VOCATIONAL EDUCATION TEACHERS' PEDAGOGICAL DIGITAL COMPETENCE

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ABSTRACT

Digitalization poses challenges for VET teachers in delivering high-quality, work-oriented education to diverse student populations. It also brings forth new dimensions in VET teachers' pedagogical digital competences, which have not received much research attention despite their crucial role in preparing employees for the future workforce. The aim of this study is to contribute to the research on VET teachers' digital competences by presenting the findings of an international study and having a particular focus on pedagogical digital competences (PDC).

This study utilized data gathered through a web-based survey of 218 VET teachers from four European countries: Finland, Italy, the Netherlands, and Spain (Catalonia). Convenience sampling was used to gather data and ensure representation from various professional fields. VET teachers' responses were analyzed quantitatively with IBM SPSS Statistics assessing means and sum variables across seven sub-areas based on Likert-scale statements. The results indicate VET teachers self-assessing their PDC in the selected sub-areas above the average level. Out of the seven sub-areas, the building interaction and teamwork for online teaching received the highest score. The sub-areas involving feedback and assessment and web content production were assessed as the lowest. The remaining sub-areas: planning online teaching, guidance in online environments and developing one's digital competences received equal scores.

The findings indicate VET teachers, aged 35 or younger, assess their competences higher that their older colleagues, and those with less than 10 years of teaching experience assess their competences higher than more experienced teachers. Also, teachers with two or more years of online teaching experience reported higher competence levels compared to those with less experience. The findings indicate that younger VET teachers (35 years or younger) and those with less than 10 years of teaching experience displayed slightly higher pedagogical digital competences than the other groups, possibly indicating a generational shift among teachers. However, longer experiences in VET does not seem to diminish teachers' competences; instead, they remain at similar levels and can be effectively transferred to online teaching environments even after 20 or more years of teaching. Based on the findings, the most effective approach to enhancing VET teachers' pedagogical digital competence development is to provide them with opportunities to gain experience in online teaching. Therefore, we encourage VET teachers, irrespective of their demographic backgrounds, to build confidence in digital learning environments, for example by pair-teaching.

Keywords: *VET teacher, pedagogical digital competence, vocational education and training, digital skills, digital learning.*

INTRODUCTION

Digitalization and its impact on educational institutions and teachers have been the subject of extensive research and discussions in recent years. Within this context, the vocational education and training (VET) sector plays a critical role in digital transformation, as it is closely involved in preparing skilled employees for the future workforce. The job market has experienced significant changes due to digitalization, including the emergence of the fourth industrial revolution (Billet, 2021) and the evolving relationship between humans and machines (Pfeiffer, 2018). Consequently, teachers and other VET education providers face the challenge of continuously adapting to the evolving skill requirements brought about by digitalization. This necessitates the development and enhancement of digital competences among both VET organisations and teachers.

Over recent decades, considerable attention has been given to investigating teachers' information and communication technology (ICT) and digital skills (Almerich et al., 2016; Roll & Ifenthaler, 2021), and several conceptual frameworks have been developed to clarify what digital competences should include (Redecker & Punie, 2017; UNESCO, 2018). However, there has been a relative lack of research on the pedagogical digital skills and competences of VET teachers. Although, scholars have previously characterized VET teachers' digital competences as being complex and fragmented (Tapani & Salonen, 2019), and comprising multiple components (Vilppula et al., 2022). Therefore, this study aims to contribute to the research on VET teachers' competences by presenting the results of an international study with a specific focus on pedagogical digital competences (From, 2017). The study is part of a broader situational analysis conducted as part of the Smooth Online Working for VET Providers (SHOW-VET) international project in 2022. The situational analysis aimed to map VET teachers' existing knowledge and experiences in digital pedagogy and identify gaps in their competences that will require upskilling. Within this analysis, VET teachers (n=218) self-assessed aspects of their digital and pedagogical competences relevant to their work. This article specifically reports the findings related to VET teachers' pedagogical digital competences (PDC).

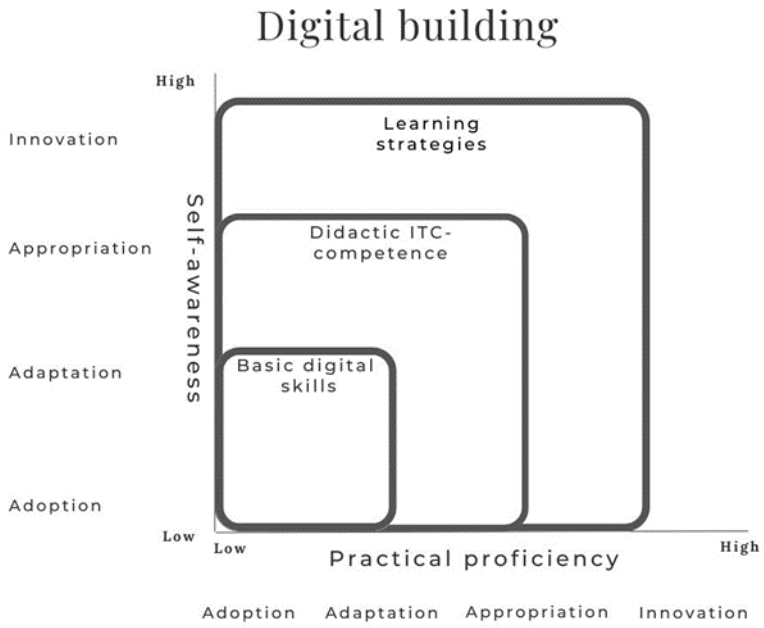
Theoretical frameworks on VET teachers' digital competences

Teachers' digital competence (TDC) is a crucial factor in effectively integrating technology in education, encompassing personal and contextual aspects (Cattaneo, et al., 2022). TDC can be broadly defined as the confident, critical, and creative use of information and communication technology (ICT) to achieve goals related to work, employability, learning, leisure, inclusion, and societal participation (Redecker & Punie, 2017). TDC is considered a transversal and multidimensional concept (Pérez-Escoda et al., 2019), comprising various dimensions or components (Ilomäki et al., 2016; Vilppola et al., 2022). Ilomäki et al. (2016) propose four components of teachers' digital competence: practical skills and their application, understanding digital technologies, engagement in the digital culture, and reflective thinking. Similarly, Vilppola et al. (2022), in their study of VET teacher trainees' work-based training, identified six main ICT competence components: creation and use of digital learning materials,

planning and utilization of digital learning environments, synchronous digitally enhanced teaching, general ICT competencies, digital interaction, and digital assessment.

In addition to TDC, the concept of teachers' pedagogical digital competence (PDC) has been discussed and introduced in the research literature (From, 2017; Purina-Bieza, 2021). PDC refers to the knowledge, skills, attitudes, and approaches related to digital technology, learning theory, subject matter, context, and the relationships between them (From, 2017). These definitions of PDC have been built upon Krumsvik's (2012, 2014) model of teachers' digital competence (Figure 1). Krumsvik's model portrays digital competence development as a journey that encompasses both practical knowledge (proficiency) and self-awareness (meta-perspective), progressing through four stages: adoption, adaptation, appropriation, and innovation. According to Krumsvik (2012), this developmental journey, which involves practical knowledge acquisition and self-reflection, is a gradual process that takes several years to reach the innovation level where teachers can fully exploit ICT to develop new pedagogical innovations (Krumsvik, 2012).

Figure 1*:* Teacher's pedagogical digital competence (based on Krumsvik, 2012).



In this article, the understanding of pedagogical digital competence is informed by the definitions provided by Krumsvik (2012) and From (2017). According to these scholars, the digital competence of teachers and teacher educators differs from that of professionals in other fields. They argue that teachers' digital competence encompasses not only practical skills but also cognitive abilities, metacognition, learning strategies, self-efficacy, and pedagogic-didactic

aspects. Consequently, we conceptualize pedagogical digital competence (PDC) as VET teachers' capacity to develop and enhance their pedagogical practices through the effective utilisation of digital technology in professional contexts. PDC comprises both practical and conceptual knowledge, as well as an understanding that competences can be developed over time. Aligning with From's (2017) perspective, we acknowledge that PDC is demonstrated through concrete actions within VET teachers' professional contexts and can be expected to develop and mature as VET teachers gain more experience. Thus, in order for VET teachers to attain PDC it is important to keep up to date with and understand concepts of relevant pedagogical approaches suitable for digital learning in their specific professional subjects. Additionally, acknowledging these theoretical, subject and context related aspects, PDC requires teachers to have a relationship with emerging digital technologies that enables them to use those tools efficiently in supporting students' learning. Subsequently, the objective of this study is to enhance awareness and knowledge of this multifaceted phenomenon by evaluating and analyzing VET teachers' pedagogical digital competences using an online survey. The research questions formulated for this study are as follows:

1. What is the status of VET teachers' pedagogical digital competences?
2. What possible relationships exist between VET teachers' demographic and professional profiles and their pedagogical digital competences?

RESEARCH DESIGN

This section provides an overview of the study's sample, data collection procedure, the self-assessment survey, and the statistical analyses conducted to address the research questions.

Sample and Procedure

Data collection took place between February and April 2022, utilising an online survey administered through the Webropol electronic system. The survey targeted VET teachers in four countries: Finland, the Netherlands, Italy, and Spain (specifically Catalonia). The objective of the online survey was to assess the current status of digital competences among VET teachers representing various professional fields. The selected professional fields included Digital, Beauty & Wellness, Business, Chemistry, Nature Guidance and Animal Care, Healthcare, Tourism, Mechanical Engineering, Production Technology, and special programs for adults. The VET colleges participating in the survey in each country identified two VET fields each in which the most support was needed to enhance teachers' digital competences.

Participants were invited from the four countries, and convenience or accidental sampling techniques (Saumure & Given, 2008) were employed to gather voluntary responses. The anonymity of participants was preserved during data collection. A total of 218 VET teachers completed and submitted the survey responses for analysis. Demographically, approximately two-thirds (64 percent) of the respondents were female, while one-third (34 percent) were male. Regarding age distribution, 43 percent of the participants were 45 years old or younger, while

55 percent were over the age of 46. Additionally, three percent of respondents chose not to disclose their age. The majority of participants (52 percent) were from Spain, with the remaining percentages represented by Finland (23 percent), Italy (15 percent), and the Netherlands (10 percent). Regarding teaching experience, more than a quarter of the respondents (28 percent) reported having less than 5 years of experience, while almost a quarter (24 percent) indicated 6 to 10 years of teaching experience. The remaining group of VET teachers (47 percent) reported having more than 10 years of teaching experience. In terms of online teaching experience, over half of the respondents (54 percent) reported having no or less than 2 years of experience, while 36 percent reported 2 to 5 years of experience, and another 36 percent reported more than five years of experience in online teaching. The participants represented the following VET fields: Business (39 percent), Chemistry (13 percent), Digital (13 percent), Production Technology (10 percent), Beauty and Wellness (6 percent), Other (18 percent), and 1 percent did not specify their vocational field. The demographic characteristics of participants are presented in Table 1.

Table 1: Demographics of the sample

Gender *n* %	*Male* 74 34%	*Female* 140 64%	*Other* 4 2%			
Age range (years) *n* %	*< 35* 36 17%	*36 -45* 57 26%	*46- 55* 84 39%	*> 55* 35 16%	*Not shared* 6 3%	
Country *n* %	*Spain* 114 52%	*Finland* 50 23%	*Italy* 32 15%	*Netherlands* 22 10%		
Teaching experience (years) *n* %	*< 5* 60 28%	*6-10* 53 24%	*11-15* 29 13%	*16-20* 25 11%	*>20* 51 23%	
Online teaching experience (years) *n* %	*None* 15 7%	*< 2* 102 47%	*2-5* 78 36%	*>5* 20 9%	*Don't know* 3 1%	
VET field *n* %	*Business* 85 39%	*Chemistry* 28 13%	*Digital* 29 13%	*Production Technology* 22 10%	*Beauty & Wellness* 13 6%	*Other* 39 18%

Self-assessment survey

To examine the existing pedagogical digital competences of VET teachers, an anonymous online survey was developed based on the European Digital Competence Framework for Educators (DigCompEdu) (Redecker & Punie, 2017), which has been widely used for analysing and assessing teachers' digital competences. The DigCompEdu framework, developed by the European Commission's Joint Research Centre (JRC), offers a scientifically grounded approach, and introduces a set of digital competences specific to the teaching profession across all levels of education (Redecker & Punie, 2017). Additionally, the current study integrated some VET-specific items, e.g., collaboration with businesses, into the situational analysis survey.

The self-assessment survey consisted of 14 sub-areas. However, for the purposes of this study, which focuses on pedagogical digital competences, 7 sub-areas comprising 50 competence statements were selected for analysis. The remaining sub-areas covered topics such as knowledge of one's organization's technological environment, searching for material using organization-specific databases, country-specific copyright issues, data security within one's own organization, and the use of digital tools specific to the organization. Although these topics are essential for VET teachers, they are considered to be more aligned with general digital competences rather than specific elements of pedagogical digital competences and therefore were not included in the analysis.

Participants were asked to self-assess their pedagogical digital skills and their prospects for engaging in digital activities within their teaching processes. VET teachers rated their current practices by indicating their level of agreement with the provided statements using a 4-point Likert scale, where 1 indicated "completely disagree," 4 indicated "completely agree," and there was also an option to choose "I don't know." The sub-areas and the number of statements in each are presented in Table 2.

Data analysis

The data analysis involved the use of descriptive statistics to examine the status of teachers' pedagogical digital competences. All quantitative questions were analyzed using IBM SPSS Statistics version 28.0.1.1. This included calculating means and sum variables for the seven different subareas with the Likert-scale statements. The various domains of questions were analyzed in relation to background variables such as age group, teacher experience in years, and experience in online/hybrid teaching in years.

To assess the internal consistency of the different domains, Cronbach's alpha values with 95% confidence intervals were computed within each domain. Cronbach's alpha provides an estimate of the interclass correlations within each domain. The number of items in each domain, the mean value, the confidence intervals, and the Cronbach's alpha values are presented in Table 2. The Cronbach's alpha values for each domain were good or excellent ($\alpha < 0.8$). The sum variables representing different aspects of digital teaching were then analyzed using the Kruskal

-Wallis test, as the sample distribution was not normal. This non-parametric test is appropriate for comparing differences between groups using ranks (Pallant, 2016).

Table 2: Sub-areas of pedagogical digital skills.

Domains	N of items	Mean value	95% CI		*p*	Cronbach α
			Lower	Upper		
Web-content production	5	2.96	.814	.880	.000	.850
Planning online teaching	9	2.97	.870	.917	.000	.895
Building interaction and teamwork	9	3.22	.867	.914	.000	.892
Guidance in online learning environments	6	3.08	.894	.932	.000	.915
Learning tasks	8	3.00	.905	.938	.000	.923
Feedback and assessment	7	2.85	.889	.928	.000	.910
Developing digital competences	6	3.10	.790	.861	.000	.834

Note. Participants rated the questionnaire on a 4-point Likert scale ranging from 4 - Completely agree to 1 - Completely disagree

Findings

The results focused on exploring the possible relationships between VET teachers' demographic and professional profiles and their pedagogical digital competences. The results, presented in Table 3, are divided into three sections: total means, means by age group, means by teaching experience in years, and means by experience in online teaching in years.

The findings indicate that VET teachers aged 35 years or younger assessed their competences in all seven sub-areas higher than their colleagues. The mean scores for this age group were significantly higher, particularly in offering guidance in online learning situations (M = 3.5), creating learning tasks (M = 3.4), giving feedback and conducting assessment (M = 3.2), and developing and sharing their own digital competences (M = 3.4). VET teachers in the age group

of 36 to 45 years also rated their competences slightly higher than their older colleagues in the aspects of building interaction and teamwork (M = 3.3), guidance in online learning (M = 3.1), learning tasks (M = 3.1), and sharing and developing digital competences (M = 3.1). Among VET teachers aged 46 to 55 (n=84) and over 55 years (n=35), the evaluation of digital teaching competences was fairly similar (refer to Table 3). The analysis highlights that all age groups rated the aspects related to feedback and assessment (M = 2.8) and web content production (M = 2.9) as the lowest.

A non-parametric test, Kruskal-Wallis, was conducted to examine the differences between age groups, teaching experience in years, experience in online teaching in years, and the different domains. The Kruskal-Wallis test is appropriate for comparing differences between more than two groups using ranks when the data is not normally distributed. The test revealed statistically significant differences in all seven domains between different age groups (see Appendix 1 for specific test results of each domain). Furthermore, statistically significant differences were found in web content production ($\chi2(4) = 13.987$, $p = 0.007$), planning online teaching ($\chi2(4) = 17.592$, $p = 0.001$), guidance in hybrid and online learning environments ($\chi2(4) = 16.537$, $p = 0.002$), learning tasks ($\chi2(4) = 18.499$, $p < 0.001$), and feedback and assessment ($\chi2(4) = 11.072$, $p = 0.026$) and experience in online and hybrid teaching. However, no statistically significant differences were found between VET teachers' teaching experience in years and the domains. Regarding teaching experience, VET teachers with 5 to 10 years of experience assessed their competences slightly higher than more experienced teachers in almost all aspects (refer to Table 3). Additionally, the results show that VET teachers with the least work experience (less than 5 years) rated their skills slightly higher than those with the longest experience (more than 20 years). On the other hand, VET teachers with a long teaching experience (11 years or more, n=105) assessed themselves as having rather similar levels of competences in all seven aspects of teaching in digital environments (Table 3). When examining the means of differences between experience in online teaching and the sub-areas, significant variations were found. VET teachers with two (n=78) or over five years (n=20) of experience in online teaching rated their skills higher compared to those with less experience. Table 3 displays the means of all sub-areas being significantly higher among this group of teachers compared to those with less (n=102) or no experience (n=15).

Table 3: Means of the sub-areas by age and teacher and online teaching experience in years.

M (1-4)		Web content Production	Planning online teaching	Building interaction and teamwork	Guidance in online learning environments	Learning tasks	Feedback and assessment	Developing digital competences
TOTAL (N=218)		**2.9**	**3.0**	**3.2**	**3.0**	**3.0**	**2.8**	**3.0**
Age group	35 or less *(n=36)*	3.2	3.3	3.5	3.5	3.4	3.2	3.4
	36-45 *(n=57)*	3.0	3.0	3.3	3.1	3.1	2.9	**3.1**
	46-55 *(n=84)*	2.8	2.9	3.1	2.9	2.8	2.7	3.0
	Over 55 years (*n*=35)	2.6	2.7	2.9	2.7	2.8	2.5	2.9
	Don't want to share (*n*=6)	3.0	3.0	3.4	2.9	3.1	2.8	2.7
Teacher experience in years	Less than 5 years (*n*=60)	3.0	3.0	3.3	3.2	3.1	2.9	3.2
	5-10 y (*n*=53)	3.0	3.1	3.3	3.2	3.1	2.9	3.2
	11-15 y (*n*=29)	2.9	2.9	3.2	2.9	3.1	3.0	3.0
	16-20 y (*n*=25)	2.9	2.7	2.9	2.7	2.7	2.7	2.8
	More than 20 years (*n*=51)	2.8	2.9	3.1	3.0	2.9	2.6	3.0
Online teaching experience in years	No experience (*n*=15)	2.3	2.6	2.9	2.6	2.7	2.4	2.7
	Less than 2 years (*n*=102)	2.9	2.8	3.1	3.0	2.8	2.7	3.0
	2-5 years (*n*=78)	3.1	3.1	3.3	3.2	3.2	3	3.2
	Over 5 years (*n*=20)	3.1	3.2	3.4	3.3	3.2	3.1	3.3
	Don't know (*n*=3)	2.7	2.8	2.8	2.3	2.6	1.9	2.7

DISCUSSION AND CONCLUSIONS

The purpose of our study was to investigate the pedagogical digital competences (PDC) of a selected group of VET teachers in four different European countries. The study utilised an online survey to measure and map the current situation of VET teachers' PDC in seven sub-areas: web-content production, planning online teaching, building interaction and teamwork, guidance in online learning environments, learning tasks, feedback and assessment, and developing one's digital competences.

Regarding the first aim of the study, which was to assess the current situation of VET teachers' pedagogical digital competences, it was observed that the competences in the seven aspects were quite similar. The total scores in pedagogical digital competences averaged at a mean value of 3.0 on a 4-point Likert scale, which closely aligns with scores obtained in similar studies. For instance, Cattaneo et al. (2022) reported a mean value of 3.09 in their study of Swiss VET teachers. These results support the findings of other studies, indicating that VET teachers generally possess above-average pedagogical digital competences. It can be speculated that the teachers might have been unaware of the criteria descriptions of skills and competences required at level four, as such criteria do not exist. Therefore, assessing themselves with an average score would be understandable, as teachers are professionals in assessment and are accustomed to evaluating based on set criteria.

Analyzing the specific scores obtained for each of the seven sub-areas, it was discovered that the building interaction and teamwork aspect was, on average, the most developed among all teachers, while the feedback and assessment sub-area was the weakest. Possible explanations for these results could be based on global issues that have emerged in recent years. During the COVID-19 pandemic, online teaching was the only option for VET education and it appears that some lessons have been learned from it. Since then, there has been increased emphasis on students' engagement in digital learning environments as many students were losing their motivation in online learning situations and there was a reduction of their overall well-being. Consequently, VET teachers were encouraged to identify and select digital tools and pedagogical methods to enhance students' interaction and engagement in vocational learning. Relative to the low scores in assessing learning, it appears that reviewing feedback and assessment methods in digital learning contexts received less attention than promoting student engagement. Assessing learning in digital environments might have focused mainly on summative assessment methods based on examinations or tests that may have deterred VET teachers from exploring and using different digitalized feedback and assessment formats.

The second aim of the study was to investigate possible relations between VET teachers' demographic, professional profiles and their pedagogical digital competences. The seven sub-areas were examined by calculating means across the following background dimensions: age group, teaching experience, and online teaching experience in years. The results suggest that younger teachers (35 years and below, n=36) rated their competences in all seven sub-areas higher than their older colleagues. This might indicate that the younger generation of teachers

(Fernández-Cruz & Fernández-Díaz, 2016) are more accustomed to evaluating their skills and competences in a more positive manner than previous generations possibly due to changes in teacher education programs shifting from content-based to competence-based curricula. Additionally, the younger teacher generation has grown up with digital technology and experienced being online students themselves. Teachers who have experiences of studying online have been found to promote student-centered practices in their own online learning environments (Cox & Prestridge, 2020). Therefore, VET teachers' positive attitudes towards technology and the use of digital tools align with previous research findings that have shown significant relationships between teachers' beliefs about their digital competence and their positive beliefs regarding the ease of use and usefulness of technology in teaching (Antonietti et al., 2022).

Examining the results of overall VET teaching experience in years indicates that VET teachers with less than five (n=60) and up to 10 years (n=53) of teaching experience rated their competences in almost all seven aspects slightly higher than teachers who have been in the VET profession for a longer period (Table 3). This group of participants (n=113) may belong to a younger generation of teachers (Generations Y and Z), having gained confidence in using technology in different ways, thus, assessing their pedagogical digital competences accordingly higher than their older colleagues. In view of Krumsvik's model, it could be assumed that these VET teachers have easily achieved the first two levels of the model, adoption and adaptation, basic digital skills that focus on the transparent use of technology and gaining experiences and confidence to move on the next levels. However, a large group of the participating VET teachers (n=105) had a long overall teaching experience (11 years or more). Interestingly, they assessed themselves as having rather similar levels of competences in all seven sub-areas (Table 3). This may indicate that they have developed a solid level of pedagogical competences in general VET teaching that can be utilized and transferred even after 20 or more years of practice to online teaching. Thus, supporting Krumsvik's (2012) understanding of pedagogical digital competence development as being a journey that takes several years to reach the higher stages of appropriation and innovation.

However, experience in online teaching clearly corresponds positively to VET teachers' pedagogical digital competences. VET teachers with two or more years of experience in teaching online evaluated their skills higher than those with less experience (Table 3). It appears that experience in online teaching accelerates the development of pedagogical digital competence (PDC). It can be postulated that such experiences enable VET teachers to reach the highest stages of the model (Krumsvik, 2012), including the appropriation stage and the innovation stage to develop new pedagogical innovations using technology with an extended knowledge of learning. VET teachers with a pedagogical digital competence (PDC), have heightened self-awareness skills highlighting the dialectic relationship between "hands-on" and "heads-on" activities (Krumsvik, 2012) when using technology in VET education.

Overall, these results suggest that pedagogical digital competence (PDC) varies among VET teachers depending on their demographic and professional profiles. However, all VET teachers, regardless of age or teaching experience, are able to develop their PDC and demonstrate it in

their professional learning contexts. Gaining experience in online teaching appears to accelerate the development of PDC and confidence in working in digital environments. Therefore, the results suggest that VET organizations should provide opportunities for all VET teachers to engage in online teaching and encourage active experimentation with adequate resources, such as through pair-teaching or mentoring.

Implications and recommendations

It is acknowledged that this study has limitations. The selection of VET teachers and vocational fields was predetermined by the project partners, which may have influenced the results. Additionally, the study relied on self-reported competence assessments, which can be prone to under- or overestimation as no criteria descriptions were provided. While the aspects of PDC were measured based on VET teachers' subjective perceptions, incorporating measurements of the VET organizational environment would provide a more objective view. Future research should consider objective VET factors, such as digitalization strategy, digital learning platforms, and support offered to teachers, as pedagogical digital competence is not a phenomenon that exists independently of the context.

This study contributes valuable insights into VET teachers' pedagogical digital competences, which need to be continuously updated. By conducting a self-assessment survey, VET teachers' beliefs about their PDC, rather than their demonstrated actions, were measured. In conclusion, it is strongly recommend and encouraged that VET teachers build their confidence in using digital learning environments in vocational education and further develop their pedagogical digital competence.

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Appendix 1: Results of the Kruskal-Wallis test

Domain	**Age group**	**Mean rank**		**Teacher experience in years**	**Mean rank**		**Experience in online/hybrid teaching**	**Mean rank**	
Web Content Production	*35 or less (n=36)*	125.56	**Chi-square 11.617 df 4 Asymtonic significance .020**	Less than 5 years (n=60)	107.92	**Chi-square 3.463 df 4 Asymtonic significance .484**	No experience (n=15)	52.39	**Chi-square 13.987 df 4 Asymtonic significance .007**
	36-45 (n=57)	108.04		5-10 y (n=53)	107.82		Less than 2 years (n=102)	97.28	
	46-55 (n=84)	94.9		11-15 y (n=29)	96.67		2-5 years (n=78)	111.56	
	Over 55 years (n=35)	80.59		16-20 y (n=25)	97.43		Over 5 years (n=20)	116.83	
	Do not want to share (n=6)	103.63		More than 20 years (n=51)	89.81		Don't know (n=3)	96	
Planning online teaching	35 or less (n=36)	118.6	**Chi-square 17.546 df 4 Asymtonic significance .002**	Less than 5 years (n=60)	89.75	**Chi-square 5.438 df 4 Asymtonic significance .245**	No experience (n=15)	50.38	**Chi-square 17.592 df 4 Asymtonic significance .001**
	36-45 (n=57)	94.19		5-10 y (n=53)	101.66		Less than 2 years (n=102)	80.14	
	46-55 (n=84)	78.77		11-15 y (n=29)	88.71		2-5 years (n=78)	101.2	
	Over 55 years (n=35)	70.17		16-20 y (n=25)	72.66		Over 5 years (n=20)	116.03	
	Do not want to share (n=6)	110.63		More than 20 years (n=51)	83.29		Don't know (n=3)	90.33	
Building interaction and teamwork	35 or less (n=36)	121.29	**Chi-square 17.631 df 4 Asymtonic significance .001**	Less than 5 years (n=60)	95.93	**Chi-square 6.250 df 4 Asymtonic significance .181**	No experience (n=15)	65.42	**Chi-square 9.268 df 4 Asymtonic significance .055**
	36-45 (n=57)	96.19		5-10 y (n=53)	102.63		Less than 2 years (n=102)	85.25	
	46-55 (n=84)	82.62		11-15 y (n=29)	92.85		2-5 years (n=78)	101.5	
	Over 55 years (n=35)	72.05		16-20 y (n=25)	71.91		Over 5 years (n=20)	109.24	
	Do not want to share (n=6)	124.63		More than 20 years (n=51)	84.51		Don't know (n=3)	67.83	
Guidance in hybrid and online learning environments	35 or less (n=36)	127.53	**Chi-square 19.926 df 4 Asymtonic significance < .001**	Less than 5 years (n=60)	98.45	**Chi-square 7.683 df 4 Asymtonic significance .104**	No experience (n=15)	50.85	**Chi-square 16.537 df 4 Asymtonic significance .002**
	36-45 (n=57)	99.24		5-10 y (n=53)	104.86		Less than 2 years (n=102)	87.35	
	46-55 (n=84)	81.52		11-15 y (n=29)	82.52		2-5 years (n=78)	105.29	
	Over 55 years (n=35)	75.23		16-20 y (n=25)	71.11		Over 5 years (n=20)	109.32	
	Do not want to share (n=6)	95.5		More than 20 years (n=51)	91.95		Don't know (n=3)	48.17	

Domain	Age group			Teacher experience in years			Experience in online/hybrid teaching		
		Mean rank			Mean rank			Mean rank	
Learning tasks	35 or less (n=36)	127.63		Less than 5 years (n=60)	98.18		No experience (n=15)	54.08	
	36-45 (n=57)	102.23	**Chi-square 18.675 df 4 Asymtonic significance < .001**	5-10 y (n=53)	106.91	**Chi-square 7.558 df 4 Asymtonic significance .109**	Less than 2 years (n=102)	86.28	**Chi-square 18.499 df 4 Asymtonic significance <.001**
	46-55 (n=84)	81.53		11-15 y (n=29)	100.62		2-5 years (n=78)	112.74	
	Over 55 years (n=35)	84.64		16-20 y (n=25)	69.59		Over 5 years (n=20)	112.34	
	Do not want to share (n=6)	132.63		More than 20 years (n=51)	92.76		Don't know (n=3)	60.25	
Feedback and assessment	35 or less (n=36)	129.71		Less than 5 years (n=60)	102.22		No experience (n=15)	67.69	
	36-45 (n=57)	107.62	**Chi-square 18.134 df 4 Asymtonic significance .001**	5-10 y (n=53)	107.62	**Chi-square 5.758 df 4 Asymtonic significance .218**	Less than 2 years (n=102)	92.4	**Chi-square 11.072 df 4 Asymtonic significance .026**
	46-55 (n=84)	86.32		11-15 y (n=29)	108.04		2-5 years (n=78)	108.2	
	Over 55 years (n=35)	79.4		16-20 y (n=25)	85.15		Over 5 years (n=20)	117.35	
	Do not want to share (n=6)	107.5		More than 20 years (n=51)	85.74		Don't know (n=3)	20.5	
Developing and sharing my own digital competence	35 or less (n=36)	130.97		Less than 5 years (n=60)	108.3		No experience (n=15)	64.46	
	36-45 (n=57)	99.32	**Chi-square 14.827 df 4 Asymtonic significance .005**	5-10 y (n=53)	109.35	**Chi-square 8.436 df 4 Asymtonic significance .077**	Less than 2 years (n=102)	93.89	**Chi-square 9.455 df 4 Asymtonic significance .051**
	46-55 (n=84)	90.86		11-15 y (n=29)	96.91		2-5 years (n=78)	105.9	
	Over 55 years (n=35)	83.14		16-20 y (n=25)	75.07		Over 5 years (n=20)	119.82	
	Do not want to share (n=6)	88		More than 20 years (n=51)	89.58		Don't know (n=3)	67.5	