 46 minutes (31,5 pages of text).

We qualitatively identified trainer-trainee-interaction scaffolds as meaningful entities, after which we applied a rating using the trainee level of attainment (TLA) and trainer strength of intervention (TSI). Finally, we evaluated the coded episodes regarding contingent and non-contingent patterns (Hermkes et al. 2018). Findings Our findings illustrated that contingent scaffolding constituted 36% of the total trainer-trainee interaction and ranged from 0 to 56 percent. In our presentation we will illustrate how trainer intervention can support contingent scaffolding and thus the quality of trainee support. For example, the question "Would you tell me more about what you thought in that situation" seems to be a good way to start scaffolding and thus ensure the quality of the interaction from a contingent point of view. This is an important observation because non-contingent scaffolding may not influence trainees' understanding in the desired way.

We were able to locate and identify the trainer's supportive behaviors and the critical aspects of contingent scaffolding. These aspects facilitate high-quality scaffolding, thereby increasing the effectiveness of simulation training. To scaffold the trainee's practical skills, cognitive understanding, and knowledge, the trainer should assess the current level of the trainee's competence and allow room for the trainee's reflective thinking during debriefing. Our findings can assist educators in understanding what constitutes high-quality contingent scaffolding and how to implement these principles in their own guidance efforts.

Situated leadership in assessment: Nurturing professional learning for assessment-capable teachers

Jennifer Charteris, University of New England; Dianne Smardon, Springboard Trust

The evolving educational landscape necessitates a profound understanding of the role of assessment-capable leaders in enhancing teacher professional learning. School leaders play a critical role in embedding formative assessment practices, enhancing teacher assessment literacy, and fostering a culture of collaborative data analysis. This presentation profiles research that explores the pivotal role of leadership for teacher professional learning to take up sociocultural practices in assessment. The development of teachers' assessment capabilities is deeply rooted in the social contexts and interactions within schooling ecologies. Central to the paper is the concept of assessment capability, where leaders and teachers integrate and utilise assessment effectively to foster student learning. This capability is crucial for teachers, especially those new to the profession who may not yet have developed deep assessment knowledge and associated skills.

Methodologically, the study employs semi-structured interviews with 38 principals, examining principals' conceptions and practices of assessment leadership. The analysis, facilitated by NVivo, a qualitative data analysis software, inductively identifies and categorises dimensions of leadership that enhance assessment capacity. The research posits that high quality teacher professional learning in assessment requires a shift from traditional competency-based models of leadership to a more situated, sociocultural approach. This emphasises the distribution of assessment expertise, collaboration, and empowerment of both teachers and students through assessment processes. Situational factors and social dynamics are leveraged in the professional development of teachers.

The study provides a roadmap for educational leaders to effectively support and advance teacher professional learning through focused and strategic assessment leadership. The data presented underscores the criticality of context-dependent, situated leadership assessment practices in schools. The vital role of school leaders in navigating complex, often politicised assessment processes is acknowledged. The sociocultural dimensions of situated assessment leadership identified in the study move beyond a technical model of leadership, focusing instead on fostering relationships between leaders, teachers, and students in assessment practices.

Dimensions of situated leadership practice are categorised into four key areas: Leadership for student capability, Leadership for teacher capability, Leadership for collective capability, and Leadership for system capability. This categorisation serves as a guide for school leaders in their work with teachers to enhance the assessment culture within their schools.

The paper highlights the necessity for leaders to engage in professional learning and development specifically focused on assessment capability. This involves not only acquiring knowledge of assessment theory but also developing the ability to effectively lead teachers in this area. Such leadership is not isolated but rather leverages the sociocultural resources of the school community, drawing on the strengths of teacher leaders in reciprocal learning relationships. Leaders need to have expertise in assessment theory and practice, as well as capability to lead teacher professional learning. This focus is not solely on competencies in data use and teacher assessment literacy, but also on distributing assessment expertise, fostering collaborations, and navigating the temporality and politics of assessment. This approach to leadership is essential for developing a robust culture of assessment that supports both teacher and student learning.

Students' profiles at the Ecole Hôtelière de Lausanne (EHL) during their internship: Tension between acculturation and individuation

Charlotte de Boer, University of Geneva; France Merhan, University of Geneva; Nathalie Delobbe, University of Geneva

The EHL Hospitality Business School is a world's leading reference in education for the hospitality and service sector. Based in Lausanne in Switzerland, this school confronts its students with a restrictive institutional framework, a strict and imposed behaviour code, little private space, a high degree of homogenization, in sum, an assumed goal of acculturation. EHL's students, while adhering to the strong values of their school, appear to be driven by a personal identity and values, as well as a high degree of autonomy, attributes that are particularly appreciated by employers.

To study this tension between acculturation and individuation, the theoretical framework of organizational socialization will be mobilized. Widely used to understand entry into a new job, this theoretical framework has also proved to understand socialization of students on placement in training companies (Pennaforte et al., 2017). Organizational practices implemented by internship institutions to promote acculturation and/or individuation of their new entrants will be analyzed and the relationships between internship students' acculturation and/or individuation profiles and internships' satisfaction and emotional exhaustion will also be examined (Montani et al., 2019, Cable et al., 2013; Hewlin et al., 2016). A cross-sectional survey using online questionnaires was carried out among 344 students in September 2022, at the end of a 6-month internship in the second semester of their first year of study at EHL. To complete this quantitative data, 6 semi-structured interviews were conducted in October 2022 with students' volunteers to participate. Of these 6 interviews, 3 contrasting interviews were retained for our analyses. The results of these interviews are currently being analyzed. Latent Profile Analysis using Mplus software (Muthén & Muthén, 2017) is used to answer to our questions.

Our results indicate first 4 different profiles: the Conformist (1), the rather Conformist (2), the rather Authentic (3) and the Authentic (4). Serial socialization tactics, i.e. offering reference people who will formally or informally serve as role models, predict a greater probability of belonging to the Conformist than to the rather Conformist and the Authentic, and predict a greater probability of belonging to the rather Authentic than to the Authentic profile. Investiture socialization tactics, i.e. depending on the extent to which its values identity and accepts the newcomer's

personal values and beliefs, present a greater probability of belonging to the rather Conformist than to the rather Authentic and the Authentic and predict a lower probability of belonging to the Conformist than to the other three profiles and also predict a lower probability of belonging to the rather Authentic than to the Authentic. Our results also show that students in the very and rather Conformist profiles are significantly less satisfied and more emotionally exhausted than students in the very and rather Authentic profiles. Finally, the dynamics of each profile will be documented by qualitative interview analyses, currently in progress.

The results will be discussed in terms of their contribution to the state of knowledge on organizational socialization and their practical implications for guiding and supporting students during their internships.

Student teachers' leadership development in a Finnish teacher education programme

Janni Alho, University of Jyväskylä; Eija Hanhimäki, University of Jyväskylä; Sirpa Eskelä-Haapanen, University of Jyväskylä

Teachers employ multifaceted leadership in their schools from the beginning of their career. The requirements for teachers' leadership competencies have only increased in educational organisations that are currently operating in their complex and fluid environments. Thus, leadership development should be considered an important aspect of teachers' professional development in initial teacher education. However, the previous research literature indicates that leadership development is not currently supported in initial teacher education to a sufficient extent. Additionally, an understanding of how leadership development occurs in initial teacher education is limited. This case study aimed to examine student teachers' (n=5) leadership development in a Finnish class teacher education programme. More precisely, we examined their individual approaches to their leadership development, how they utilised the study programme in their leadership development processes, and what kinds of perceptions they had of the factors that either supported or prevented their leadership development in their studies. The data consisted of motivation letters written by the student teachers and semistructured individual interviews, and was analysed with qualitative content analysis with inductive reasoning and typologisation. The results revealed student teachers representing three different approaches to leadership development: competence-, personality- and context-driven, and utilising the study programme diversely in their leadership development processes. They perceived their achieved leadership development relatively limited

in practical leadership. This study contributes to the previous research by identifying initial teacher education as a potential leadership development context and revealing the individual nature of student teachers' leadership development. In the future, it would be worth considering whether more practical leadership exercises should be included in initial teacher education from the beginning of studies. Additionally, more coordinated and continuous support for leadership development, including elements such as personal leadership development plans, could help student teachers to achieve even more holistic leadership development in their studies and receive expert guidance from teacher educators.

Superpowers in Vocational Education: A Thematic Analysis of Expectations and Potential of Learning Analytics

Ville Heilala, University of Jyväskylä; Toni Stubin, Metodix Oy; Antti Kauppi, Metodix Oy; Hannu Linturi, Metodix Oy

Despite the potential benefits of learning analytics (LA) in vocational education and training (VET), there is a research gap in understanding how to effectively integrate LA tools for supporting students, particularly in the context of combining workplace and classroom learning, while also addressing the critical issues of ethical data use and privacy concerns (e.g., Gedrimiene et al., 2020). Thus, this research aimed to answer the research question: What are the expectations of LA in the VET context?

The data were part of a larger Delphi study, where the respondents (N = 37) were Finnish VET educators, researchers, and professionals with experience in LA. The respondents were asked to answer a free text question: "If you had any superpowers to help you do your job in vocational teaching/learning better, what would they be?" This study considered "a superpower" as a metaphor (e.g., Holstein et al., 2017) for an expectation of how LA could augment the work of a VET professional. The data were analyzed using a thematic analysis. Based on the thematic analysis of the "superpowers" metaphorically representing the expected benefits of LA, 14 themes emerged in which respondents expressed a desire for LA to support their work in VET: 1) emotional support, 2) motivation, 3) interaction, 4) students' coping, 5) assessment, 6) support for learning and guidance, 7) personalization, 8) time management, 9) effectiveness, 10) lesson planning, 11) support for special education, 12) strengthening of personal characteristics and competences, 13) school system development, and 14) knowledge management. From the teacher's perspective, the benefits of LA were seen mainly in terms of

support for learning and guidance, personalization, and lesson planning. The most crucial benefit of LA for a VET student was personalization. Other essential aspects were strengthening personal characteristics and competencies, support for motivation, learning, and guidance. Regarding administration and support functions, the most cited areas were knowledge management and the development of the school system, which would aim to renew and streamline the educational processes to foster more efficient, supportive, and innovative learning environments. In summary, LA was expected to support learning in VET by providing personalized support, enabling students to take more control over their learning journey, make informed decisions, and actively shape their educational experiences and career paths (e.g., Heilala et al., 2022).

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Supporting Students´ Career Choices During Learning Activities at Museums and Science Centres

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Schoolteachers and parents play an important role in shaping future education paths and career trajectories of children. For example, children with higher socio-economic status are more likely to reach higher education than their counterparts with lower socio-economic status (Põder et al., 2023), belonging to a specific minority or gender group can also limit perceived educational or career options (Faitar & Faitar, 2013). However, considering that 'learning rests on interpretations of the lived-in-world' (Seddon, 2022), it is important to keep in mind that a wide range of other 'contexts' can and do influence or inspire children. For example, participating in learning activities that take place in out-of-school learning environments (OSLE), such as field trips to museums, galleries, and science centres, can have a positive influence on students learning motivation (Greene et al., 2014), introduce them to their communities' learning resources (Nabors et al., 2009), and inspire future careers in science (Flemming, 2023). Moreover, educators of OSLE's

value life-long learning in a broad sense (Tran & King, 2007). On the hand, curriculum-related learning activities at OSLE's are boundary practices and their results depend on the collaboration of on-site educators and schoolteachers. Yet, it is unclear whether or how educators of OSLEs introduce specific career options or support concrete career-related competencies during learning activities. The aim of this research was to explore how on-site educators perceive supporting students' career choices at museums and science centres; and to find out how career choices are addressed during learning activities. 43 educators from OSLE-s were interviewed. Qualitative content analysis was used to find meaningful patterns from the dataset. Most participants feel that their practice can have a positive effect on students' future career-choices. They stated that participating in learning activities at OSLE-s rises awareness of different fields of research and related career paths (especially those, but not limited to careers available at their OSLE, e.g. historians at a museum), encourages children to explore novel ideas and educational paths in an unbiased context, and helps to connect theoretical or superficial knowledge about their fields with authentic activities and examples. Most participants made specific examples of career-related activities from their work experience, ranging from discussing practical implications of their field of research (e.g. environmental protection) and possibilities to contribute (e.g. related educational programs), sharing personal career paths, introducing influential scientists, to designing practical tasks mirroring the work of professionals from their field. A smaller number of educators, mostly those with more working experience, gave examples of systematic support to career development – whether during explicitly designed learning activities or by leading larger career-related events and programs for youth. All in all, educators at OSLE's should be considered important partners in introducing future educational and career-related choices to children. However, many of the respondents had not previously conceptualized their practice using the lens of future careers. Thus, in the future career- and educational choices could be more explicitly discussed and reflected upon in the context of curriculum-related learning activities at OSLE-s.

Teachers' digitally mediated collaboration practices

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The purpose of this study was to examine how teachers' digitally mediated collaboration practices are developed and what factors support the use of digital

tools in teacher collaboration. Digital tools in teachers' work are not limited only to teaching situations but are relevant also in their collaboration with peers, students, and guardians. Similarly, the digital tools that are used in collaboration with peers require professional learning as does the use of new tools and practices for teaching and learning. Teachers' novel digital collaboration practices were explored by relying on the practice theory and particularly on the aspects of episodic or continuous change (Weick & Quinn, 1999) and intentional or unintentional change (Schatzki, 2002). In addition, this study was inspired by the idea of the connection between practitioners' (teachers, principals) transformative professional agency and school structures, resources, and other stakeholders (Kemmis, 2011).

68 teachers from six comprehensive schools in Helsinki, Finland were interviewed, and the same teachers replied to a questionnaire examining their digital competencies and practices. The themes of the interview protocol included school culture development needs, teachers' collaboration practices, and teachers' professional development needs. The one-hour long semi-structured interviews were transcribed, and participants were coded. In this study all the participants were examined as one dataset to protect their anonymity. The interview data was categorized based on qualitative content analysis principles and an abductive approach was adopted.

Three questions from the questionnaire data concerning teachers' collaboration practices were chosen to be included in this study and a descriptive analysis was conducted. The preliminary results from the ongoing data analysis revealed that digitally mediated collaboration practices were developed to mitigate the time used for everyday activities and to enhance teacher collaboration. These practices differed per practitioner group and specific collaboration practices were identified on whole school level, inside teacher teams, and between smaller teacher groups such as co-teaching pairs. This resulted in various collaboration practices that each teacher participated in. The school practitioners' perceived agency varied regarding the collaboration practices, but a common notion was that school leaders' contribution appeared to be lacking when teachers' collaboration practices were created. Instead, it seemed that digital practices were determined both by education provider's prerequisites and by teachers' needs based initiatives. Furthermore, the factors that were perceived either as supporting or hindering teachers' digitally mediated collaboration practices consisted of a personal approach towards digital tools, teachers' competencies, resources, and schools' organizational culture. To conclude, the results imply that digital collaboration tools are utilized to support teachers' work, even though school structures do not always support the use in an

ideal way and that adopting new tools and practices is sometimes time-consuming due to lack of competencies that in turn impact personal approaches.

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Teachers' professional agency in the development of science literacy pedagogy

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This study investigates the professional agency of 5th-6th grade teachers when they teach science literacy in a design research project. Understanding that agency is constructed in classroom interaction as a result from the interplay of individual factors and sociocultural elements, we ask: how teacher positions him/herself in relation to the pedagogical approach to science literacy? By science literacy we refer to attitudes, knowledge and skills which strengthen students' science aspirations, conceptual learning and support multiple source reading, i.e. searching, evaluating, understanding and synthesizing information from different sources in complex information environments like from Internet. Science literacy skills are part of the Finnish primary school curriculum goals. They are needed both in solving personal and global problems. However, achieving these goals are challenging both for teachers and students. Therefore, it is important to support teachers with novel pedagogical solutions. Thus, the teacher can develop his/her professional competence and thereby his/her teaching practices. In this development process the teacher's professional agency plays a significant role.

In Finland, teachers have autonomous position and so the freedom to make pedagogical choices and decisions independently. Hence, the teacher's professional agency is an important factor to be investigated when assessing the success of novel pedagogical solutions in classroom practice. So we can better understand the factors that support or hinder the potential utilization of solutions.

The research context was primary school classrooms in which teachers were supported to teach science literacy skills in the spring 2023. During the intervention teachers were supported by in-service training, background reading material and mentoring by the researchers. Our leading idea was to support the pedagogical

development of teachers and thus the teaching of science literacy in their own classroom. The pedagogical approach consists of teaching and learning materials of science literacy. It combines printed and digital material in a new way, providing meaningful conceptual links between them. The teaching materials, students' printed workbook and the digital learning environment support structuring teaching. These include educational activities and tools to facilitate teaching science literacy.

Teachers (N=17) implemented the science literacy approach in their own classroom in a period of five lessons (5x90min). The data is based on feedback notes written by the teachers. Feedback was collected from teachers using online survey three times during the intervention and at the end of the intervention. All surveys had several open-ended questions. We used small stories and positioning as analytical tools for studying teachers' professional agency.

The analysis identified four different agency positions from the data which are called adaptor, applicator, submitter and filter. The results indicate that these positions are constructed in the complex classroom interaction. Even a similar interaction situation seems to direct the teacher's agency in different ways, depending on the importance the teacher gives to each factor of the sosiocultural context. The study reveals factors that influence different positioning and how these positions support or hinder the use of pedagogical approach. In this way, the research provides best practices for the development of teaching science literacy and in-service training for teachers.

Teaching with Virtual Reality – A Comparative Study of VR Literacies Among Pre-Service Educators in Finland and Germany

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This paper investigates the ways in which future educators transform their general technical expertise in digital technologies into the proficient utilization of Virtual Reality (VR) for learning and teaching purposes. Within the framework of Technological Pedagogical Content Knowledge (TPACK, see Mishra & Koehler 2006), technological knowledge intersects with pedagogical knowledge (how to teach) and content knowledge (what to teach), continuously evolving in response to technological innovations. New technologies, however, do not exist in a vacuum;

they are an extension and reconfiguration of preceding media and their corresponding literacy practices (Bolter & Grusin 2004, Eisenlauer & Hoffmann 2008). Accordingly, this paper approaches technological knowledge in VR learning contexts by disclosing how meaning-making via and within VR incorporates and enhances skills and competencies required for earlier digital media use. More specifically, our study focuses on VR literacies among pre-service educators from a comparative Finnish-German perspective. We engage with different sets of qualitative and quantitative data within the context of previously identified trends in digital literacy, noting Finland's leading position and Germany's relatively lagging status in terms of digitally skilled citizens and professionals (Eurostat 2023). The research participants comprise pre-service educators from Germany and Finland, providing a diverse spectrum of prior experiences with digital technologies, including VR. Methodically, the study employs a mixed-methods approach, combining qualitative insights from participant-created VR learning spaces with quantitative data on VR learning experiences and instructional design decisions. In relation to the former, productive VR literacies were explored through workshops where participants learned to design and implement engaging VR learning experiences. To accommodate participants with limited technical expertise, particularly in coding, the study favored the use of 360-degree cameras over computer-generated imagery for creating VR learning experiences. Post-workshop discussions gathered insights into experiences and reflections of the workshop participants. The quantitative aspect focuses on collecting and analyzing data related to the effectiveness of a VR learning space within the area of paleontology. Such analysis encompasses aspects of instructional design and the impact on learners' experiences as well as previous knowledge about digital/VR technologies. Our study highlights the connection between pre-service educators' varying digital fluency and their understanding of earlier media and literacy practices, and how this relationship influences their approach to using and developing VR learning environments. Although the data collection from Finnish participants is ongoing, the German participants have already shown notable proficiency in assimilating virtual reality (VR) into their teaching methodologies. In the realm of their VR literacies, two distinct meaning-making practices emerge: the conceptualization of immersive environments during the creation and shooting/filming of VR scenes, and the prediction of user interaction in the editing and presentation of these materials. These skills build upon and broaden the established multilinear, interactive, and multimodal practices described for navigating digital texts/environments (Eisenlauer 2020). In conclusion, our research emphasizes the need to incorporate VR technologies within education curricula, not only to refine instructional methods but

also to prepare upcoming educators for the ever-changing sphere of digital literacy skills (Fink, Eisenlauer & Ertl 2023).

Team learning: Developing innovative student teachers for emerging complexities at work

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Professionals, including teachers, increasingly must learn and collaborate closely due to the emerging complexities of their work which may often be difficult to address. This growing complexity at work drives a need to reconceptualise professional learning (Goh and Lim, 2022), for many of the professions. Many dominant conceptions of professional learning do not necessarily address the emerging complexities of professional practice.

These conceptions tend to view learning as a linear process and individualistic which this paper argues, could impoverish the purpose of teacher professional learning. Within the same line of argument, there is a growing pool of researchers who recommend a paradigm shift away from a traditional teacher development programme to a collaborative endeavour.

The idea of this shift is akin to the recent UNESCO (2019) response to the new social contract for education, where it is imperative to recast the future of teaching as a 'collaborative profession'. In parallel, until recently, studies on teacher professional learning have also tended to downplay the significance of team practices that could lead to emergent learning.

Within the same line of arguments proposing a shift in thinking about learning, this paper draws on Hager and Beckett's (2019) concept of complexity theory and co-present groups (teams), this paper is structured around one key question, 'How can using an educational lens of complexity science help us to advance our understanding of teacher professional learning?

Using data from a group of student teachers, this study uses an explanatory case study approach to gain insight into what happened when they engaged in a series of shared activities in a teacher training course. This shared activity required student teachers to work collaboratively in designing lessons to address common issues of professional practice.

Analysis of the findings shows that emergent learning happens as a result of contingently purposeful interactions and ongoing processes of sense-making in team practices. Shared sense-making and collective reflection (Goh, 2019) for

further innovative actions drawing on an individual's knowledge is more likely to occur in team learning/practices.

Hence, the implication of this study signals the importance of teacher preparation programmes to build environments or create opportunities to promote the likelihood of emergent learning, such as shared spaces for team learning/practices to develop student teachers' design thinking capacities given the complexities at work.

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Through Sieve to Fighter's Cockpit. Flight Instructor´s Role in Pilot Training

Harri Karjalainen, University of Jyväskylä; Mikko Vesisenaho, University of Jyväskylä

In this presentation we examine how airmen experience their task as instructors and educators. The focus is on the primary flight training phase of future fighter pilots in the framework of a pilot selection and training system. This research is unique in the context of Finnish military aviation, and internationally as well. We put instructors' tacit information into words.

The study is qualitative research of teaching demanding psychomotor skills to young adults. Data was collected by thematical interviews of 13 instructors, who educate both primary flight students and flight instructor students in the Finnish Airforce Academy. The data consisted of 113 pages, 35947 words and were subjected to an inductive content analysis. The study revealed that flight instructors' professional identities are based on three building blocks: 1) an instructor, 2) a role model and 3) a selector for further training. The focus of this presentation is on the instruction as supporting learning process. Instructors are committed to teaching. If a student fails to achieve learning objectives, instructors regard this as their own failure. Even though instructors base their methods on the constructivist learning theory in an essentially constructivist learning environment, they also see themselves as developers of the holistic learning environment through instructor-

student interaction. They see students first and foremost as individuals and seek to find the most suitable learning method for everyone. In instructors' view, the key skill is to build a confidential relation with students, which can be achieved by listening and placing oneself in students´ position. The instructors described their organizational culture as a constructive learning environment. The air force is an extremely close-knit unique community, where individuals with specific traits apply for pilot training.

These traits are then reinforced by the demands of the profession. Instructors continuously evaluate students' aptitude for success in this community where confidence is essential. A student has to commitment himself or herself to the organization's values and ethical standards. Therefore, social skills are needed too. As role models, instructors aim to instill the organization's culture – in which flight safety is the paramount goal – in students. The instructor is more than a teacher or a mentor; s/he is a sensei, who provides all-encompassing guidance to students and enables their growth into the fully-fledged member of a fighter pilot community.

This study validates earlier research on teaching of demanding psychomotor skills and on expertise development. This study emphasizes the significance of learning environment and organizational culture, e.g., constructive, social, experience-based learning with experts is highlighted. Instruction and learning happen both consciously and unconsciously. We have put instructors' tacit information into words. The presented novel results could be applicable in other training organization as well by pinpointing the targets for the development of floor-level practices.

Towards design principles for Immersive Virtual Reality simulation for professional learning: Results from two review studies

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Both on-the-job and off-the-job training methods often only prepare employees partially for their job. The increased accessibility to Immersive Virtual Reality (IVR) simulations is promising to combine real-life irregularities with the safety of a practice environment. However, there is limited to no understanding of how IVR simulations should be designed in order to help individuals learn (Radianti et al., 2020). This study combines two systematic literature reviews into multimedia educational design principles that reduce unnecessary cognitive load (Mayer, 2014;

Study 1) and educational simulation design principles (Study 2) for adults to gain insight into which design principles need to be used in IVR simulation design for professional learning. In the first literature review, we analysed 19 papers that reported on 31 experimental groups on multimedia educational design principles to better understand which multimedia principles reduce extraneous processing, manage essential processing, and foster generative processing (e.g., Hsu, 2012; Khacharem, 2017; Scheiter, 2006; Yuliver-Gavish, 2023). Only few design principles led to positive results in multiple experiments, these were the signalling-, spatial contiguity-, redundancy- and modality principle, with the most robust learning effect associated with the modality principle. The segmenting principle had varying results but could be promising when segments are divided into information provided before a task and during a task. Finally, results regarding the self-explanation- and worked example principles were inconclusive; these principles require further investigation.

The second literature review explored the potential simulation design principles for professional learning. Only four articles fulfilled the inclusion criteria of this systematic literature review (Park, 2011; Jagger, 2016; Nadolny, 2013; Widiasih. 2022). The results showed different types of simulation and applied gamification that reported positive learning effects. However, it was unclear what in these simulations caused these positive effects. This thesis did shed light on an important trend in educational science: most of the knowledge that we currently have about effective educational design stems from research conducted in traditional school settings, often with university or college students as participants. This knowledge cannot be generalised towards a professional population, due to differences in age and literacy and numeracy skills.

Overall, these studies add to the knowledge base about educational IVR design for professional learning. The review demonstrates that a variety of strategies can be used to facilitate learning using IVR, but implementing the modality has a robust positive effect. A limitation is that most of the studies on educational simulations are focused on pupils or students who differ considerably with adults in their literacy and numeracy skills. The current synthesis leads to practical recommendations for educational design of IVR educational simulations for the context of professional learning and provides a critical note for necessary future research.

Towards an integrated online learning system for microscopic pathology: two teaching examples

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Microscopy is an essential basis for exploring and understanding pathological disease mechanisms. As a discipline, pathology is highly dependent on visual imaging technologies. Currently, digital pathology is a standard method with certain advantages for clinical histopathological diagnostics as well as for the education of undergraduate medical students and pathology residents. However, to date, most digital applications lack features to optimally support more student-centered learning and teaching of histopathology, such as possibilities for learners to annotate tissue slides and to receive feedback on the interpretation of microscopic images. The shortcomings of educational applications are exasperated in the current development, in which teaching and learning are increasingly shifting towards online learning.

Therefore, the EU-sponsored cLovid (collaborative Learning of viewing and decision-making skills) ERASMUS+ project (2021-2023) set out to build an integrated online learning system featuring

- an open-source webmicroscope (an extension to the OMERO-viewer) with enhanced features for annotating Whole Slide Images, allowing integration with assessment and feedback software
- a student assessment system (e.g., VQuest, in our design) for designing and constructing assignments and training materials to acquire digital competencies in individual and collaborative activities
- an open-source software application/dashboard (PRISMA) for visualizing students' responses in tasks using various types of responses (e.g., marker questions that are ideal for visual domains) in order to provide collective feedback to a group of students and a joint platform for communication.

Subsequently, the international multi-disciplinary project team carried out two naturalistic teaching experiment of the integrated system incorporating several principles of powerful learning: reflection, elaborate feedback and collaboration by means of a flipped-learning scenario. Experiment 1 involved second-year undergraduate medical students (N=70) from two European universities and Experiment 2 pathology residents (N=16).

The purpose of the study is to describe the development of the system, demonstrate how it can be used and to present user appraisals from the two teaching experiments. Based on the existing evidence, it seems that the system is very well suited for arranging training for geographically dispersed pathology residents, in particular.

Towards multimodal learning analytics in simulation-based professional training

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Simulation-based training is a key component in professional education, preparing students for working life in industries with high safety standards (Lehtinen, 2021). In maritime education and training (MET), simulators have become an essential part of education (Wiig et al. 2023). In recent years, novel technologies such as virtual reality and cloud-based simulators have gained interest in MET, providing new modes for remote training, skill acquisition and competence development (Kim et al. 2021). However, early attempts to provide adaptive feedback to students during training on cloud-based desktop simulators show the complexities involved in designing educational systems that provide an engaging and meaningful learning experience (Gyldensten et al., 2023). A conclusion drawn from interviews with MET students highlights how feedback from the system must be carefully aligned with the student's previous knowledge in order to provide adequate scaffolding during training (Gyldensten et al. 2023). Multi-model Learning Analytics (MMLA) has the potential to offer new insights into student's learning trajectories in complex learning environments (Blikstein and Worsley, 2016). Taking a design ethnographic approach (Crabtree et al. 2012) this study aims to inform the design of an intelligent learning system (ILS) with multimodal learning analytics and adaptive feedback for students engaged in high-fidelity simulator-based navigation training by exploring the limits and affordances of technologies and sensors used for measuring different aspects of team training in professional education. The empirical case in focus is a basic navigation course at a Scandinavian university. Video-recorded data covers all instructors in the course (n=3) and four of the six student groups (n=40). Episodes identified as instructor-student interaction (n=70) were transcribed verbatim and subjected to multimodal interaction analysis. Close analysis of two episodes from the data corpus, shows how the delivery of feedback consists of recurring, multilayered, and multimodal feedback cycles, comprising instructors' close monitoring of student's actions to continuously assess the fit between the learning objectives and the ongoing task, providing feedback that draws on the rich semiotic recourses of the simulated environment, while considering aspects of realism and authenticity. Considering the multilayered and multimodal nature of feedback in professional learning contexts, we identify technologies and sensors needed for

capturing interactions in simulated environments and discuss their limits and affordances.

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Trainers' knowledge about the transfer of training – conceptualization and operationalization of a crucial yet uncharted concept

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Perhaps the most central question in education is transfer" (Anderson & Singley, 1993). This might even more be the case regarding the extensive transformations our society is currently undergoing. The digitization of crucial domains of our lives can only be met by lifelong learning, including the continuous professional development of adult learners. To empower individuals to not just react to, but to actively shape the digital transformation, learners should be enabled to use new knowledge and skills successfully and sustainably in their working-lives. In this case, scholars speak of successful transfer of training (Baldwin & Ford, 1988). Despite the extensive research on the determinants of the transfer of training (Bell et al., 2017), the professional personnel who conduct training – the trainers – have been largely overlooked so far. With regard to the general importance of teachers for learning outcomes, our study builds on the premise that trainers need to know what determinants affect transfer and how to promote transfer. We therefore theoretically conceptualized and empirically operationalized the construct trainers' knowledge about the transfer of training. In 1988, Baldwin and Ford introduced their model of the transfer of training, which is still widely recognized. The authors differentiate between the training inputs trainee characteristics (learners' ability,

personality, motivation), training design, (principles of learning, sequencing, training content), and work environment (support at the workplace, opportunity to use). Currently, an impressive amount of original empirical studies, meta-analyses, and literature reviews exists on the determinants of transfer, and their findings can be predominantly fitted into the model (e.g., Bell et al., 2017). Based on this research, we conceptualized trainers' transfer knowledge as a three-dimensional construct, incorporating the dimensions knowledge about learner characteristics, knowledge about training design and knowledge about the learners' work environment. We developed an instrument with 31 test items and evaluated the test behavior of 341 trainers from a cross-sectional study via Item Response Theory. All items show good fit to the three-dimensional partial credit model (infit values: 0.87-1.10). EAP-Reliabilities are acceptable (0.63; 0.70; 0.73). Model comparison favors the expected three-dimensional structure compared to a one-dimensional, and other plausible multidimensional models. The results suggest that our conceptualization and operationalization of trainers' transfer knowledge can be reliably measured and validly interpreted. Hence, the instrument can be used for the further investigation of trainers' professional knowledge. Our findings can further be interpreted as empirical evidence for the three-dimensionality of the construct.

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Training professionals into looking at interactional competences with collective data sessions: experiences in the fields of education, healthcare and social work

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In service professions such as in healthcare, education or teaching, social interaction is at the core of practitioners' daily business. Interactional competence is deployed to coordinate actions with service users or recipients as well as other co-workers and partners. While novices' interactional skills are typically developed within situated work practices (see Gonzalez-Martinez & Buillard 2018; Nguyen 2011; Filliettaz 2011; Filliettaz 2022, Pochon-Berger et al. 2015), the question arises how

interactional competences can be addressed within training settings. In the past decade, there has been a growing interest for the use of Conversation Analysis, through diverse methods, to train professionals into unpacking the interactional skills that are needed in their work practices (see Filliettaz et al. 2022; O'Reilly et al. 2020; Parry et al. 2022; Sert 2015; Stokoe 2014). At the center of these training methods lies the close examination of videorecorded workplace interactions. These methods allow practitioners to gain insights into the interactional workings of their professional practices with the aim to further bring change into praxis. Following that line of thoughts, we have recently experimented the use of data sessions as a training method in diverse initial and continuing vocational training contexts in the fields of nursing, early childhood education, special needs education and social work. In this paper, we will present our methodology through several exemplary cases. Although the pedagogical designs slightly differed from one setting to another, they all shared these following ingredients: 1) working with detailed transcripts, 2) observing and describing multimodal conducts in the video, 3) applying a sequential analysis and 4) experiencing a collective analysis (data session). Based on the collected experiences and video recorded accounts of training sessions, we will question the outcomes and avenues of such training method for broaching interactional competences in professional training. Empirical findings show that training sessions based on the principles of collective data sessions may have significant impact on at least three different levels of professional practice: a) action interpretation and reflexive practice, b) knowledge production and dissemination across participants, c) identity construction and affiliation within communities of practices. Based on these findings and a range of illustrations, we will discuss the implications of transposing a research-based method into a pedagogy and reflect about the potentialities and limitations of the data session as a "pedagogical institution" (Harris et al., 2012).

Trust and distrust in distance learning - a special case of exam fraud

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In this presentation, our interest focuses on issues of trust and distrust in distance learning, and we have chosen the university exam and exam fraud as our "peeking window". Exam fraud is discussed and, in our experience, often comes up as a concern, but the topic has been studied relatively little in Finland. We conducted an electronic survey of the university's teaching staff to study teachers' experiences

and perceptions of exams, and remote exams in particular. We analyze our data using qualitative content analysis. Our results show that the role of the traditional exam as an assessment practice is still strong, although alternative forms of assessment - compared to real working life - are in use. The COVID-19 pandemic changed assessment practices and changed the lecture hall exams to remote exams and its various forms. Trust is really an issue in remote context, and our results showed the diversity of the definition of exam fraud and the different angles of entry into exam fraud and its prevention.

Understanding the associations between teaching processes and physiological arousal to support higher education teachers' professional development

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Social interaction in the teaching-learning situation has been shown to act as an important antecedent of well-being (Aldrup et al., 2018). Moreover, interaction is a typical characteristic of learning-focused teaching along with the teachers' pedagogical awareness, i.e. ability to reflect teaching and student learning (Postareff et al., 2023). Recent educational research has approached well-being using techniques that measure physiological arousal, with one of the most common measures being electrodermal activity (EDA) (Horvers et al., 2021). EDA is measured from eccrine sweating, which refers to increased sweat gland activity as a result of psychological and emotional states, for example, when experiencing states of high arousal or stress (Boucsein, 2012). Physiological arousal has also been examined among teachers, focusing on physiological arousal e.g. in relation to teachers' behavior and emotions (Donker et al., 2020) and self-efficacy beliefs (Jõgi et al., 2020). Still, the relation between teachers' teaching processes, i.e. learning-focused teaching and arousal in a specific teaching situation has not been examined.

Following this, we formulated the research question as: "How self-assessed interactive, unreflective, transmissive, organised and constructive approaches to teaching are related to physiologically measured arousal during higher education (HE) teaching events?"

The participants of the study were 59 Finnish university teachers (age M=49.5, SD=8.422). They represented applied universities (n=33, 55.9%) and research universities (n=22, 37.3%). In addition to responding to a cross-sectional survey, participants wore smart ring during teaching events (to record their EDA) on average

2.4 days (SD=1.534). They reported 185 teaching events (M=3.1, SD=2.542). The normalized average arousal level (from 0-100, with a typical mean of 50) during these events was 59.4 (SD=14.465, Min = 21, Max = 93).

The data were analyzed using Bayesian mixed-effects regression analysis (brms package, Bürkner, 2017) in the R environment (R Core Team, 2022). The dependent variable was the average arousal level during the teaching events. Predictor variables were the four HowUTeach factors (Parpala & Postareff, 2021) from the survey data: Interactive Approach (3 items, α = 0.83), Unreflective Approach (3 items, α = 0.81), Transmissive Approach (3 items, α = 0.75), Organized Approach (3 items, α = 0.71). The fifth factor was Constructive Approach (4 items, α = 0.68) modified for teachers from HowULearn survey (Parpala et al., 2022). The response scale for all items was from 1 (strongly disagree) to 5 (strongly agree). Items measuring each factor were averaged and centered on the grand mean (cgm) for analysis. Results showed that self-rated unreflective teaching approach was positively and credibly related to arousal during teaching events, (βcgm= 7.79, $S.E.$ = 3.313, 95% $C.I.$= 1.41 - 14.32). Even stronger finding was that constructive approach to teaching was positively related to arousal (βcgm= 15.31, $S.E.$ = 5.356, 95% $C.I.$= 4.51 - 25.78). Other three factors were not credibly related to arousal values during teaching events. The findings suggest that inability to reflect teaching and learning and teaching supporting students' deep approach to learning are related to higher arousal during teaching events. This should be acknowledged in higher education teachers' professional development.

University teachers' possibilities for collaborative pedagogical regulation in relation to regulation of their students' learning

Henna Vilppu, University of Turku; Emmi Saariaho-Räsänen, University of Turku; Mari Murtonen, University of Turku

University teachers constantly encounter new challenges and requirements in their teaching work, such as the recent Covid pandemic and the launch of ChatGPT, which call for regulation of their own learning and development of teaching, i.e., pedagogical regulation. While regulation of learning has been well-studied among university students, there is not a substantial amount of research on regulation of teacher learning and pedagogical development. What is known about teacher regulation of learning is that it is not often planned and self-regulated, but rather spontaneous and non-linear (van Eekelen et al., 2005) and that teachers differ in

their skills in self-regulating their learning (Lindblom-Ylänne et al. 2011). Further, self-regulation skills have been found to contribute to university teachers' willingness to develop their teaching (Kreber et al., 2005). Thus, previous research has focused on the individual aspects of regulation. However, what is not yet well-known is the role of colleagues and management support in teachers' pedagogical development. The aim of this study is to fill this research gap, i.e., to understand better the individual but also collaborative regulation processes among teachers. Further, we aim to explore, how teacher regulation resonates with teachers' ways and intentions to regulate their students' learning in problematic situations.

The data was collected via an electronic survey (N = 181) in one Finnish university, and the open-ended questions related to teachers' ways and possibilities to participate in development of teaching in their unit as well as questions concerning their reactions and intentions in situations, where students are not self-regulating their learning and proceeding in their studies are used as data. Data-driven content analysis was utilised to analyse the answers.

Preliminary results show that the teachers could be divided into five subcategories in terms of their ways and possibilities to participate in developing teaching. About a fifth experienced that teaching-related issues were actively dealt with in their working community, and felt that they had good possibilities to influence these. On the opposite end, 13 % of the teachers mentioned that teaching-related issues were not attended in their unit nor were they interested in influencing these themselves. In the subcategories between the extreme ends, dealing with pedagogical issues varied from often to scarce, and from informal to formal ways of participation. The analysis of teachers' ways to react to students' lack of regulation is ongoing, and the results concerning this and the interplay with teachers' pedagogical regulation will be presented in the conference. To conclude, there seems to be substantial variation in how pedagogical regulation takes place in teachers' working communities and especially the role of management seems to be crucial in supporting collaborative pedagogical regulation.

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Unveiling the Dynamics of Learning Location Cooperation in VET: An In-Depth Exploration of Stakeholders' Perspectives, Experiences, and Approaches

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Previous research – especially in the context of intensive studies conducted during the 1990s (e.g., Euler, 2004; Pätzold & Walden, 1999) – paints a disheartening picture of the state of Learning Location Cooperation (LLC) in Germany's dual VET system. Most often, the implementation of cooperation strategies among involved learning locations (i.e., vocational schools, companies, and inter-company training centers) falls significantly short of pedagogical requirements and purposes. This lack of effective cooperation has been identified as a key obstacle in achieving the dual VET system's full potential (e.g., Aprea et al., 2020; Gessler, 2017). However, over the past two decades, research on LLC has become sparse, resulting in an academic void that the present study aims to fill by providing contemporary insights on the topic. Examining different stakeholders' perspectives, experiences, and approaches with a particular focus on the integration of theory and practice, this study seeks to provide an in-depth understanding of those dynamics that characterize current LLC in Germany's dual VET system.

The study's primary research questions focus on (a) comprehending stakeholders' perceptions of applied LLC strategies and their views on pedagogical demands for effective LLC, (b) exploring factors that contribute to the success or failure of applied LLC strategies and the intended pedagogical ideal, (c) delving into didactic approaches deemed beneficial for linking theory and practice within LLC. Methodologically, the present study adopts a qualitative research design based on 16 semi-structured interviews with representatives from all directly involved stakeholder groups: vocational school teachers, company trainers, inter-company trainers, and apprentices. A systematic selection process ensures that participants belong to the same cooperation teams, enabling a direct comparison of their subjective perceptions on LLC.

The anticipated interview outcomes encompass not only nuanced thoughts on the current LLC state in Germany's dual VET system but also diverse evaluations of associated challenges and opportunities as well as discrepancies between theoretical ambitions and practical realities. Offering a comprehensive exploration of factors that influence LLC effectiveness, the research results demonstrate possibilities to overcome identified barriers while proposing valuable pedagogical

approaches to enhance theory-practice integration. Beyond the scope of Germany's dual VET system, the study's practical implications extend globally by informing policymakers, educators, and industry leaders about pivotal factors for impactful LLC, widely applicable to diverse VET systems around the world. Ultimately, this research contributes to the broader discourse on VET as it emphasizes the synergy potential of theory-practice interplays which are crucial for developing a skilled and competent workforce.

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The Use of Team Learning in Engineering Education - A Systematic Literature Review

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Engineering is a profession that heavily relies on teamwork. This study aims to provide insight into the use of team learning in engineering education, including how team learning is used, how professional learning can be supported by team learning, and how the effectiveness of team learning is assessed. A systematic literature review was conducted following the PRISMA statement, using 89 peer-reviewed research articles published between 2013 and 2023. The importance of team learning skills has been acknowledged as the most crucial skill in engineering, according to an extensive study by Passow (2012). However, employers perceive that recent graduates lack sufficient team skills (e.g. Czerwińska-Lubszczyk et al., 2022; Hirudayaraj et al., 2021). Collaborative teaching methods widely used in engineering education seem not to guarantee the development of team skills unless they are deliberately practiced (e.g. Gallegos & Peeters, 2011). Although a large body of research literature on engineering education has been published, actual engineering education research did not begin to develop until the mid-1990s (Borrego & Bernhard, 2011; Jesiek et al., 2009). The field has been criticized for its

lack of quality and rigor (Borrego, 2007). To gain a better understanding of current research on team learning, this study aims to answer the following research questions: How has team learning been studied in engineering education? What results have been achieved through team learning? How has team learning been defined in previous studies?

Based on preliminary results, it was found that most studies relied on surveys and only 20% of the studies implemented a control group.

Additionally, learning outcomes were not properly assessed in the majority of studies. Therefore, we recommend that further rigorous research on team learning is important for designing research-based practices in engineering education in future.

Validating Quantitative Engagement Metrics in Speech-to-Text Data on Team Interaction

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For teams to thrive in challenging or innovative assignments, engagement of all members in the process of knowledge sharing and the construction of new ideas and solutions is paramount. Previous studies also suggest that engagement relates to innovative behaviors in both teams (Widmann et al, 2019) and individuals (Kwon & Kim, 2020). Engagement needs thus to be understood and increased to foster and accelerate innovative behaviors in team collaboration. Engagement is a multi-faceted concept. Fredricks et al. (2004) describe three types of engagement: "Behavioral engagement encompasses doing the work and following the rules; emotional engagement includes interest, values, and emotions; and cognitive engagement incorporates motivation, effort, and strategy use" (Fredricks et al., 2004, p. 7).

Past studies have tried to analyze these facets using qualitative and quantitative metrics. However, many previous qualitative studies focus on post hoc assessment and self-reported metrics such as questionnaires (e.g. Henrie et al., 2015; Manwaring et al., 2017; Ben-Eliyahu et al., 2018; Widmann et al., 2019). Hoi and Le Hang (2021) argue that non-obtrusive methods are suitable for detecting behavioral engagement while providing fewer insights into internal cognitive or emotional processes. However, recent developments in AI have increased both the quality of speech-processing applications as well as the amount of available speech-to-text

data. Hence, it is timely and relevant to conduct more research on whether engagement can be identified without using self-reported measures. Quantitative and non-self-reported metrics have mainly been studied in a written language context. Examples include message boards, learning management systems (LMS), and social media. However, studies on communication argue that verbal and written communication have significant differences, such as differences in the use of functional words (i.e. articles, pronouns), which have been found across various languages (e.g. Crawford, 2007; Lintunen & Mäkilä, 2014; Olujić & Matić, 2017). One of the aims of this study is to investigate if metrics derived from a written language context can also be applicable in the context of speech-to-text data. Therefore, we explored various metrics derived from previous research. The research question we aim to answer is: Which quantitative measures will give a good representation of engagement in speech-to-text data on team interaction?

The Louvain method for community detection on three fixed clusters shows that the quantitative metrics are a valid representation of engagement, since they clusters as expected to theory. However, when using Principal Component Analysis (PCA) to identify the most important contributors within the types of engagement we lost many of the more specific text-based metrics. It needs to be explored further if text-based metrics are an absolute necessity in detecting engagement. Engagement remains a multi-faced, context-dependent, and challenging-to-capture concept. This paper suggests that combining several network measures with a more generic sentiment analysis might already adequately capture engagement in speech-to-text data on team collaboration. We will present the most important characteristics to assess if a team is engaged, along with some implications for automated detection.

VET Teachers' Professional Development at Work: Validation of a Measurement Instrument

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Since the world is changing rapidly, the importance for teachers to continue their professional development after their basic teacher training grows. The workplace appears to be the preferred context for teachers' professionalization (Postholm, 2012). Workplace learning of teachers takes place when teachers participate in professional learning activities within the school. The Teachers' Professional Development at Work survey (TPD@Work) by Evers et al. (2016) measures

participation in these learning activities. The instrument had been tested and validated in Dutch primary and secondary education, as well as among teacher educators in higher education. It might also be useful in vocational education and training (VET). Professional development activities of VET teachers are currently not monitored or evaluated in most countries (Cedefop, 2016). A comprehensive validated instrument for measuring VET teachers' workplace learning activities is lacking. The first aim of this study was to test the factorial structure of the TPD@Work survey among a sample of Dutch VET teachers. Additionally, the second aim was to assess the construct validity of the instrument, since teachers' professional development cannot be measured directly (Gravetter & Forzano, 2012). Construct validity was assessed in terms of convergent validity (when an instrument shows positive and rather high associations with instruments that are intended to study theoretically similar concepts), divergent validity (when a construct shows low associations with a theoretically unrelated, or weakly related, construct) and predictive validity (when the measurements of the TPD@Work survey predict certain behaviour). A thorough literature search led to relevant existing questionnaires for validity assessment, which were added to the measurement instruments. A quantitative, cross sectional survey study was executed (N = 142). The results of a confirmatory factor analysis indicate that the six-factor model of the TPD@Work survey holds among a sample of Dutch VET teachers. In addition, all subscales show sufficient to good internal consistency. Furthermore, correlation tests and regression analysis confirm both convergent validity (with similar workplace learning instruments), divergent validity (with an instrument to measure emotional demands) and predictive validity (with an instrument measuring innovative behavior). Therefore, the instrument is validated in the context of VET and is recommended to measure workplace learning of VET teachers. This helps monitoring and evaluating professional development activities, for example by human resource departments or team managers of a VET institution, and indicating opportunities to further improve quality of teachers and education. The TPD@Work survey can also be used as a valid instrument to conduct further scientific research into workplace learning of VET teachers.

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Vocational education teachers' digital competence

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Research has shown that digital competence is necessary for teacher to design learning environments that help students to be prepared for the tech-driven world. Digital competence of teachers can be understood as the ability to design digital learning environments. The "Will, Skill, Tool (WST) model of technology integration" (Knezek et al., 2003) shows that both the competencies of teachers and their attitudes and the digital equipment available to them are of relevance when designing appropriate teaching-learning environments. Especially in Germany, there is a lack on research-based approaches regarding the status of digitalization in vocational schools. The study therefore examines the digital equipment, the available digital teaching and learning materials, the digital competence and the attitudes of teachers toward the use of digital technologies at vocational schools, in Germany.

The main research questions are: (a) What digital equipment do VET teacher use? (b) How do VET teacher estimate their digital competence? (c) What are VET teachers´ attitudes towards the use of digital equipment? (b) Do VET teacher differ regarding their digital competence? To answer the research questions, a cross-sectional online questionnaire study with validated and self-developed scales was conducted with teachers at vocational schools specializing in nursing (N = 372). To measure digital competence DigCompEdu (Redecker & Punie, 2019) and a scale from Rubach & Lazarides (2019; 5-point Likert scale 1=absolute agreement – 5=absolute disagreement) was used. The scale measured digital competence used different competence dimensions such as digital communication or analyzing and reflection. For measuring attitudes towards the use of digital equipment for learning, we developed a scale based on the WST model, that measures teachers´ agreement with nine potential advantages of digital learning equipment (5-point Likert scale 1=absolute agreement – 5=absolute disagreement). For analyzing data, we used to analyze Cronbach´s alpha and used explorative factor analysis. For the self-developed scale, we conducted confirmatory factor analysis. Furthermore, we used descriptive analyses and ANOVA. Cronbach´s alpha for all scales was satisfying (□=.80 - 96.). Confirmatory factor analysis for our self-developed scales also shows acceptable results (RMSEA .11 CFI .91 SRMR .04). The results on equipment indicate that the teachers are equipped with basic technical devices for using digital technologies (such as PC and tablet). In terms of usage, primarily free content is used here. When asked about their digital competence, most teachers describe

themselves as being at the level of explorers. Regarding different competence dimensions, VET teachers see them most competent in “Digital communication” (M=1.66; SD=.70) and less competent in “Digital Problem solving” (M=2.35; SD=.85). About their attitudes VET teacher assume positive effects of using digital learning equipment (M=2.36; SD=.65). Younger teachers rate their digital competence higher (M= 1.57; SD=.46) than older teachers (M=2.02; SD=.69; F(5) = 3.230; p = .007). The results of the study imply that for fostering VET teachers´ digital competence digital tools must be provided and learning opportunities created. The digital competence of teachers should be promoted as early as the higher education phase.

What Makes You Stay or Leave? Individual Experiences Behind the Retention and Turnover Intention in the Field of Technology in Finland

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Retaining current workforce has become a significant challenge for many public and private sector organisations, particularly in the technology sector. Employee turnover has negative consequences, including recruitment costs and the loss of valuable workplace-specific knowledge and social capital. Moreover, it can be challenging to replace those who leave, as knowledge-intensive sectors face labour shortages (Larja & Peltonen, 2023).

While turnover intention refers to conscious and voluntary willingness of employees to leave their current workplaces (Bothma & Roodt, 2013), retention refers to employees' willingness to stay in their current workplaces. Referring to latter, embeddedness theory (Mitchell et al., 2001) argues that i) links with colleagues, ii) fit with the job and work environment, and iii) sacrifices associated with workplace change prevent employees from leaving their workplaces. However, it should be noted that turnover intention and retention are not two sides of the same coin, as the reasons behind them may differ (Holtom et al., 2006).

Following this, the research questions of the current empirical study were formulated as:

- RQ1: How do employees describe the factors influencing retention through the three components of embeddedness: links, fit, and sacrifices?
- RQ2: How do employees' descriptions of the factors behind turnover intention and retention differ?

- RQ3: When comparing employees with low and high turnover intentions, what differences can be observed in the factors related to retention and turnover intention?

The data were collected from two technology sector companies in Finland in 2019 and 2020, comprising an online questionnaire (N=153) and thematic interviews (N=31). Turnover Intention Scale (see Bothma & Roodt, 2013) was used to categorise employees into two categories: higher and lower turnover intention. The interview data were analysed using thematic analysis.

The three categories of embeddedness theory comprehensively addressed factors interviewees described as contributing to retention. Previous research has not extensively detailed the factors within these categories. The analysis confirmed the categories and highlighted factors, such as the opportunity for continuous learning and development, that workplaces can consciously address and develop, fostering a stronger sense of engagement and satisfaction. When comparing the factors influencing turnover intention and retention, some differences emerged. Generally, it appears that the factors in the sacrifice category embed employees in their current jobs. However, if implemented weakly, they do not lead to higher turnover intention.

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When teams adapt: Applying the four measurement principles to study the temporal dynamics between team stress and team behavior during natural task setting

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For decades, authors have further theorized the concept of team stress and studied its relationship to how teams think, feel, and behave during a task. Understanding how team stress can affect teams' ability to adapt to the demands of a naturalistic

task setting has been an essential focus. Moreover, team performance is particularly susceptible to stress through team behavior (Weaver et al., 2001). Nevertheless, how researchers have traditionally studied the relationship between team stress and adaptive behavior can be further inquired. Like a natural scientist choosing an instrument such as a microscope to study the structure of a cell, social scientists should also carefully choose their design and metrics, inherently aligning it with how they define the phenomenon they are interested in (Collins, 2006; Shadish et al., 2002). Even though early authors have warned team researchers of two methodological pitfalls, avoiding these has still proven difficult.

Firstly, authors such as Roe et al. (2012) strongly addressed the role of time within team research. They noticed that team processes such as team stress, adaptation, and performance are often measured as time-stable metrics or variables that characterize a team (e.g., Daudelin-Peltier et al., 2017; James et al., 2021). However, all can continuously change during a task depending on the context and time they occur (Dietz et al., 2012; Driskell et al., 2001). Team stress rises and descends. The function of the adaptive behavior can change, and performance can improve and decline throughout a task. Although challenging, studying when and how teams change is thus crucial to further understanding how team stress, behavior, and performance can affect one another. Secondly, Chan (1998) explains that when operationalizing multilevel phenomena, such as team stress, team researchers must first consider what type of functional relationship the levels of analysis in the concept hold (e.g., the individual and team level). Traditionally, most stress studies have operationalized team stress using a central tendency metric (i.e., the mean). However, this metric type may only partially reflect the emergent nature of team stress, or in other words, how members' stress appraisals and responses dynamically relate to each other over time (Barsade & Knight, 2015).

When studying the relationship between team stress and behavior, researchers must know their nature and how to avoid these pitfalls. Therefore, this study builds on what we already know about team stress, adaptive behavior, and performance and presents four theory-based measurement principles to guide researchers who want to capture their relationship. To enhance their comprehensibility, this study demonstrates their practical application using physiological, video and expert-coded data collected from one student team during a 1.5-hour navigation training exercise in a 360° ship simulation. Although This application does not aim to present significant results relating to stress, team behavior, and performance, this allows us to showcase how these principles can guide and further our understanding about the nature of team stress and its relation to other team processes and outcomes.

By discussing and motivating these principles, this study encourages researchers to reflect on their measurement designs.

Workplace and organizational learning and well-being – How are they approached and related in the research?

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Recent studies suggest that emerging learning requirements may unintentionally threaten the well-being of employees and work groups (e.g., Collin et al., 2024). This is also in line with the notion by the European Agency for Safety and Health at Work concerning the critical role of well-being in learning (EASHE, 2019). Learning in the work context mainly takes place while doing the work itself, that is, informally and situated in work practices and workplaces' activity systems. However, we have a very narrow understanding of how daily individual and shared learning practices are intertwined with well-being. In this scoping review, we aim to reveal what we already know about this relationship. More specifically we ask: How has the relationship between learning and well-being been approached and studied in the context of work? The few earlier pedagogical interventions (e.g., Watson et al., 2018) conducted in work contexts lack a deeper examination of informal learning as an eminent part of regular workplace practices. However, a few existing studies have evidence that learning may enhance or burden employees' well-being. We know that an environment that is beneficial for learning develops through well-being. We also know that an excessive and incremental learning load may be negatively connected to the well-being experienced. Previous research has thus emphasized individual-level learning and well-being, but in this review, we are open to any elaborations that concern individual, social- and organization-level learning and well-being as related constructions in the contexts of work and organizations. The search was done with keywords of learning AND well-being AND work OR organization in Scopus.com. starting from 1999 and limited to open-access articles available in English. The search resulted in 996 relevant abstracts of those we further excluded other contexts than work (such as students). Working now with the relevant 173 abstracts, we will continue to limit them to relevant full-text articles based on which we will conduct a thematic analysis according to our RQ. In the paper, we will present preliminary findings of the scoping review, critically elaborate them, and suggest practical implications and a way forward in indicating some future directions for research. Our findings will have high relevance to the research field of work and learning, first because of the lack of research of the relationship under

study and second, because of the importance of this relationship for the sustainability of working life and its people.

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The power of feedback and facilitation in post-simulation debriefings

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A lot of research has been conducted in the field of medical education (Cook, 2014; Cook et al., 2013; Hegland et al., 2017), where simulations are used to advance mostly individual skills such as diagnostic competences and motor and technical skills of prospective doctors, nurses, and emergency teams. However, little is known about the use of simulations to train team skills and on the interaction between individual and team-level constructs to leverage team capability. In this paper, we want to outline which of core simulation-based learning (SBL) instructional features (i.e., feedback and facilitation) examined in the literature hold potential for improving learning in collaborative contexts.

The diversity of SBL instructional features and implementations raises some concerns. The drawback of studies reviewing the literature on a specific method is that they may analyze and compare SBL implementations that are not comparable. There is a myriad of implementation schemes for SBL and thus, it may lead to misinterpretation of results and confusion concerning what is really the method that is being studied (Prince, 2004). Given the differences observed within instructional methods, a first step would be to single out the unique instructional features examined in the literature on SBL and compare their effects. In this field study, we qualitatively compare the depth of feedback processing between conditions in which student teams (N= 20) have been involved in post-simulation debriefings. Two important instructional features that can augment SBL are examined and contrasted. We single out the benefits of Multisource feedback (MSF) compared to feedback given by supervisors only and the benefits of facilitation coupled with video review compared to feedback only (debriefing with feedback but with no

facilitation). Some of the preliminary findings show that MSF brings feedback processing to a higher level (in terms of depth of processing and team processing). Feedback discrepancies contained in MSF seem to create a learning opportunity for teams to co-construct new understandings. By contrast, when teams only receive feedback from their instructor, they seem to keep moving to different types of information or components without sharing and building upon those different components. They act more as individuals and less as teams. Adding human facilitation to a debriefing seems to help team members engage in high reasoning with each other, build upon each other, and co-construct new understandings (higher and team processing). If teams are only given feedback data (and no facilitation), they tend to make sense of those data, but they stick to individual-level reasoning. In other words, they rather focus on "what those data mean to me?" than on "what can we learn from each other as a team"? This research in medical education can more generally fuel our understanding of teams that engage in complex communication skills and of how to optimize their learning from their experience. In sum, in this paper, MSF and facilitation are presented as powerful instructional features to augment the quality of reasoning of teams in post-simulation debriefings.

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