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THEMES AND POTENTIAL GAPS IN RESEARCH ON VOCATIONAL EDUCATION AND UNIVERSITIES OF APPLIED SCIENCES IN FINLAND: A SCOPING REVIEW OF STUDIES PUBLISHED IN 2020–2022

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Abstract:
This scoping literature review examined studies conducted in Finland in 2020–2022 in the context of vocational education and university of applied sciences education. The aim was to map research related to the theme published in national and international journals, to gain insight into the research field and to identify key themes. A total of 60 peer-reviewed articles were selected for the review. The study analysed the articles published in the two Finnish journals focusing on adult education and vocational education (n=15). In addition, articles published in international scientific journals (n=45) were analysed from the most relevant databases. Eleven thematic content areas were identified from the studies, which collectively construct a representation of a digitalising, work-oriented research field in which student-centeredness can be seen as evident in studies related to, for example, career paths and competence-based approaches. Of the studies, 30 had been carried out primarily in the context of a university of applied sciences, while 30 articles

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dealt primarily with vocational upper secondary school context. There were 9 studies carried out at several different levels of education, and in addition, the level of examination in six studies was societal. The results show that there is a need for more research in the areas of sustainable development, future competences, diversity and well-being, as well as a need to further investigate the growing importance of digitalization, especially of artificial intelligence. Based on the results, it is possible to identify both research gaps and current challenges and phenomena related to learning and societal discourse.

Keywords: vocational education and training, university of applied sciences education, scoping literature review

1. Introduction

This review examines vocational education and training (VET) and university of applied sciences (UAS) education, which, as forms of education situated close to the world of work, respond to the competence needs of the workplace. They are oriented towards the acquisition of a profession, work-related competences, and work-readiness. The aspiration to achieve proximity to the working environment necessitates a capacity for flexibility and the pursuit of individualised learning pathways. This presents a significant challenge for students, requiring them to develop their capacity for self-direction and to enhance their own competence (Upola et al., 2020). The Finnish approach to VET and UAS education is characterised by a student-centeredness, a competence-based approach, a strong alignment with the demands of the world of work and a commitment to continuous learning (Brauer et al., 2020; Isacsson et al., 2021; Ministry of Education and Culture, 2019). Competence-based education is an important starting point for education in Finland and in the Nordic countries (Heikkinen & Kukkonen, 2019). Internationally, the significant differentiation of VET systems and practices in Finland presents substantial research challenges, due to inherent complexities such as being difficult to specify, dynamic in nature, and broadly scoped (Organisation for Economic Co-operation and Development [OECD], 2014). In contrast to basic education and university education, VET is highly nationally defined and culturally linked. The diversity of the research area partly stems from the fact that VET is situated at the multilevel and multidimensional intersection of work, occupations, and learning, which is simultaneously influenced by current economic, political, institutional, social, and individual factors (Gessler et al., 2021).

Research on VET in Finland has been both quantitatively limited and less systematic compared to university research. This is explained by the fact that the research traditions of VET are considerably younger. (Isacsson et al., 2021). In recent years, the importance of VET research has increased considerably, partly due to the increased demands of economic-social crises, which has made this education an even more important subject of social, economic and political debate (CEDEFOP, 2021; McGrath et

al., 2019). The research provides important perspectives and solutions for managing crises and understanding their impact, reinforcing the role of VET as a key instrument in societal and working life changes. Significant changes in working life and their impact on the changing needs of education and training, as well as continuing rapid developments at both international and national levels, highlight the importance of mapping research. It is thus essential to understand how educational needs evolve and transform over time. It is, therefore, crucial to monitor phenomena related to VET research in order to be able to respond to changing societal needs by directing research towards topical and socially relevant topics. As the importance of research continues to grow, it is expected that this will be reflected in the topics covered and the quality and quantity of the publications produced.

This scoping literature review covers original peer-reviewed studies conducted in Finland in 2020–2022 in the context of VET and UAS education. The aim is to map research published both in national and international journals, to gain insight into the research field and to identify key themes. The review partly serves as a continuation of Siirilä and Laukia's (2021) analysis of vocational education research published in Finland, which examined the national publications from 2016 to 2020.

This scoping literature review aims to outline and analyse research published both in national and international journals. In the field of VET research, scoping literature reviews that provide a broad overview of the research area without hypothesis testing are still quite rare (e.g. Gessler & Siemer, 2020; Arksey & O'Malley, 2005; Grant & Booth, 2009). The approach allows for the identification of themes, trends or developments.

This type of review is topical from the perspective of the national education strategy work, as the quality management strategy for VET, "Quality strategy for vocational education and training 2030" (Ministry of Education and Culture, 2019), places even greater emphasis on decision-making based on foresight and informed decision making. Education providers must thus respond to the transforming challenges of the operating environment by investing in quality and effectiveness by utilising foresight and research data (Ministry of Education and Culture, 2019).

The next chapter examines the national and international themes that unite VET and universities of applied sciences. The research method, research design and materials are then presented in more detail. After presenting the results of the scoping literature review, their significance is assessed, and possible future research directions are considered.

2. Background and the rationale of the scoping review

It is essential to explore how research in Finnish VET and UAS education relates to internationally observed social phenomena and current issues in education and the world of work. Continuous changes in operating environments necessitate proactive development and adaptability from educational actors to effectively respond to rapidly evolving circumstances. Digitalisation and other technological advancements challenge

society's ability to renew, but at the same time, they offer new opportunities for reforming work and learning. Continuous learning is seen as a key factor in responding to the changing competence needs of working life and strengthening competence. At the same time, we can see how the shrinking age cohorts will inevitably have an impact on the demographic structure: the number of people of working age will continue to decline, and the labour market will become more globalised (Mulder et al., 2015; Vähäsantanen & Hämäläinen, 2019; Ministry of Education and Culture, 2019; Trenerry et al., 2021; Löfgren et al., 2023; World Economic Forum, 2023). VET and UAS education must actively respond to global changes by educating a workforce capable of responding diversely and sustainably to the needs of the changing labour market. The following paragraphs provide a more detailed examination of these aforementioned themes.

Digital transformation is widely believed to have been accelerated by the changes brought about by the global pandemic caused by COVID-19 (Aditya, 2021; Thomas, 2020). Driven by the societal changes resulting from the pandemic, those working in educational institutions and other organizations are facing the demands of constant technological, social, economic, and cultural changes (Bhagat & Kim, 2020; Harteis et al., 2020). Changing work practices due to automation, robotisation and digitalisation require continuous updating of competences (Cetindamar et al., 2024; Poquet & De Laat, 2021; Leung et al., 2021). The development of digitalisation has brought up several so-called emerging technologies, of which the most significant change can be considered the development of artificial intelligence (AI) (Bankins & Formosa, 2023). As AI becomes increasingly integrated into both the workplace and formal learning environments, it is imperative that employees and students possess the ability to comprehend the intricacies of AI systems, navigate their complexity, and respond effectively to situations where systems require impromptu problem-solving (Bearman & Ajjawi, 2023; George & Wooden, 2023; Lodge et al., 2023). Understanding the functioning and effects of AI, i.e. artificial intelligence literacy (AI literacy), is already an increasingly important competence requirement in different professions. Conversely, in addition to AI literacy, contemporary workplaces and learning environments demand a further set of skills, namely those associated with what is known as AI literacy. This encompasses an understanding of how to deploy supporting intelligence, in other words, the capacity to harness the potential of AI within practical contexts and tasks. (Magnisalis et al., 2011; Feuston & Brubaker, 2021; Shiohira, 2021). The development of technologies and innovations requires new kinds of competences, such as skills related to emerging technologies, analytics and cyber security (e.g. Kipper et al., 2021). This creates an opportunity for educators to leverage emerging technologies in support of student learning. However, to effectively harness these technologies, education itself must undergo a process of renewal to adequately prepare students to become future experts in their respective fields (Moraes et al., 2023).

The global labour market, worker mobility, and demographic change expanded by digital transformation present a significant challenge to the development of professional skills and training programmes. It is thus essential that education equips

students with the requisite skills and knowledge to thrive in the diverse and multicultural workplaces of the future. This requires both students and the education system to demonstrate the ability to adapt and adopt a flexible approach (e.g. Trenerry et al., 2021). The requirements for competence in the Finnish workplace are becoming increasingly diverse and differentiated, which presents a challenge in accurately assessing the educational challenges and future needs of the workplace (Dufva & Rekola, 2023). The change requires a reassessment of the emphasis on professional and general meta-skills (e.g. Gekara & Snell, 2018; Löfgren et al., 2020). For instance, the significance of softer, generic or non-technical skills, including emotional and social skills, will be underscored in future professional contexts as well as in the ability to adapt to change (e.g. Ruhalahti et al. 2021). In addition, increasing multiculturalism requires cultural intelligence, i.e. the ability to understand, adapt and act in a diverse environment (e.g. Seitamaa & Hakokõngäs, 2022).

In today's globalised world, new situations and challenges are emerging due to accelerated technological transformation, evolving work practices and the growing complexity of society (e.g. Lemmetty & Billet, 2023). In Finland, a key objective has been set with the aim of improving the level of competence, which serves to reinforce the significance of continuous learning in the context of evolving working practices. The shortage of experts will be addressed by extensively developing the provision of continuous learning, both by utilising existing competence and by developing micro-credentials (Finnish Government, 2023). According to Kinnari et al. (2022), the reform of continuous learning is seen as a revolutionary and necessary measure to enable citizens' competence and the nation's global competitiveness. Responding to new skills needs requires flexibility in the VET system and opportunities for workers to participate in the training they need alongside and during work. In the national context, continuous learning will be challenged by the previously mentioned decline in working-age people, demographic changes and, on the other hand, the accumulation of skills and participation among certain groups (Finnish Government, 2020). Furthermore, it is evident that the provision of education and career guidance services would benefit from reinforcement (Finnish Government, 2020).

It can be argued that education is a significant factor in the global promotion of environmental awareness and the adoption of sustainable lifestyles (Salonen et al., 2023; Laininen & Salonen, 2023; Ergene et al., 2021). Sustainability and digitalisation are significant global trends that are interconnected in many ways. While not all of the impacts have yet been fully understood, it is nevertheless important to assess how digitalisation can support sustainable development in education and training systems, including the use of AI (e.g. Vinuesa et al., 2020) As indicated by the National Forum for Skills Anticipation future employment and educational opportunities will necessitate an understanding of the principles of sustainable development, including ecological and environmental competence in a range of professional settings (Finnish National Agency for Education, 2020). These competences relate to environmental, social and economic sustainability and aim to promote resource efficiency, reduce environmental impacts and

increase social justice. From the standpoint of social equality, the Finnish government is committed to fostering a socially, economically, and ecologically sustainable society in which equality of opportunity is the prevailing norm. This means that digital, social, cultural and physical equality is considered from the perspective of accessibility and equality (Kosunen, 2021). Furthermore, partnership with the world of work also seeks to facilitate the transition towards greater sustainability (Laininen & Salonen, 2019). The role of education in developing sustainability competence is significant, affecting students, the wider education community, local businesses and the whole society (Asikainen & Tapani, 2021).

Global and national developments are reflected in the surveys of previous studies in VET and UAS education, as well as in the results of recent national reviews and reports. Recent research in Finland has concentrated on the interface between the workplace and wider society. However, there is a lack of research examining other key areas, such as research, development and innovation (RDI) activities (Siirilä & Laukia, 2021). In the context of UAS education, there has been a notable emphasis on active participation in RDI activities, which facilitates a connection to national and regional societal development needs (Sipari et al., 2022; Väänänen & Peltonen, 2020). Based on the review of the literature concerning vocational education, Siirilä and Laukia (2021) identify several key themes for future research, including the development of professional competence, the acquisition of working life skills, pedagogy and teaching methods. Furthermore, they suggest that the post-pandemic era will see a shift in focus towards exploring digital learning solutions (Siirilä & Laukia, 2021). Nokelainen (2013) underscores the importance of integrating research on vocational education with an examination of the diverse educational initiatives and pedagogical practices occurring within educational institutions, the professional sphere, and the interphases between the two. However, Isacsson et al. (2021) demonstrate that, according to Nordic comparative research on vocational education and training, research on Finnish vocational education and pedagogy is dispersed across different universities and faculties. Furthermore, the differentiation of themes makes it challenging to perceive the field of research and important phenomena in a comprehensive manner. The studies state that there is no continuum for the development of education, and, for example, there is not enough support for the research-based development of practices or pedagogical methods in different professional fields (Isacsson et al., 2021).

3. Research methods, research design and data analysis

The method used in this study is a scoping literature review. A scoping literature review can be defined as a type of research synthesis aimed at systematic mapping and identification of the scope of evidence for a particular topic, field, concept, or research problem independent of sources (Munn et al., 2018). This type of review is used, for example, when compiling a systematic literature review is challenging due to the diversity of research methods or publication formats (Levac et al., 2010). A scoping

literature review differs from a systematic literature review, especially in that it does not typically take a stand on the quality of studies, but on the other hand, it contains an analytical interpretation of the research literature, which in turn distinguishes it from a narrative literature review (Levac et al., 2010).

In this article, the scoping literature review follows the model of Levac et al. (2010) and Arksey & O'Malley (2005), which includes the following six steps:

1) Identifying the research question,
2) Identifying relevant studies,
3) Study selection (inclusion and exclusion criteria),
4) Charting the data,
5) Collating, summarising, and reporting the results,
6) Consultation (optional).

In this study, steps 1 to 6 of the process were carried out as follows. Figure 1 shows the data retrieval and screening process.

1. The previous research question was used as the basis for identifying the research question. The research question of an earlier review conducted by Siirilä and Laukia (2021) was: what kinds of research related to vocational education orientations have been published in Finland during 2016–2020. This study took into account the VET and UAS research conducted in Finland, which focuses on both national and international publications, and it was examined in 2020–2022, i.e. as a kind of continuation and widening of the review by Siirilä and Laukia (2021). The focus of the study was limited to the context of VET and UAS education. The entire research group discussed the limitations of the study and specified the research question. The final research question emerged as: *What kind of key themes can be identified from the Finnish research on vocational education and training and university of applied sciences published in international and national journals in 2020–2022?*
2. For international articles, identifying of relevant studies began with the selection of databases and the definition of search queries and search criteria. The following databases were selected: ERIC (Ebsco), Education (ProQuest), Emerald Insight, Sage Journals and Scopus. In the selection of databases and information retrieval, an information specialist was consulted to ensure the quality of the search results. The search query included the following keywords, which were aligned with the standardised descriptors used in the databases: Vocational Education OR Professional Education / Interprofessional Education OR Professional Training OR Vocational Schools AND Finland or Finnish.
3. Of the international articles, only peer-reviewed international articles that had been published in 2020–2022 were included. For example, dissertations were excluded from the review. With regard to international articles, the first and second authors first independently read all the abstracts and went through the keywords used in these articles to determine which ones were suitable for the review. Unclear cases were jointly discussed in order to build a common

understanding. The first screening of the studies removed duplicates and articles that did not mention Finland in keywords or abstracts. At this stage, articles written by Finns or whose title, keywords or abstract mentioned Finland were selected. Articles referring to a vocational institution or UAS with some of the following descriptors were selected: "*vocational education, vocational schools, vocational school students, professional education, vocational higher education, vocational upper secondary education, vocational education and training, vocational special education, bachelor's degrees, masters degrees, workplace learning, upper secondary education, professional teacher education, professional continuing education, higher education, UAS, polytechnics, University of Applied Sciences, school to work transition, employment insecurity, graduating student, clinical practice, nursing education, mentoring, or educational reform*". At this stage, 74 articles were selected from international databases. Subsequently, the researchers conducted a full-text review, resulting in the inclusion of 63 articles.

During the study selection phase, the third and fourth authors simultaneously reviewed research publications published between 2020–2022 from two Finnish-language scientific journals: the Journal of Adult Education and the Journal of Professional and Vocational Education, JPVE. The selection criterion was based on the likelihood that nearly all peer-reviewed studies on VET and UAS published in Finnish are published in these journals. No separate keyword search was conducted for these journals, instead, all peer-reviewed articles published in the journals during the selected period 2020–2022 were reviewed. Based on the readings of the abstracts 22 articles were selected for the literature review. Since a national search resulted in a considerably smaller number of studies compared to an international database scanning, it was possible to examine each article directly without a keyword search. Articles focusing on VET or UAS education, including vocational teacher education, were selected for the review. In addition, the review included research articles which addressed on-the-job learning during these educations or the transition from these educations to working life, graduation from studying a professional field or profession or reviewing a vocational education reform.

4. Charting the data was compiled so that the following information about each article, both national and international studies, was entered in its own columns in the Excel table: Title, Authors, Key/keywords, Journal, DOI, Research question, Research object, N/n, Methods, Analysis Methods and Results.
5. Collating, summarizing, and reporting the results was done in pairs. One pair analyzed national articles, while the other focused on international ones. The pairs discussed unclear cases related to inclusion and exclusion criteria. For all articles, the information outlined in section 4 was recorded in Excel. The process continued with a more detailed analysis during which the data was analysed and themed based on the content analysis. The themes were identified as a result of a collaborative group effort involving all authors. The remaining articles were

jointly discussed within a group work carried out for one day, and repeated themes and research topics and contents were identified from the articles. Finally, the studies were grouped thematically based on their jointly identified content or research topic. After discussions and thematic analysis, the final review included 60 articles.

6. The consultation phase can be considered in this article as a discussion that takes place both in the introduction and in the reflection sections with the national and international studies, as well as with reviews and reports carried out in recent years. The results of the review are discussed in light of the research field of VET and UAS education, social debate and the needs of the future direction of research. The following figure (Figure 1) presents the identification and selection process of this scoping literature review.

Figure 1: The identification and selection process of the scoping literature review

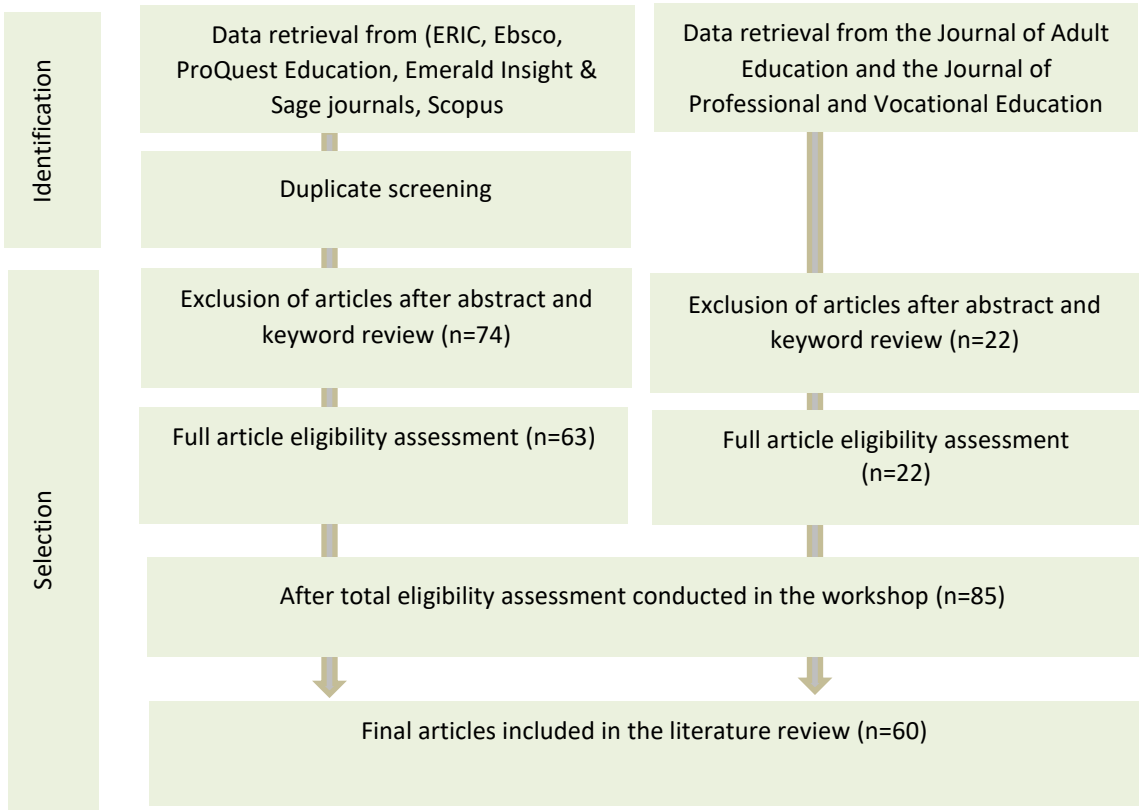

Figure 1 shows, for example, that there was no need to screen duplicates from the national articles, which could be identified directly from the two Finnish peer-reviewed journals. Instead, articles published in international journals needed a more eligibility assessment since they did not meet the set requirements placed on review. For example, the database search included also articles in which the term higher education referred to either a university or a university of applied sciences. Final certainty was only obtained by reading the entire article, in which case studies carried out in a university context were

excluded from the review. As a result of the researchers' joint group working, a total of 60 articles passed the eligibility assessment and ended up in the final review.

4. Results

As a result of the analysis, a thematic categorization of articles was conducted based on their content. Table 1 presents a summary of the results, the themes, main content, level of education or social level of the articles, and whether the research was published in national or international journal. The number corresponds to the attached table, which provides a more detailed overview of the articles included in the review.

Table 1: Summary of results: themes, contexts, education levels and publication scope

Theme	Context	Level of education			Societal level	Publication		ID
		VET	UAS	Others		National	International	
World of work *(n = 11)*	Supervising internships		x				x	27
	Workplace collaboration	x				x		40
	Workplace collaboration	x				x		44
	Networking and collaboration		x				x	4
	Workplace skills expectations, career guidance	x					x	8
	Working life skills	x				x		33
	Youth future workplace expectations				x		x	28
	Meeting vocational education and workplace	x					x	12
	Learning at work	x					x	10
	Learning at work and self-direction	x					x	55
	Institution and workplace connection, learning environments	x					x	58
Digitalisation *(n = 9)*	ePortfolio's role in supporting competence	x					x	7
	Student teachers' e-portfolio		x *				x	17
	Teachers' digital skills		x				x	24
	Digital skills environment		x *				x	25
	Student teachers' digital skills learning		x *			x		30
	Digital learning environment, virtual reality	x	x	x		x		31
	Digital open badges		x *				x	18
	Student teachers' ICT skills and competence		x *				x	49
	Students' ICT skills self-assessment	x					x	51
Career paths and transitions *(n = 7)*	Career paths and identity		x	x		x		43
	Students' career paths		x **				x	14
	Career guidance, and meaning of peers	x					x	26
	Educational paths and transitions		x				x	22
	Career paths and career aspirations		x**			x		38
	Students' experiences on transitioning to the workforce	x					x	54
	Career guidance, student counseling	x		x			x	57
Education system *(n = 6)*	Education reform				x		x	2
	Education system history and dual degrees	x					x	23
	Curriculum and working life		x	x		x		37
	Education system, graduates in the labor market		x	x			x	13
	Reforming the education	x		x	x		x	45
	Career paths and transitions at the system level	x			x		x	53
Pedagogical solutions *(n = 5)*	Teacher as a learning facilitator	x					x	9
	Media and media education	x					x	21
	Participatory teaching methods	x					x	3
	Occupational safety training	x					x	48
	Sustainable development and entrepreneurship education in teaching		x*				x	56
Competence-based education *(n=4)*	Competence-based and work-life oriented teacher education		x *				x	32
	Work-life readiness and competence goals		x			x		42
	Student teachers' views of competence goals		x *				x	16

	Teacher competence development		x *				x	52
Entrepreneurship *(n = 3)*	Entrepreneurship education		x	x	x	x		34
	Entrepreneurial intentions	x	x			x		35
	Entrepreneurial competence and self-efficacy		x	x		x		36
RDI activities *(n=3)*	RDI activities and innovations		x				x	20
	Participatory RDI partnership		x			x		39
	Integration of RDI and education		x			x		60
Special education *(n = 3)*	Special support and inclusivity	x					x	19
	Students' social relationships	x					x	46
	Teacher-provided support and student - teacher interaction	x					x	47
Multiculturalism *(n = 3)*	Teacher's multicultural competence	x		x		x		41
	Multilingual students	x					x	50
	Multiculturalism and working life	x			x		x	59
Student admissions *(n = 2)*	Student selection and burnout risk identification		x				x	6
	Student selection		x				x	15
Other *(n = 4)*	Student satisfaction		x				x	1
	Psychological needs and well-being	x					x	5
	Ethical competence in the health and social care sector		x				x	29
	Sustainable development in construction sector education	x					x	11
Total *(n=60)*		**30**	**30**	**9**	**6**	**15**	**45**	**60**

Note: x* Professional Teacher Education; x** Master of Applied Sciences

Based on the literature review, the number of *world of work* related studies (n11) in the review was the highest, with a particular focus on secondary education. The studies addressed the importance of new types of skills for students in preparing for the world of work (Upola et al., 2020; 2022), the impact of skills gaps in the workforce on education and training (Capsada-Munsech & Valiente, 2020) and the influence of graduates' motivation, attitudes and social skills on employment, and consequently on companies' access to skilled labor (Löfgren et al., 2020). In addition, differences in on-the-job learning in VET were examined in two different education models in three different fields of education (Rintala & Nokelainen, 2020a), practices for strengthening the connection between school and working life (Rintala & Nokelainen, 2020b) and self-directed learning at workplaces (Pylväs et al., 2022). The multinational study highlighted the significant importance of collaboration with working life in universities of applied sciences, particularly in fostering partnerships and further developing work internships (Valk & Kratovich, 2021; Karjalainen et al., 2022).

The second largest number of studies were themed under *digitalisation* (n9). Digitalisation emerged, for example, as a driver of change in learning environments, study methods, skill and competency requirements among both students and teaching staff (Frangou & Keskitalo, 2021; Harju et al., 2020; Huotari et al., 2020; Korhonen et al., 2020a; Korhonen et al., 2020b; Männistö et al., 2020; Salonen et al., 2021). These studies highlighted the need to strengthen digital competences at several different levels. This was evident in both students' self-assessments (Suominen et al., 2021) and vocational teachers' competence assessments (Vilppola et al., 2022). Digitalisation as a theme was also emphasised in the context of vocational teacher education. Based on the results of Harju et al. (2020), teacher education provides sufficient skills for digital competence, while the findings of Korhonen (2020a; 2020b) emphasize the importance of making competence digitally visible, particularly through structured processes such as the use of digital badges, which support the recognition of prior learning. In addition, the study of

Salonen et al. (2021) highlights the importance of timely guidance for progress in teacher studies. An interesting cross-cutting theme is also ePortfolios as part of competence development (Frangou & Keskitalo, 2021; Korhonen et al., 2020a; Korhonen et al., 2020b).

Studies related to *career paths and transitions* (n7) had been carried out both in a higher education context and at the upper secondary level. Student counselling from the perspective of individual needs was examined in the context of both upper secondary vocational education and Preparatory education for upper secondary qualifications (TUVA) (Rosenblad et al. 2022). Research suggests that universities of applied sciences should develop their degree programs to better align with students' career aspirations (Ojala & Isopahkala-Bouret, 2022; Hanhimäki et al., 2021) as well as to better support student's career transitions (Haltia et al., 2022). As a result of a study on career guidance carried conducted in the context of upper secondary education, results showed that peers play a major role in young people's career choices (Ruschoff et al., 2022). The studies focusing on transitions examined both the backgrounds of those applying for higher education (Haltia et al., 2022) and VET students' experiences of their transition to working life (Ågren, 2021). Ojala et al. (2021) instead conducted a study on the career paths of students at a higher university of applied sciences and found that the career paths of these graduates were evenly distributed between transitioning and remaining in current careers. The benefits of the degree were particularly evident in career advancement and new employment opportunities.

Research related to *the education system* (n6) investigated the status of double degrees (Lietzén, 2022) and the different elements and temporal changes related to education reform (Hardy et al., 2021). It also explored in connection with the reform, the benefits of opening the higher education path as well as dropping out of studies for those who had applied for the path (Ollikainen & Karhunen, 2021). At the system level, the position of UAS graduates in Finland was also examined (Isopahkala-Bouret et al., 2021). Kettunen & Prokkola (2022) examined the allocation of vocational education and training from the perspectives of regional labour availability and social exclusion (Kettunen & Prokkola, 2022). Miettinen et al. (2021) study analysed the reflection of the European Union key competences for lifelong learning in curricula.

Research related to *pedagogical solutions* (n5), such as guidance and teaching methods, had mainly been carried out in the context of vocational upper secondary education (Kallio et al., 2021; Marine, 2022; Pietilä et al., 2021; Nykänen et al., 2021). For example, the research focused on teachers' support for students' metacognitive self-assessment skills (Kallio et al., 2021). The findings of this study revealed that special education teachers succeed in supporting students' metacognitive skills most among teachers in general. Asikainen and Tapani (2021) examined a very topical theme, strengthening the competences of sustainable development and entrepreneurship education both as a pedagogical solution and as teachers' competence.

Research related to *competence-based education* (4) had been carried out, especially in the contexts of vocational teacher education and UAS education. The studies were related to the assessment of one's own teacher competence (Virkkula, 2022), the

development of teacher competence and the challenges identified in that process (Vilppola et al., 2020), as well as the target descriptions of skills required at work across different fields of education (Huusko & Pyykkö, 2021). The studies also produced information on e.g. competency-based teacher education (Kepanen et al., 2020). Our review, however, did not find any research related to competence-based approaches at the vocational upper secondary level, even though the implementation of such an approach is strongest and most strictly regulated in that level of education.

The research identified to the theme of *entrepreneurship* (n3) showed that attitudes, at least based on a multinational study of Joensuu-Salo et al. (2020), have the greatest impact on becoming an entrepreneur at both levels of education. Based on Parkkari's (2020) analysis, the development of entrepreneurship education requires a more innovative approach. The study by Siklander et al. (2021) interestingly highlights the importance of supporting entrepreneurial self-efficacy in promoting entrepreneurship. Moreover, the findings suggest that pedagogical planning should prioritise enhancing students' entrepreneurial self-efficacy over focusing solely on practical measures for starting a business.

There were three studies on *RDI activities* included in the review. Sipari et al. (2022) examined the core elements of participatory RDI partnerships in the context of universities of applied sciences and highlighted that ethical sustainability competence is enhanced through these partnerships in addressing today’s complex eco-social challenges. Vetoshkina et al. (2022) concluded that universities of applied sciences should redefine their role in innovation systems by mapping research expertise, projects, and emerging research areas, which could provide a foundation for research-based collaboration with research universities and other key stakeholders. In addition, the views of UAS personnel on the integration of teaching and RDI activities were examined, and the challenges in utilising the results of projects in teaching were identified (Väänänen & Peltonen, 2020).

Three of the studies focused on the theme of *special education* (n3). The studies identified in the literature review were focused on vocational upper-secondary education, particularly emphasizing inclusivity and targeted special support (Ryökkynen et al., 2022). Additionally, the research examined the significance of community and social belonging (Ryökkynen et al., 2021). Ryökkynen and Räty (2022) focused on the interaction between students receiving demanding special support and their teachers, specifically from the viewpoint of vocational special education teachers.

Research related to *student admissions* identified in the literature review had been conducted in a UAS environment. Based on Koerselman's (2020) results, the application system does not encourage applicants to apply for multiple study places in the same year. A study by Pienimaa et al. (2021) examined the significance of identifying emotional skills in entrance examinations in the social and healthcare sectors in order to prevent burnout at work for these future professionals.

Three studies in the review focused on the theme of *multiculturalism*, two of which examined the recognition of immigrant students' competence and competence potential.

The first examined, in particular, the challenges and perspectives of assessment and competence recognition in teachers' continuing education (Mustonen et al., 2021), and the second examined the integration of students' multilingual resources into practical nursing studies (Mustonen & Strömmer, 2022). Seitamaa and Hakokõngäs (2022) studied Finnish vocational education experts and their views on the challenges of multiculturalism for education and work. In the study, experts emphasised the importance of personalisation and were concerned about securing future competencies, when integrating immigrants into the workforce. Other studies included in the review didn't have a specific theme, these studies focused on student satisfaction and motivation, ethical competence and sustainable development.

Examining the studies at the level of educational institutions showed that vocational upper secondary education had focused most on the thematic areas of the world of work and pedagogical solutions. The studies on the themes of special education and multiculturalism included in the review were carried out exclusively in vocational upper-secondary education. In terms of career paths and transitions, the studies were divided between both levels of education.

Correspondingly, the university of applied sciences survey focused strongly on the themes of digitalisation and competence-based learning, in the latter two of which a significant part of the studies had been carried out in the context of vocational teacher education. The RDI activities and student admissions studies in the review were carried out in a higher education context. The research carried out at several different levels of education was divided under different themes, but for example, studies examining entrepreneurship targeted at several different levels of education. The studies focusing on the education system level targeted at least two different levels of education. From the perspective of several different levels of education, at least entrepreneurship, uncertainty in professional life and VR learning environments were examined. At the societal level, the research topics were future work expectations, educational reform and entrepreneurial attitudes.

When examining the publications from the perspective of themes in relation to what kind of research has been published, especially in national or international journals, the following indicative observations can be made. National research articles included in the review did not contain themes of special education, pedagogical solutions or the theme of student admissions. Correspondingly, research related to entrepreneurship was only visible in national publications. However, as the numbers in national publications are considerably lower, such a comparison of themes is not very reliable.

5. Conclusions and reliability of the study

This literature review provides insights into the key themes that have been featured in the publications of VET and UAS education in Finland in 2020–2022. The review not only identifies current topics of discussion but also sheds light on possible blind spots in the research that might have received less attention. The analysis identified eleven key

themes from the studies, which collectively construct a representation of a digitalising, work-oriented research field, in which the student-centeredness can be seen as evident in studies related to career paths, competence-based approaches, pedagogical solutions and special education. As a whole, the themes vary from the education system level to the level of individual learners. The themes found as a result of the survey were: *world of work, digitalisation, career paths and transitions, education system, pedagogical solutions, competence-based education, entrepreneurship, RDI activities, special education, multiculturalism* and *student admissions*. In addition, there were individual research articles on other themes. Of the studies selected in the review, 30 had been carried out in the context of a UAS, while 30 articles dealt with vocational upper-secondary education. There were 9 studies carried out at several different levels of education, and in addition, the level of examination in six studies was societal. As Isacsson et al. (2021) stated in their review, the differentiation of themes may challenge the perception of key phenomena. When examining how the studies selected for the review in recent years focus on current and future societal challenges, it can be seen that the studies focus particularly on global and national topical phenomena, such as digitalisation, world of work and continuous learning. In addition, research shows that there is a close connection between secondary and higher education, which is manifested in the examination of diversifying study and teaching practices, as well as competence-based approaches, both in educational institutions and in the workplace, including the interfaces between them (e.g. Nokelainen, 2013). For example, expectations of the world of work and transitions both into work and between educational institutions are reflected in many studies which were placed under different themes.

As previously anticipated by the Finnish Government (2020), the studies included in the review have raised awareness of the risks of continuous learning. These risks are related, among others, to problems of demand, supply and work-life matching, as well as to the perspectives of competence, education and career guidance. In relation to continuous learning, the research reviewed offers perspectives on, for example, raising the level of competence and developing generic skills of students, in our future workforce. Research here identified changes in the world of work and the demographic structure, multiculturalism, accumulation of skills and participation among certain groups, inadequate education and career guidance services, and mismatches between labour supply and demand as potential working life risks. These phenomena occur in research themes to varying degrees, some stronger and some weaker.

In the context of labour supply mismatches, there is still a need to identify and explain skills and competence mismatches (e.g. Capsada-Munsech & Valiente, 2020). In addition, more information on working life expectations and skills shortages is still needed to develop career guidance (e.g. Löfgren et al., 2020). As solutions to respond to the transformation of the working life, for example, Rintala and Nokelainen (2020) suggest promoting flexible combinations of school-based and work-based educational pathways. Miettinen et al. (2021), on the other hand, state that education loses its relevance to the world of work if the objectives of teaching do not take into account the

changes in various professions and industries, or the knowledge and expertise needed to cope with these changes. This highlights the importance of research in identifying and responding to societal changes.

This review shows those instances of societal changes, such as digitalisation, which can be characterised as a megatrend of our time or a driver of competence change. Siirilä and Laukia (2021) anticipated in their previous review that the pandemic may accelerate this kind of orientation of research themes. Many of the studies in this review actually took place during and after the pandemic, which also may have contributed to the focus of studies on digitalisation, distance learning, continuous learning and the needs of the world of work during this period. The importance of digitalisation is actually known to continue to grow, which requires future employees and continuous learners to have even more diverse skills, such as mastering new ways of working and using technologies effectively in different professions, including, for example, complex production processes and decision-making (Poquet & De Laat, 2021; Cetindamar et al., 2022). As can be seen from the studies in the review, digitalisation challenges education in general, as it widely impacts on studying, teaching and the development of skills (Finnish National Agency for Education, 2019; Toiminen, 2017). These changes are manifested concretely in educational institutions through necessary modifications in study environments, instructional methods, as well as in the competency requirements for teachers. In this case, pedagogically meaningful utilisation of technologies and platforms is a significant competence for a vocational teacher, for example. Unlike Isacsson et al. (2021) predicted in their previous review, emerging technologies such as virtual learning or robotics were not particularly emphasized in the themes of the review. Instead, the literature review of Huotari (2020) mentioned that there exists a strong culture of experimentation in teaching in relation to utilisation of VR learning environments and that there is actually a need to increase research evidence on the effectiveness of these applications. There was also no research focusing on artificial intelligence included in this review. On the other hand, research on digital badges (Korhonen et al., 2020b) was visible in vocational teacher education research within this period, which was targeted to the recognition and recognition of competence produced by continuous learning (Isacsson et al., 2021).

As a result, we may conclude that research related to digitalisation during the period under review seems to have focused more on competences related to technological solutions, while less attention has been paid to change management, ensuring sustainability and improving the student experience in the digital environment. However, the need to strengthen competence related to sustainable development had been raised in teaching, which was specifically highlighted in the study of Asikainen and Tapani (2021). Thematically topical are also research articles which were not thematically grouped, since these studies focus on topical issues such as ethical competence, study-related well-being and learning experience, as well as sustainable development. For example, the examination of self-directed learning was carried out within a working life project (Upola et al., 2020) from the perspective of learning motivation and autonomy (Virkkula, 2020) as well as related to on-the-job learning (Pylväs et al., 2022). However,

there were no studies directly related to the recognition of study experience included in the review, even though the examination of guidance, teaching methods, as well as study experience are directly linked to both the quality and effectiveness of education (e.g. Prosser et al., 2003; Han et al., 2020).

The themes of multiculturalism and inclusion related to the global labor market and mobility also seemed to have received less attention. However, it is important that research identifies the challenges of multiculturalism from the varying perspectives of teachers, education experts and students. Based on the review, the role of vocational teaching in solving many educational challenges could have been more visible, for example, in studies related to pedagogical guidance and teaching methods.

Given that collaborative development with the workforce is central to vocational education and that research-based development is particularly emphasised in UAS education, it is noteworthy that there was a limited amount of research related to R&D activities found in the publications reviewed, as was also the case in the findings by Siirilä & Laukia (2021). Unlike in the review by Isacsson and colleagues (2021), entrepreneurship no longer appeared as a central theme in the studies during this review period.

In this scoping review, the research process has been described transparently so that readers can evaluate the choices and interpretations made during it (Puusa & Julkunen, 2020). Reliability is affected by several factors, such as the researchers' methodological skills, the appropriate use of the review, the correct extraction of the data, its thorough analysis, and the appropriate presentation of the results and drawing conclusions (Khalil et al., 2021). The objective of the review and the research questions guided our systematic implementation of information retrieval and analysis, which took into account several databases and the most important national journals. The search strategy and keyword selection are here described in detail to enable reproducibility. When database searches are carried out on the basis of keywords, the problem is thus that publications that do not use precisely standardised descriptors of the databases are inevitably excluded from the search. However, the analysis and synthesis of the content of the articles were carried out systematically and efforts have been made to present the results logically and consistently. This research, therefore, has its limitations; for example, exclusion criteria and the limitation of keywords may have contributed to the exclusion of a certain area, such as some publications related to special education or sustainable development, from the scope of the search.

6. Future directions for research

Based on the results of this scoping literature review, it is possible to discuss the emerging themes as well as how to address challenges and focus attention on less visible yet significant contemporary phenomena in research. Among the trends of global change, demographic change, diversity, and sustainable development require a stronger research contribution from the perspective of the VET system and the world of work (Anisimova

& Efremova, 2022). Research should continue to be in constant interaction with the world of work and society in order to respond to its timely challenges. Research is especially needed on how VET and UAS education can respond to the increasing complexities within our modern society. Furthermore, incorporating sustainability principles into curricula is essential for educating the future workforce. (UNESCO, 2017). Research is needed to find out how sustainable development principles can be integrated into different study modules and how this affects students' attitudes and behavior (Ahmad et al. 2023, Finnveden & Schneider, 2023).

It is important to consider how this field of research on VET and UAS education might develop in the near future. The important role of artificial intelligence must inevitably be considered, and research into the development, application and evaluation of AI methods is needed in this regard. The application of artificial intelligence and digitalisation in VET and UAS education needs such research, which focuses on the examination of digital transformation at many levels (Cantú-Ortiz et al., 2020; Anisimova &; Efremova, 2022). Currently and in the near future, AI will be utilized in many ways in teaching, for example, to tailor learning experiences and anticipate student needs (Gedrimiene et al., 2024; Markauskaite et al., 2022; Gašević et al., 2023) In addition, research relating AI should focus on the ethical issues, AI's impact on learning and teaching, and its central role in the future world of work (Varma et al., 2023; Markauskaite et al., 2022).

The review shows that research on future competences, such as meta-skills related to sustainable development and change management, appears to be limited, so it would be justified to systematically expand research in these areas. Similarly, the research could be directed towards investigating the functionality of individual pedagogical educational solutions, developing student-centered solutions that support students' well-being and self-direction and meet the competence needs of a changing working life. Research could explore teachers' pedagogical approaches and their capacity to support continuous learners, as well as the role of vocational teachers in an evolving education system that is undergoing digital transformation.

It would be important to strengthen both national and international publishing activities, as they address different themes and audiences in Finland. At the national level, there are very few publishing forums dedicated to professionally oriented research. International publishing is essential for fostering academic dialogue and promoting international collaboration. At the same time, publishing research in Finnish is crucial, as it more effectively reaches teachers and education professionals, supports the practical application of research findings, and influences Finnish educational policy and practice. Additionally, Finnish-language publications contribute to broader societal discussions on education.

One of the purposes of the review is to promote understanding of recent research in VET and UAS education in Finland, also in relation to global trends and phenomena and to help to direct research towards current and important future topics while enabling more efficient research planning. Researchers and educators can use the review to

identify the main priorities of RDI in recent years. Prudent and more coordinated research management is an effective way of responding to the fragmentation of current research, with the aim of avoiding research becoming too dependent on the personal skills profiles and interests of individual researchers and education developers. By presenting the work of different research groups and researchers in the field of VET, which is less researched than the university context, the review may encourage the emergence of possible new forms of research and development cooperation and, thus the expansion of thematic areas.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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Appendix

Annex 1: Final articles included in the literature review (45 international and 15 national)

No	Heading	Authors	Year	Topic
1	Organizational Differences among Universities in Three Socioeconomic Contexts: Finland, Spain and Ecuador. Relational Coordination Approach	Checa-Morales, De-Pablos-Heredero, Lorena Carreño, Haider & García	2021	The higher education institutions (Finland, Spain, Ecuador in comparison) that best implement relational coordination achieve a higher level of quality in terms of student satisfaction, regardless of the socio-economic context.
2	The 'Spirit of the Times': Fast Policy for Educational Reform in Finland	Hardy, Heikkinen, Pennanen, Salo & Kiilakoski	2021	Effects of neoliberalism on Finnish education policy at all levels - Education reforms have become intensified, fragmented, individualised, decontextualised and caused imbalances, privatisation and a reduction in education budgets. Reform 2015 competence-based approach, student/customer orientation personalisation, recognition and recognition of competence, and emphasis on on-the-job learning.
3	Swearing as a Method of Antipedagogy in Workshops of Rap Lyrics for 'Failing Boys' in Vocational Education	Pietilä, Tainio, Lappalainen & Lahelma	2021	Swearing is a strategic means of presentation used by gangsta rap workshop leaders to connect with (male) students, while presenting themselves as opposites to the traditional educational context and the traditional study of Finnish. Students profile themselves as a "target group" that has not been well served by the education system.
4	We Collaborate with Everyone, but with Some More than Others: Evidence of Stakeholder Collaboration among Internal Security Professional Higher Education Institutions	Valk & Kratovich	2021	The main stakeholders of the UAS (Estonia, Finland, Norway and Germany) and the nature and main influencers of cooperation with them are employers, ministries and other higher education institutions before students.
5	Evaluating Motivational Characteristics in Vocational Music Education within the Perspective of Self-Determination Theory	Virkkula	2020	The impact of professional music education workshops on the learning motivation of students focusing on popular and jazz music within the framework of self-determination theory (SDT). SDT shows that satisfying people's general psychological needs has a significant impact on well-being and learning. Psychological needs are met when the learner has an autonomous influence on their own learning choices and decisions.
6	The Assessment of Emotional Intelligence in Social Care and	Pienimaa, Talman & Haavisto	2021	In student admissions, trainers and professionals in the social and healthcare

	Healthcare Student Selection: A Qualitative Descriptive Study			sector believe that applicants must demonstrate their abilities in all areas of emotional intelligence in order to cope with the requirements of studies in the field of social and healthcare and in order to reduce the risk of burnout at work.
7	ePortfolio as a Tool to Support Competency Development in Hybrid Learning	Frangou & Keskitalo	2021	The role of ePortfolios in developing the competence of vocational students in the reindeer husbandry sector is to promote meaningful study, especially in changing circumstances, far from campus. Successful use requires collaboration and commitment between students and teachers to change the learning culture.
8	Employer Views on Upper-Secondary Vocational Graduate Competences	Löfgren, Ilomäki & Toom	2020	Employers' expectations of desired competences among recent graduates and trainees in upper secondary vocational education: graduates' motivation, attitude, social skills and potential for professional development affect employment, qualifications vary, not everyone has sufficient skills.
9	Teachers' Support for Learners' Metacognitive Awareness	Kallio, Kallio, Virta, Iiskala & Hotulainen	2021	Special education teachers support their students' metacognitive awareness significantly more than professional teachers and teachers of general subjects. However, professional teachers support self-assessment of the subject matter better than special education teachers.
10	Vocational Education and Learners' Experienced Workplace Curriculum	Rintala & Nokelainen	2020	Student experiences on different study paths of on-the-job learning. Professional fields social and health care, trade and administration, and construction. VET and apprenticeships differ significantly, flexible combinations of school- and work-based paths should be promoted.
11	Overcoming Diverse Approaches to Vocational Education and Training to Combat Climate Change: The Case of Low Energy Construction in Europe	Clarke, Sahin-Dikmen & Winch	2020	Differences in vocational training in low-energy construction (10 European countries: Belgium, Bulgaria, Finland, Germany, Hungary, Ireland, Italy, Poland, Slovenia, Spain). In Finland, education is under-resourced, low-energy construction only in the vocational school system. Most countries do not meet the criteria for education. Belgium and Germany, relatively well prepared. Finland, Ireland, Italy and Poland, still far away.
12	Sub-National Variation of Skill Formation Regimes: A Comparative Analysis of Skill	Capsada-Munsech & Valiente	2020	Skill ecosystem. Matching skills supply and demand across the EU (18 regions across countries) – how skills from education and

	Mismatch across 18 European Regions			training guarantee employability. The importance of demand in explaining skills shortages calls for local skills strategies. The need to look beyond the fight against inequalities among young people. Explaining the mismatch requires an analysis of the socio-economic and labour market situation.
13	Positional Competition in a Binary System: The Case of Finnish Higher Education	Isopahkala-Bouret, Aro & Ojala	2021	The opportunities of graduates to succeed in the labour market, the placement of bachelor's degrees in relation to higher education degrees in different fields of study. Success depends on educational attainment, sectoral variation, but e.g. Master's degrees vs. bachelor's degrees offer better chances of success. Disparities are widening in sectors that include "closed" professions such as healthcare.
14	Adult Graduates' Employability and Mid-Career Trajectories after Graduation with Finnish UAS Master's Degree	Ojala, Isopahkala-Bouret & Varhelahti	2021	In middle age, the career paths and career distribution of master's degree graduates. 1. ascending careers 15.9%, 2. renewable careers 29.4%, 3. entrepreneurial careers 2.4%, 4. continuous careers 42.7% and 5. volatile careers 8.1%.
15	Why Finnish Polytechnics Reject Top Applicants	Koerselman	2020	Finland's centralised application system for UAS study places, the problem with the application systems is that it does not encourage applications to several places at the same time, there is a delay in starts. The application system needs to be made more efficient in order to shorten queues.
16	Student teachers' views of competence goals in vocational teacher education	Virkkula	2022	Implementation of competence-based learning among vocational teacher students. Learning outcomes help to understand the dimensions of professional teaching and enable the assessment of one's own competence. Based on this, vocational teachers were able to build their own learning path.
17	Vocational Student Teachers' Self-Reported Experiences in Creating ePortfolios	Korhonen, Ruhalahti, Lakkala & Veermans	2020a	What kind of practices, support and motivating factors do student teachers have in producing an ePortfolio? The creation of the ePorfolio was helped and motivated by keeping a learning diary, experimenting with digital tools, feedback and demonstrations, as well as monitoring the process and developing competence.
18	Finnish Vocational Teachers' Competences Made Visible by Open Badges	Korhonen, Ruhalahti & Niinimäki	2020b	The learning process, guided by badges, supports the needs and expectations of the vocational teacher student's study process,

				especially during the RDI project, by guiding the student in demonstrating the competence already acquired, but not in the learning process itself.
19	Learning about Students' Receiving Special Educational Support Experiences of Qualification, Socialization and Subjectification in Finnish Vocational Education and Training: A Narrative Approach	Ryökkynen, Maunu, Pirttimaa & Kontu	2022	The dimensions of support provided by good education: socialisation and subjectisation can still be heard in the stories of Finnish special needs students studying at special vocational schools. The third dimension, qualification, was not included in the stories describing students' professional self-confidence. The study emphasises the importance of inclusivity in specialised vocational education.
20	Innovation activities in a university of applied sciences: redefining applied research	Vetoshkina, Lamberg, Ryymin, Rintala & Paavola	2021	Redefining applied research, where research plays a changing role in the development of innovation activities. The UAS should redefine its role in innovation systems and, among other things, map existing research expertise, projects, organisational profile and potential growing research fields, requirements and practices. This could provide a basis for research-based innovation cooperation with, for example, research universities and other strong actors.
21	"I find this really entertaining" – first look of the relationship between vocational school students and various media	Meriläinen	2022	How professional Valma/Tuva students frame themselves and their participation in society and how they are seen in the media. Traditional media are no longer so central to young people's lives compared to social media.
22	The vocational route to higher education in Finland: Students' backgrounds, choices and study experiences	Haltia, Isopahkala-Bouret & Jauhiainen	2022	Compared to matriculation-based students, those applying for higher education through the vocational route are often older in age, children of those with a lower level of education and those who have completed a longer study path. They more often apply to a professionally oriented institution and bring different cultural capital to their studies. Those with higher education feel that they belong to higher education the strongest, and those who only have a vocational degree the weakest.
23	The positioning of dual qualification studies in Finnish upper secondary education and government	Lietzén	2022	The status of double qualifications (DQs) in Finnish education policy and the education system 1980–2020 based on 32 education policy documents published by the Government:

	policy since the 1980s			1980s: Dysfunctional system to be reformed, 1990s: Youth education pilots and dual qualifications, changes in the demands of working life 2000s: Unclear political objectives, cooperation with higher education institutions, number of student degrees +10%, 2010s: Double qualifications on the periphery of education policy – budget cuts, vocational education and training reforms, 2020s: employment growth, significant changes in working life, continuous learning
24	Health and Social Care Educators' Competence in Digital Collaborative Learning: A Cross-Sectional Survey	Männistö, Mikkonen, Kuivala, Koskinen, Koivula, Sjögren, Salminen, Saaranen, Kyngäs & Kääriäinen	2020	Health and social services teachers' perceptions of their competence level. Due to the significant link between the type of work organisation and digital collaborative learning competence, vocational teachers rated their competence as weaker in supporting students' learning compared to UAS teachers. Competence in the educational use of a digital learning environment is essential for meeting students' need for support and should be strengthened.
25	Student Online Activity in Blended Learning: A Learning Analytics Perspective of Professional Teacher Education Studies in Finland	Salonen, Tapani & Suhonen	2021	Online learning for teacher students. The availability of a trainer is an essential factor and prerequisite for students' commitment to studying in digital learning environments, interaction forums are important, there is a clear need for contact teaching, peer support, face-to-face meetings, etc. should be organised to support the completion of studies
26	The effects of peers' career goal appraisals on school to work transition outcomes.	Ruschoff, Kowalewski, & Salmela-Aro	2022	Peer networks are in late teens (17–20 years) and the impact of peer career goal assessments on young people's transitions. Peers play a social role in the transition from education to working life.
27	Healthcare educators' experiences of challenging situations with their students during clinical practice: A qualitative study.	Karjalainen, Juntunen, Kuivala, Tuomikoski, Kääriäinen & Mikkonen	2022	Experiences of experienced trainers in healthcare during challenging situations during clinical training and actions in situations with other parties (e.g. students or their mentors). Reactions usually towards emotional, goal-oriented and pedagogical support for students. Building a safe learning environment requires cooperation between actors.
28	Young People and Subjective Employment Insecurity: Evidence from the Finnish	Haikkola, Laine & Pitkänen	2022	15–29-year-olds in 2009, 2013, 2016 and 2019 subjective uncertainty about future employment. Although young people

	Youth Barometer between 2009 and 2019.			believe in their future, due to employment opportunities, uncertainty fluctuates and is concentrated young women and those without language skills. Young people's uncertainty reacts to economic crises.
29	Analysis of graduating nursing students' moral courage in six European countries.	Koskinen, Pajakoski, Fuster, Ingadottir, Löyttyniemi & Numminen	2021	Factors related to the moral courage of a graduating nurse, 6 EU countries (Spain, Finland, Iceland, Germany, Lithuania, Ireland) Higher moral courage is especially related to the level of professional qualifications. Managers rated the moral courage of graduating nursing students as lower than themselves. There were statistical differences between countries that required further investigation.
30	Experiences of student teachers in vocational teacher education institutions on digital skills competence and studying.	Harju, Pehkonen, Niemi & Niu	2020	On average, students studying to become vocational teachers rated their digital skills fairly good, for example from the perspective of cooperation tools. Teaching multiliteracy, such as interpreting, producing and valuing various written, audiovisual and digital texts, was considered particularly difficult. The students felt the need to develop especially in the pedagogical use of technology.
31	A descriptive literature review of the added value of virtual reality in the field of vocational education.	Huotari, Toivonen, Lämsä & Hämäläinen,	2020	The added value of virtual reality for vocational education, according to the review, descriptive research on the use of VR in vocational education is more common and the results are still limited. Research so far focused on user experiences of applications. Added value, especially when overcoming real-world limitations.
32	Competence development of student teachers already working as teachers – competence-based and working life-oriented vocational teacher education	Vilppola, Hämäläinen, Vähäsantanen & Salo	2020	Competence, support and study methods of vocational teacher students: Competence developed especially in the areas of conceptual thinking and reflection and pedagogical competence (guidance and learner orientation). Significant integration of learning outcomes into work tasks and support from a workplace mentor. Challenges include hurry and changes in work. Critical examination of in-depth knowledge and diverse and dynamic competencies is necessary.
33	Towards working life skills — A vocational student as a learner in working life projects	Upola, Kangas & Ruokamo	2020	Professional students with work-oriented project learning. Motivation, the right attitude and a sense of responsibility, as well as self-direction, self-confidence, openness, flexibility, discipline and

				commitment as working life skills. Emotional skills linked to working life skills permeate the above.
34	Building an "intact path" of entrepreneurship education in entrepreneurship education strategies	Parkkari	2020	Based on 12 documents, the intact path of entrepreneurship education describes entrepreneurship as something that affects "all" students and is self-evidently positive, all-encompassing and ambiguous, even though entrepreneurship is not necessarily open to everyone in its various meanings and its consequences are not unequivocally good. The examination raises the question of the innovativeness of the field of entrepreneurship education.
35	What makes a student become an entrepreneur? Results from secondary education and higher education in six countries	Joensuu-Salo, Varamäki & Viljamaa	2020	What explains how 2nd degree and UAS students become entrepreneurs (6 countries): entrepreneurial intentions explain becoming an entrepreneur more than entrepreneurship education, which, however, has a clear positive link to becoming an entrepreneur. The student's belief in self-efficacy and their perception of their own business knowledge base are linked to becoming an entrepreneur, as are age and previous experience of entrepreneurship.
36	Connection of the MindBusiness framework to changes in entrepreneurial self-efficacy in higher education studies – "All challenges can be overcome"	Siklander, Hintikka & Eskola	2021	The entrepreneurial self-efficacy of higher education students (UAS & YO) brings positive development in terms of working life cooperation, communality and entrepreneurial competences. In the pedagogical planning of teaching, it is more important to pay attention to supporting the student's entrepreneurial self-efficacy than to the practical measures of starting a business.
37	Key competences for lifelong learning in the European Union, the European Qualifications Framework and curriculum development in educational institutions	Miettinen, Lang, Pehkonen & Pihlainen	2021	Based on the curriculum documents, the view of the key competences and qualifications framework for lifelong learning in the EU, as well as the related competence-based approach and competences, shows that education loses its influence in working life if the objectives of teaching do not take into account changes in different professions and industries and the knowledge and expertise needed to cope with the changes
38	"A career is a measure of success" – building the career aspirations and career paths of	Ojala & Isopahkala-Bouret	2022	The career goals and realisation of master's degree graduates show that only some of their career wishes are fulfilled as

	master's degree graduates within the framework of different career types.			anticipated due to, for example, demand in the labour market or changes in life situations. It is important to take into account the diversity of students' life histories and changes in career aspirations when developing master's degree programmes. The study provides a framework for goal-oriented career guidance.
39	Participatory research, development and innovation partnership in a university of applied sciences context.	Sipari, Helenius, Vänskä, Foster & Salonen	2022	The core elements of a participatory RDI partnership in the context of universities of applied sciences are equal participation, diverse competence, and systemic development and partnership are built into multifunctional and diverse partnerships. New knowledge creates shared ownership and shared social capital between actors. Ethical sustainability competence benefits from participatory RDI partnerships as a catalyst for social renewal in solving today's complex eco-social challenges.
40	From individual agency to common practice: Change workshops building cooperation between educational institutions and workplaces.	Island Kurki & Mattila-Holappa	2021	Development agency in a multi-stakeholder network (retail company and educational institution employees) created by the change workshop intervention. The individual agency of the trainer is essential. A value debate that prevents cooperation is needed in the rush of workplaces. The development and establishment of cooperation practices requires the agency of all parties in the network, and efforts must be made to establish experiments after interventions.
41	Teachers developing the basic skills of adult immigrants	Mustonen, Reiman, Vaarala, Bogdanoff & Tarnanen	2021	Basic skills of adult immigrants as understood by their teachers and pedagogical teaching through assessment. Basic skills are often seen as separate from each other, and the skills acquired by immigrant students in informal environments are not taken into account. The understanding of students' resources and overlapping skills deepened in teachers' continuing education, and they thus built learning objectives and tasks more functional than before. Guiding evaluation was challenging to implement.
42	General competence in the learning outcomes of higher education degree programmes in four fields of study	Huusko & Pyykkö	2021	A broad spectrum of general competencies from coping at work to sustainable development. The ways of writing learning outcomes vary, and there are differences in

				the target descriptions by field of study. UAS goals more concrete than YO goals. RDI and working life skills were defined most. Least sustainable development skills and study process skills.
43	Individual and social emphases of agency and identity in the career paths of higher education graduates	Hanhimäki, Vähäsantanen, & Rantanen	2021	Career stories of graduates (YO and UAS) among 1974–2017 graduates. 7 career types. Agency and identity were individually or socially weighted in different ways, depending on how different career types made choices about their own careers and defined what they wanted to be in their work. The foundation identifies and supports different ways of building career paths for higher education graduates.
44	Participation of working life clients in VET project-based learning practice communities	Upola, Kangas & Ruokamo	2022	Project learning in visual sales work in vocational education and training and the involvement of the client in working life, which manifests itself in a working life oriented or educational institution-oriented manner. The results can be utilised in working life cooperation, vocational education and training and other levels of education.
45	Differential inclusion through education: Reforms and spatial justice in Finnish education policy.	Kettunen & Prokkola	2022	Reforms in secondary education, including vocational education and training, and their impact on spatial justice and changes in education policy that favour urban areas over rural areas. The study examines the focus of vocational education and training on the availability of regional labour and the prevention of social exclusion among young people.
46	From the shade into the sun: Exploring pride and shame in students with special needs in Finnish VET.	Ryökkynen, Maunu, Pirttimaa & Kontu	2021	Examination of emotions and social relationships between students and teachers in vocational education and training, through the narratives of students receiving intensive special support. Students felt proud of achieving goals and pleasing teachers, but experienced feelings of shame related to social status overshadowed by special needs. The results highlight the importance of community and social belonging.
47	Vocational special needs teachers promoting inclusion in Finnish vocational education and training	Ryökkynen & Räty	2022	The study examines Finnish vocational special education teachers' descriptions of interaction with students receiving intensive support and their opportunities to support these students in vocational institutions, working life and society in an

				inclusive manner. The results show that the role of vocational teachers goes beyond teaching and that they play an important role as a bridge between the educational institution and society. This role supports students' personal and social growth, promoting inclusivity in vocational education.
48	Identifying the "Active Ingredients" of a School-Based, Workplace Safety and Health Training Intervention.	Nykänen, Guerin & Vuori	2021	Safety training interventions in Finnish upper secondary vocational schools. The study aims to identify key areas of safety education and provides information on how these affect students' learning outcomes and motivation, which is essential from the perspective of VET development.
49	Teacher Trainees' Experiences of the Components of ICT Competencies and Key Factors in ICT Competence Development in Work-Based Vocational Teacher Training in Finland.	Vilppola, Lämsä, Vähäsantanen & Hämäläinen	2022	The study dealt with the main components of vocational teacher students' ICT skills in workplace-based education as well as factors related to teacher education that support and challenge the development of ICT competences. As a result, a framework for the digital competence of vocational teachers is presented.
50	Becoming a multilingual health professional in vocational education - two adult migrants' translanguaging trajectories.	Mustonen & Strömmer	2022	Learning of students with an immigrant background in vocational education and training in Finland and how students' existing knowledge can be identified, supported and utilised when they become multilingual professionals in their fields. The study examined the integration of students' multilingual resources into their studies through the perspectives of practical nurse students.
51	New Vocational School Students' Basic ICT Skills Self-Assessment.	Suominen Ikonen & Asikainen	2021	Self-assessments of vocational upper secondary students of their ICT skills and their importance in their future careers among students from seven vocational fields who started their studies for a vocational upper secondary qualification. ICT students rated their skills significantly higher than other students, while health and wellbeing students rated their own skills significantly lower. The study helps to develop online studies that take into account the need for student guidance in different fields.
52	How Do Students Describe Their Study Processes in the Competence-Based Vocational	Kepanen, Määttä & Uusiautti	2020	Experiences of special education teacher students in a competency-based teacher training program, benefits and challenges of education. Although competency-based

	Special Education Teacher Training?			education served adult learners well, its definitions and practices still need to be further explored and defined. Development proposals were derived from the study to improve both vocational teacher education and competence-based education in general.
53	A tale of two trade-offs: Effects of opening pathways from vocational to higher education.	Ollikainen & Karhunen	2021	Effects of the reform of vocational upper secondary education in Finland 1999–2001. The results did not reveal any long-term effects on enrolment in further education or labour market outcomes. However, the reform increased the likelihood of dropping out of studies, which may negate the benefits of opening up a higher education path.
54	Exploring vocational education students' visions of a successful transition to working life from the perspective of societal belonging.	Ågren	2021	VET students' experiences of transitioning to a changing labour market and how they see a successful transition to working life. Based on the results, paid employment is an important determinant of students' social belonging, and traditional ideals of worker citizenship strongly influence their social belonging. The role of vocational education and training should be critically examined in the light of the changing labour market.
55	Vocational students' perceptions of self-regulated learning in work-based VET.	Pylväs, Nokelainen & Rintala	2022	Vocational students' perceptions of self-directed learning in workplace education in Finland. The results showed that on-the-job learning promoted students' cognitive engagement and motivation. The interviews also revealed certain strategies for self-directed learning that guided students' learning efforts.
56	Exploring the Connections of Education for Sustainable Development and Entrepreneurial Education – A Case Study of Vocational Teacher Education in Finland.	Asikainen & Stephen	2021	Sustainability (ESD) and entrepreneurship education (EE) are abstract and demanding concepts for student teachers, but since the competences related to these are important in working life, student teachers must be able to incorporate their promotion into teaching. The follow-up study yielded positive results on transformative learning and found an increase in the importance of entrepreneurial skills.
57	The grey zone between individualised goal and actual need: a CHAT analysis of student counselling within VET	Rosenblad, Schaffar & Löfström	2022	How the unclear policy concepts of "efficiency" and "needs" affect Finnish vocational education and training in student counselling. The results showed that the instrumental value of the individual is emphasized, while real needs

	Theme: Career paths, personalisation, student guidance Level of education vocational and TUVA			and relative importance are overshadowed. Student counselling focuses on individual goals. Recognition of human uniqueness is necessary.
58	Standing and attractiveness of vocational education and training in Finland: Focus on learning environments	Rintala & Nokelainen	2020	The status and attractiveness of vocational education and training in Finland from the perspective of learning environments. The results suggest that the design of learning environments focuses on strengthening the connection between school and working life. In the former, however, attitudes and practices emerge that hinder the link between education and working life, and the responsibility for reconciling experiences remains largely with the learner.
59	Finnish vocational education and training experts' reflections on multiculturalism in the aftermath of a major reform	Seitamaa & Hakoköngäs	2022	Finnish vocational education and training experts discuss multiculturalism. Experts consider multiculturalism to be a significant challenge for education and working life, and the ability of the reform to provide solutions is unclear. Experts emphasise the importance of individualisation and working life for immigrants, and some are concerned about the future of broad-based social competence.
60	From silos to seamless integration of teaching and RDI activities in universities of applied sciences.	Väänänen & Peltonen	2020	The views of UAS staff on the integration of teaching and RDI activities and on the utilisation of RDI project results in teaching. Several themes were identified in the results, such as curriculum projects, accreditation of projects, communal participation and a culture of experimentation. Integration is seen as possible, but it includes, among other things, challenges in practical implementation. The results highlight the need for a systematic and clear operating model.