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PAPER

The Relation among Vocational Teachers' Use of Digital and Mobile Tools and Socio-Demographic Factors

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ABSTRACT

Education is increasingly influenced by digitalization and intergenerational differences. With the coming of the Alpha generation and its future entry into secondary education, there is a need to continuously improve and adapt educational strategies, teaching methods, and pedagogical and digital competences of teachers to these changes. The aim of the study is to find out which digital and mobile tools are used in teaching by Czech teachers in secondary vocational education and which factors influence teachers' attitude towards the reasons for not including these tools in teaching. Data were collected using a questionnaire survey method. The data were analyzed at 95% confidence level using Chi-square test in SPSS software. Phi-coefficient, Odds ratio, and Cramer's *V* method were used to find out the degree of relation between the variables. The research showed a significant effect of gender, age, and subject area taught on teachers' use of digital tools. The use of mobile tools in teaching decreases as teachers, age. Women are more likely to not use LMS Moodle compared to men. Women perceive teachers' digital competences as more deficient and believe that they may be the reason for not using digital tools in teaching. The study extends theoretical knowledge and provides recommendations on how to prepare secondary education actors in the context of digital pedagogy for the arrival of the Alpha generation.

KEYWORDS

digital tools, mobile learning tools, vocational teachers, Alpha generation, generation Z, socio-demographic factors

1 INTRODUCTION

The development of teachers' digital competences has been supported and actively addressed, especially since 2017 through the "European Framework for the Digital Competence of Educators: DigCompEdu" [1]. DigCompEdu defines digital technology as any device that can be used to create, view, distribute, store, transmit, or receive digital data. Digital competence in education is closely linked to a number

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of other areas. The links are obvious to digital resources, digital assessment, and student support, but also to the promotion of digital competences of students and the professional engagement of the teachers themselves. Digital assessment is gaining importance as it relates to feedback, student assessment, management, and lesson planning. Teaching is also transforming to take into account the characteristics of the new generation of students. Representatives of Generation Z, who are now studying at secondary schools, prefer digital technologies in teaching, which has an impact on the change in the approach to teaching or on teacher communication [2], [3]. It is therefore essential to systematically and continuously investigate teachers' use of digital technologies in teaching [4] as well as the current or target level of teachers' digital competences. A key area is also the identification of the reasons that Czech teachers perceive as crucial for not using or incorporating digital technologies in teaching [5].

The aim of this study conducted in the first half of 2023 is to find out which digital and mobile tools are used in teaching by teachers from secondary vocational schools of economics. Another aim is to find out teachers' attitudes towards the reasons for not including educational digital and mobile tools in teaching and what these teachers' attitudes depend on.

2 LITERATURE REVIEW

The use of mobile applications plays an extremely important role in contemporary education, as the majority of learners actively use mobile phones to support their learning, and also a significant proportion of teachers are able to manage and creatively use mobile applications in virtual learning. In addition, constant communication with learners through applications such as WhatsApp, Moodle Mobile, Zoom, and/or Google Meet can also be considered a strength of m-learning. This clearly leads to an increase in the attractiveness of the learning experience for learners and to an increasing effectiveness of the learning experience [6]. An empirical study [7] outlines seven basic systemic premises for the effective use of mobile technologies in teaching and learning processes: 1. content, 2. methodological strategies, 3. activities, 4. assessment, 5. technological means for learning, 6. mobile resources, and 7. teacher. Digital competence is essential for the successful transversal integration of these technologies. In this sense, the authors of the present study call for the need to pay attention to teacher-centered training and resources. These findings are in line with [8], which leads to the conclusion that optimization of time use and directing attention through mobile media is a promising intervention in the sphere of media education. Teachers' direct involvement in educational activities through digital media provides students with deeper and sustained exposure to educational content, shapes exemplary media habits, and helps anchor desirable connections among media education and curricular disciplines.

Academic research is oriented towards exploring the impact of teaching strategies combining mobile learning with traditional methods in teaching finance and leaning towards blended learning models that promote effective teacher-student interactions [9]. When teachers have appropriately considered the characteristics and learning needs of students and courses, the potential for transferring greater confidence in using digital tools from teacher to student has been enhanced, resulting in improved teaching. Research often involves students, parents, and teachers. Such research [10] was carried out in the Slovenian secondary education context, which investigated the role of smartphones and tablets in the acquisition of 21st century

skills. Respondents see this role as significant. At the same time, they also uncovered differences among the target groups, with students pointing mainly to the positive impact of smartphones and tablets on a wider range of skills, while teachers saw their importance mainly in promoting digital literacy and the possibility to engage students more in the classroom. There is the phenomenon of gamification, which particularly encourages Generation Z users. Gamification is useful for satisfaction with the information retrieval system, especially when game elements are embedded in the system according to users' preferences [11].

Prospective teachers' attitudes towards mobile learning and mobile learning support behaviors also showed significant differences by gender and grade level [12]. In these studies, it was found that attitudes towards mobile learning positively predicted mobile learning adoption behaviors in prospective teachers and that prospective teachers expressed positive needs and attitudes towards mobile learning in many aspects. These authors also report that males spend more time on mobile learning tools and social media than their female peers, also use social media more and engage more with mobile communication applications. Prospective teachers studying in lower grades are more accepting of mobile learning and show a high affinity for it. The use and adoption of mobile learning tools decreases with increasing grade and age. Other studies [13] report that male teachers show a stronger self-concept of digital competence in education than female teachers, who rate themselves as less knowledgeable about the pedagogical use of mobile devices compared to men. Beginning teachers see the implementation of digitalization in education as a priority, they consider that digitalization facilitates learning processes and is a motivator for lifelong learning [14]. They see the disadvantages of mobile learning in the need for Internet connectivity, charging, and ownership of a suitable phone, the fact that such learning does not offer face-to-face questioning, that it increases the risks of phone dependency and puts excessive strain on eyesight. They also point out that mobile learning environments can lead to laziness because information is quickly and easily available. The results of the study [15] show teachers' motivation to use digital technologies with the Alpha generation, in which satisfying their physiological, safety, social, cognitive, aesthetic, and self-actualization needs play a major role. These findings are consistent with earlier research [16] which concluded that primary school teachers are more open to using smartphones, tablets and other mobile learning devices in their classrooms than secondary school teachers.

3 PURPOSE OF THE STUDY AND JUSTIFICATION OF THE HYPOTHESES

The purpose of this study is to find out which digital and mobile tools are used in teaching by teachers at secondary vocational schools of economics. The study examines teachers' attitudes towards the reasons for not incorporating these instructional digital tools into their teaching and the factors that influence these attitudes. The need for the study is triggered by the expansion of the digitalization of education, the emergence of the Alpha generation and its future entry into secondary education, and the need to conceptualize new strategies for teaching with digital technologies based on scientific knowledge. Empirical studies point to teachers' motivation to use digital technologies more as the Alpha generation emerges [15]. Elementary school teachers are more open to using smartphones, tablets, and other mobile learning devices in their classrooms than secondary school teachers [16]. As generation Alpha enters secondary education, there is a need to explore secondary school teachers' approaches to teaching, digitizing, and supporting generation Alpha

learning. Already for Generation Z, independent learning, Internet searches, the use of e-books, digital applications, YouTube, or virtual assistants [17]. There are studies [12], [13] that have investigated the influence of socio-demographic factors such as gender or age on teachers' use of digital tools in the classroom. What is lacking in the studies is the identification of impacts into secondary education and the exploration of other factors that may influence the use of tools to support teaching, such as the subject area taught. Studies often fail to explore the reasons that lead teachers not to incorporate digital tools into their teaching.

The results of the current study will be helpful for designing appropriate educational strategies that reflect the strengths and weaknesses of secondary vocational education in the context of digital technologies for vocational education. The significance of this study lies not only in terms of the practical implications of the study on teachers' pedagogical activities using didactically effective digital tools but also in terms of theoretical implications. The study greatly enhances scientific knowledge with the concepts and constructs of the methodology used and the theoretical facts, given the less existence of studies oriented to the influence of socio-demographic factors on the use of digital and mobile tools by secondary school teachers.

The following hypotheses emerged from the research objectives:

H1: There is a positive relation between the age of a teacher and the length of teaching experience.
H2: Teachers' use of digital platforms to support teaching depends on socio-demographic factors (gender, age, years of teaching experience, and subject area).
H3: Attitudes towards reasons for not using digital platforms to support teaching vary depending on socio-demographic factors (gender, age, years of teaching experience, and subject area taught).

4 METHODOLOGY

A quantitative, empirical survey design, which aimed to determine the dependence of socio-demographic factors (gender, age, years of teaching experience, and subject area taught) on the use of digital and mobile tools in teaching by secondary school teachers of economics was adopted as the research methodology for this study. Another objective was to find out teachers' attitudes towards the reasons for not incorporating educational digital and mobile tools in teaching and what these teachers' attitudes depend on. This is related to the choice of research methods with regard to the type of variables that were subject to statistical analysis. The study was conducted in the first half of 2023. The current study extends the knowledge of empirical research aimed at investigating the influence of socio-demographic factors on teachers' emotional experiences of using online tools to support teaching. The study also explored the reasons for teachers' perceived burden in distance education in the COVID era [18].

4.1 Research sample

The sampling was done in a deliberate manner. The sample composed of teachers from secondary schools of economics in the Czech Republic providing full secondary education with a high school diploma. This type of secondary vocational school was

chosen due to the lack of studies oriented to secondary education and monitoring the environment of this level of education with an economic focus in the context of digital technologies to support teaching. The need to investigate these aspects results from their almost quarter share in the total number of secondary schools in the Czech Republic (1285 institutions). All schools of this type were contacted, i.e., 307 institutions [19]. A total of 147 Czech teachers of various professional backgrounds, i.e., social science, science, and economics, from 105 secondary schools participated in the study [18] (refer to Table 1).

Table 1. Research sample

Socio-Demographic Factor	Absolute Frequency	Relative Frequency in %
Gender		
Female	106	72.1
Male	41	27.9
Total	147	100.0
Age		
25–35	19	12.9
36–45	38	25.9
46–55	35	23.8
56–65	47	32.0
66–75	8	5.4
Total	147	100.0
Years of teaching experience		
To 5 years	19	12.9
6–15	30	20.4
16–25	31	21.1
26–35	49	33.3
36–45	18	12.2
Total	147	100.0
Area of the taught subject		
Social Sciences	66	44.9
Natural Sciences	41	27.9
Economics	40	27.2
Total	147	100.0

The socio-demographic factors of the respondents were monitored according to gender, age, length of teaching experience, and subject area taught. The focus of the subject taught is grouped into larger areas for the purpose of this study with respect to the classification of teachers into the discipline they have been professionally and lifelong involved in. Three basic groups were chosen, which also take into account the most frequent structure of subjects in vocational secondary schools. Language

teaching was also included in the social sciences. Mathematics and technical subjects were included in the science area [18].

4.2 Data and methods

The quantitative empirical research used the survey method for data collection. A non-standardized questionnaire was designed as a research instrument [18], which is consistent with the aim of the study and the hypotheses to be tested (refer to Table 2). The questionnaire was distributed to the email addresses of the respondents. The survey was anonymized, and all sensitive data were encrypted. The study received ethical review and approval and complied with all institutional procedures. The conceptual design of the questionnaire, which was divided into three main parts, was based on similar studies oriented towards research on teachers and students, particularly in tertiary education settings [20]. This study seeks to transfer the scientific knowledge from universities to the secondary education level and to explore the relation among variables in the secondary school setting of economics.

The first part of the questionnaire concerned the use of digital and mobile tools by teachers in teaching. In the light of current studies [2], [21], [22], and the need to develop teachers' digital competences according to the European Framework for the Digital Competence of Educators: DigCompEdu [1], the following most commonly used digital and mobile tools were selected:

- Moodle: Learning management system (LMS) Moodle;
- Teams' basis: MS Teams at the basic level, which allows online transfer and upload of studies and other documents;
- Teams progress: MS Teams at a more advanced level, which allows you to control other applications, create questionnaires, quizzes, and assess tasks;
- Google classroom; and
- Poll: Instructional online tools for voting and formative assessment, i.e., ongoing feedback from teacher to students and from students to teacher.

The second part of the questionnaire aimed to explore teachers' attitudes towards the reasons for not using digital platforms to support teaching. These reasons included, for example [5]:

- Lack of time to use digital platforms and tools;
- insufficient technical equipment;
- Lack of digital competence of teachers;
- The digital platform or tool does not fit the subject matter or themes;
- low learning potential of students; and
- I don't see the benefit.

The choice of variables was first assessed with respect to existing studies, followed by peer review [23] processed by three researchers at the same professional level. This evaluation method was three-round. In the first round, the variables were blindly selected based on current studies and examples of good practice. In the second round, the results were shared with all reviewers and discussed with them. The third round had the form of an output selection of digital platforms and forms of learning, which was based on the consensus of the majority of reviewers, i.e., at least two.

Table 2. Questionnaire items and variables in relation to the hypotheses

Topic	Question in the Questionnaire	Response, Type of Variable and Relation Hypothesis
Experience in using digital and mobile tools in teaching	Which digital and mobile tools do you use in your teaching? – Moodle – Teams basis – Teams progress – Google classroom – Poll	1-yes; 0-no. Dichotomous variables Hypothesis 2
Attitudes towards reasons for not using digital and mobile tools in teaching	In your opinion, what are the reasons why digital and mobile tools are not used? – Lack of time to use digital platforms and tools; – insufficient technical equipment; – Lack of digital competence of teachers; – the digital platform or tool does not fit the subject matter, themes; – low learning potential of students; – I don't see the benefit	1-yes; 0-no. Dichotomous variables Hypothesis 3

The third part of the questionnaire investigated the socio-demographic factors of teachers: gender, age, length of teaching experience, and subject area taught (refer to Table 1).

The content validity of the questionnaire was established through a focus group research method conducted with six teachers in face-to-face mode. It was one focus group lasting 80 minutes with one moderator—a researcher. Due to the characteristics and scope of the questionnaire and the result of content validation, no other methods were used.

The research instrument was validated in terms of its validity and reliability on a sample of 12 teachers. The research instrument was refined based on the comments of the respondents, especially in terms of wording. The reliability of the questionnaire was measured by computing the Cronbach's alpha. The questionnaire was evaluated as reliable, as the Cronbach's alpha is 758 [18]. The reliability of each subscale related to one construct was measured by calculating Cronbach's alpha. The results for each construct are shown below:

- Experience in using digital and mobile tools in teaching (.787)
- Attitudes towards reasons for not using digital and mobile tools in teaching (.744)

Table 3 shows the Cronbach's alpha values for each questionnaire item

Table 3. Cronbach's alpha values for each questionnaire item

Item	Cronbach's α
Experience in using digital and mobile tools in teaching	
LMS Moodle	.788
Teams' basis	.781
Teams progress	.773
Google classroom	.776
Poll (Kahoot or Sli.do or Mentimeter)	.792

(Continued)

Table 3. Cronbach's alpha values for each questionnaire item *(Continued)*

Item	Cronbach's α
Experience in using digital and mobile tools in teaching	
Lack of time	.689
Insufficient technical equipment	.771
Lack of digital competences of teachers	.755
The tool does not suit the subject, themes	.741
Low learning potential of students	.721
I don't see the benefit	.791

4.3 Data analysis

The subject of statistical analysis were three null hypotheses tested at the 5% significance level.

$H_{0\text{-}1}$: There is no positive relation between the age of a teacher and the length of teaching experience.

$H_{0\text{-}2}$: Teachers' use of digital platforms to support teaching is independent of socio-demographic factors (gender, age, years of teaching experience, and subject area taught).

$H_{0\text{-}3}$: Attitudes towards the reasons for not using digital platforms to support teaching do not differ according to socio-demographic factors (gender, age, years of teaching experience, and subject area taught).

The original data are of several types, according to which appropriate statistical tests were selected. Statistical analysis was performed in SPSS. The variables expressing the characteristics of the sample, i.e., gender, age, years of teaching experience, and subject area taught, are nominal variables and are used as a sorting factor to perform comparative analyses. The data used to verify hypothesis 2, i.e., the use of digital and mobile tools, and hypothesis 3, i.e., attitudes towards the reasons for not including these tools in teaching, contain dichotomous variables 0 (no) and 1 (yes). The dependence of teachers' uses of digital and mobile tools and their attitudes towards reasons for not using these tools in teaching on socio-demographic factors was investigated at 95% confidence level using Chi-square test. The test was applicable as the data met several assumptions. The data are nominal (dichotomous or multivariate), interdependence of observations is maintained, and a sufficiently large sample size is required. More specifically, it is usually required that the contingency table of the pair of traits whose relationship is being examined has sufficiently large (at least five) expected frequencies in each cell. *Phi*-coefficient and odds ratio were used to find the degree of dependence among dichotomous variables. That coefficient could be used in the case of the gender factor. In the case of examining the influence of other factors, the Cramer's *V* statistical method was used. This method was also used to test hypothesis 1. This method is used to determine the degree of association among two categorical variables in a contingency table greater than 2×2. It is a numerical value between zero and one that expresses the strength of association among the variables. The higher the value of Cramer's *V*, the stronger the association among the variables. It is typically used in data analysis and in statistical tests such as the χ^2 (chi-square) test of independence.

5 RESULTS

First, the results of descriptive statistics are published, followed by the results of the verification of hypotheses 1–3.

5.1 Descriptive statistics

The results of the descriptive statistics are illustrated by the absolute and relative frequencies of the respondents' answers (n = 147) in relation to their experiences of using digital and mobile tools in education (refer to Table 4) and their attitudes towards the reasons for not using these tools in education (refer to Table 5).

Table 4. Descriptive analysis of teachers' responses in relation to the use of digital and mobile tools in teaching (n = 147)

Tools	Uses (1)		Not in Use (0)	
	Absolute Frequency	Relative Frequency (%)	Absolute Frequency	Relative Frequency (%)
LMS Moodle	19	12.9	128	87.1
Teams' basis	80	54.4	67	45.6
Teams progress	47	32.0	100	68.0
Google classroom	49	33.3	98	66.7
Poll (Kahoot or Sli.do or Mentimeter)	55	37.4	92	62.6

Table 5. Descriptive analysis of teachers' responses in relation to attitudes towards reasons for not using digital and mobile tools in teaching (n = 147)

Tools	Yes (1)		No (0)	
	Absolute Frequency	Relative Frequency (%)	Absolute Frequency	Relative Frequency (%)
Lack of time	79	53.7	68	46.3
Insufficient technical equipment	43	29.3	104	70.7
Lack of digital competences of teachers	24	16.3	123	83.7
The tool does not suit the subject, themes	107	72.8	40	27.2
Low learning potential of students	20	13.6	127	86.4
I don't see the benefit	38	25.9	109	74.1
Other	0	0	0	0

The results of the descriptive statistics show that from the analyzed digital platforms based on the learning management system, which also enable online meetings among teachers and students, MS Teams is the most used at the 107 Czech secondary vocational schools we surveyed, followed by Google Classroom, and Moodle is the least used. The majority of vocational teachers involved in this research (54.4%) use MS Teams the most among digital and mobile platforms at the basic level, which allows online transfer and uploading of studies and other documents. In secondary

vocational education at the level of our sample, 19 teachers out of 147, i.e., 12.9%, work with LMS Moodle. A third of the teachers (37.4%) use mobile tools in their teaching that enable formative assessment, i.e., immediate feedback from students to teacher, but also from teacher to students. A third of teachers (32%) also use MS Teams at a more advanced level, which allows for additional control of other applications, the creation of questionnaires, quizzes, and assessment of assignments. The results show that teachers are familiar with digital platforms and know their functions and their use for different teaching purposes.

The study also explored the reasons why teachers believe that digital and mobile tools are not being used in the classroom. Most responses (72.8%) were found for the reason that the tool does not suit the subject or topics in the subject. The least number of teachers (13.6%) leaned towards the reason that non-use could be due to low learning potential of students. A pleasing finding is that the majority of teachers are of the opinion that schools have sufficient technical equipment (70.7%) and teachers have sufficient digital competences (83.7%). A quarter of the teachers interviewed do not see any benefit in using digital and mobile tools directly in teaching. 53.7% of the respondents are of the opinion that there is no time for these digital tools during teaching. No other reasons were given by the respondents.

5.2 The relation between teacher age and length of teaching experience (H_{0-1})

The study examined the positive association between the age of the teacher and the length of teaching experience. That is, whether the length of teaching experience also increases with age. A contingency table was used to test the hypothesis H_{0-1} at the 5% significance level, and Cramer's *V* method was used to find the degree of relation. There was a positive association ($p = .001$) and a strong relation among the variables, i.e., 50.9% dependence (refer to Table 6).

Table 6. Significance of the relation among the teacher's age and length of teaching experience (H_{0-1})

	Value	df	*p*	*V*
χ^2	152.356	16	<.001	.509
n = 147				

At the 5% significance level, we reject the hypothesis H_{0-1}. This result is helpful in determining whether the research population conforms to the standard or whether the research population also includes respondents who started the teaching profession at a later age. Our study population matches the standard tendency, i.e., respondents started the teaching profession at a younger age. This tendency may influence teachers' use of digital tools in real teaching and their attitudes towards the reasons for not using these tools during teaching. For this reason, we excluded the length of teaching experience from the socio-demographic factors and included gender, age, and subject area taught to verify hypotheses H_{0-2} and H_{0-3}.

5.3 The relation among teachers' uses of digital and mobile tools and socio-demographic factors (H_{0-2})

Hypothesis H_{0-2} was tested at 5% significance level using Chi-square test and 2×2 association table for the gender factor. The *phi*-coefficient and odds ratio were used

to determine the degree of association. In the case of the age and subject taught factor, the 2 × 3 and above contingency table was used and Cramer's *V* was used, to find the degree of dependence (refer to Table 7).

Table 7. Significance of the relation among teachers' use of digital and mobile tools and socio-demographic factors (H_{0-2})

Tools	Gender			Age		Area of the Taught Subject	
	p	Phi	OR	p	V	p	V
LMS Moodle	.002	.258	4.492	.062	.247	.736	.065
Teams basic	.908	.010	–	.379	.169	.253	.137
Teams progress	.966	.004	–	.675	.126	.395	.112
Google classroom	.153	.118	–	.500	.151	.357	.118
Poll (Kahoot or Sli.do or Mentimeter)	.042	.167	.437	<.001	.365	<.001	.348

The use of digital and mobile tools by secondary vocational teachers at our sample level is significantly influenced by the socio-demographic factors of gender, age, and subject area of the teacher's subject. In terms of gender, significant relations were found in the case of the use of LMS Moodle. Females are 4.5 times more likely than males not to use LMS Moodle in teaching. The strength of the gender dependence on the use of LMS Moodle in teaching is 25.8%. 5.4% of women and 7.5% of men use this tool. At the same time, significant relationships were found in the case of using online mobile tools for voting and expressing students' attitudes for immediate feedback from student to teacher and from teacher to student. Males are 2.3 times (inverse of 437) more likely to not use a mobile tool in the classroom. The gender dependence on using online mobile tools (such as Kahoot, Sli.do. or Mentimeter) in teaching is weaker at 16.7%. 30.6% of women and 6.8% of men use this tool. In terms of age of the teacher and subject area taught, significant relationships were found for online mobile tools for instant feedback and voting, expressing students' attitudes. The strength of the dependency of the use of the tool on the age of the teacher is 36.5%. Similarly, there is a strong relationship between the use of that tool and the subject area of the subject taught (34.8%). In terms of the age of the teacher, the age group of 46–55 years makes the most use of the online mobile tools for providing instant feedback (12.2%), while the age group of 56–65 years makes the least use of that tool (7.5%). In terms of the subject area of the subject taught, the teachers who teach subjects in the social sciences group make the most use of that tool (25.2%).

At the 5% significance level, we reject hypothesis H_{0-2} for all socio-demographic factors.

5.4 The relation among teachers' attitudes towards reasons for not using digital tools in teaching and socio-demographic factors (H_{0-3})

Hypothesis H_{0-3} was tested at 5% significance level using Chi-square test and 2 × 2 association table for the gender factor. The *phi*-coefficient and odds ratio were used to determine the degree of association. In the case of the age and subject taught factor, a larger contingency table was used, and Cramer's *V* was used to find the degree of dependence (refer to Table 8).

Table 8. Significance of the relation among teachers' attitudes towards reasons for not using digital tools in teaching and socio-demographic factors (H_{0-3})

Reason	Gender			Age		Area of the Taught Subject	
	p	Phi	OR	p	V	p	V
Lack of time	.703	.031	.869	.221	.197	.533	.093
Insufficient technical equipment	.226	.100	.596	.111	.226	.316	.125
Lack of digital competences of teachers	.049	.152	.320	.830	.100	.216	.144
The tool does not suit the subject, topics	.948	.005	1.027	.371	.170	.891	.040
Low learning potential of students	.821	.019	1.127	.244	.193	.344	.121
I don't see the benefit	.313	.083	1.504	.552	.144	.798	.055

Teachers' attitudes towards the reasons for not using digital and mobile tools in teaching are significantly influenced by gender. This relation was found for the reason of teachers' lack of digital competence. The relation among the variables is weaker and is 15.2%. This attitude was expressed by 14.3% of females and 2% of males. The other attitudes of teachers towards the reasons for not using digital and mobile tools in teaching are not significantly influenced by gender. Neither age nor subject area taught significantly influences teachers' attitudes towards reasons for not including tools in teaching. At the 5% significance level, we reject hypothesis H_{0-3} in the case of the relation among gender and teachers' lack of digital competence as a reason for not using digital tools in teaching.

6 DISCUSSION

The current study investigated the significant influence of socio-demographic factors on the use of digital and mobile tools by Czech vocational teachers at secondary schools. The study provides several new findings beyond recent studies from national and international secondary education settings. With regard to the emerging Alpha generation, which is currently in primary education [15], and given that primary school teachers are more open to using digital and mobile tools than secondary school teachers [16], there is therefore potential for exploring further contexts in secondary education. As the Alpha generation enters secondary education, it is imperative that secondary school teachers are even more open to the possibilities of digitalization in education and are aligned with the safety, social, cognitive, or self-actualization requirements of this type of pedagogy. In the era of "post-pandemic learning," there are four main themes: 1) Learning that is not monotonous, 2) Balanced portions of theory and practice, 3) Ideal instructor-driven learning, 4) The need for the application of blended learning [17]. Generation Z brains are structurally different from previous generations. Their brains are surrounded by complex visual imagery, and the parts of their brains responsible for visual skills are more developed and thus more receptive to "visual learning," but with shorter attentional retention times. Therefore, it is desirable to change the approach to teaching, and not all teachers have adapted to these trends.

Our study supports the findings of nearly a decade of older research [24], which highlights a fundamental problem in pedagogical practice. Paradoxically, the introduction of innovative digital and mobile technologies has resulted in some teachers

adopting conservative attitudes in instrumental approaches to teaching, adopting a rigid mentoring role, and presenting traditional courses, albeit with tablet devices. This is somewhat contrary to the intention of using digital and mobile tools instead of "revolutionizing education." Our study points out that more than 70% of the teachers we interviewed believe that such tools are often not included in the classroom precisely because they do not suit the subject or topic. This may be related to the aforementioned conservative approaches in teaching and the unwillingness to innovate subjects in terms of the concept of teaching, the role of the teacher, and the students of Generation Z, and thus the emerging Alpha generation. This problem can be addressed, for example, by existing progressive teaching experiments [25], which confirm the effectiveness of the modern digital training model CUPMF (convolutional pooled probability matrix decomposition model). A four-dimensional co-teaching model on a digital platform can effectively improve the digital performance level in the work of vocational subject teachers in the classroom. Teachers, students, and other partners in education agree that ChatGPT also has a significant role in strengthening broader hard and soft skill structures, including communication skills. They also highlighted its impact on the development of desirable research skills [26].

Our study found that in the context of vocational secondary teachers' attitudes towards not using digital and mobile tools in teaching, teachers' views differ significantly by gender. Female teachers, compared to male teachers are more skeptical about the digital competencies of teachers. Thus, they perceive teachers' digital competences as more deficient and believe that they may be the reason for not using digital tools in teaching. This result is in line with other research [11] oriented towards prospective and novice teachers. The study showed that men spend more time on mobile learning tools and social media than women. However, these findings are not sufficiently supported by research from secondary vocational education; thus, our study extends the knowledge. Our study closely results in the views of women and men of the teaching profession. At the same time, attitudinal differences between men and women are corrected by the common professional interests and competencies of teachers who work in the same socio-cultural environment and face the same educational challenges. This may lead them to tend to balance more or less similar views on the digital teaching tools that can be used in a given teaching situation [27].

The results of our study are inconsistent with research [28]. The 2023 study summarizes that mobile phones are losing importance in direct instruction. At schools, the authors traced a tendency to prohibit mobile phone use and identified a preference for computer use, with mobile phones only being used at certain times when the pedagogical goal desires, and highlighted the related need for pedagogical and digital training for teachers. According to our study, the use of mobile tools by teachers in teaching decreases as teachers, age. We find it interesting that women are more likely to not use LMS Moodle than men. This can be explained by another study [13], which report that men show a stronger self-concept of digital competence in education than women, who rate themselves as less knowledgeable about the pedagogical use of mobile devices compared to men. The subject area of the subject being taught also influences the use of mobile tools, especially for the purpose of getting immediate feedback. Teachers from the social sciences field use these tools significantly the most. Study [29] is in line with our findings and highlights the need to strengthen relevant skills for using digital tools and to provide digital learning applications, tools, and resources that meet teachers' expectations and needs. Teachers are motivated to use digital technologies because they see them as a powerful didactic tool, allowing

a wider range of approaches to support learning and thus generally enhancing the quality of teaching and learning. The implementation of mobile technologies in education contributes to increased student motivation, greater engagement in learning, and faster acquisition of professional competences [30].

There are some limitations of the current study. In the next stages, it will be desirable to expand the study sample while maintaining at least the socio-demographic factors we used. However, it will also be desirable to extend the factors influencing the use of digital and mobile tools to include the social domain of education in particular.

7 CONCLUSION

The study investigated the relation between the use of digital and mobile tools by vocational teachers in Czech secondary education and socio-demographic factors (such as gender, age, and subject area). The results of the current study have direct practical implications for digital pedagogy and its adequate grasp in the conditions of secondary education. Given the emerging wave of the Alpha generation and its entry into secondary education, it will be necessary to prepare vocational education actors in secondary schools for this rather fundamental change, even if their digital competences and grasp of digital pedagogy can be perceived as stable due to the pandemic era. Even so, a change in educators' approach to teaching and even greater use of digital and mobile tools is necessary given the changing brain structures and learning needs of Generation Z and Generation Alpha. Integrating measures into the management of the pedagogical process of the school, a strong rationale for these changes, and the conviction of all representatives of the secondary school, such as teachers, parents, and school partners who can participate in these changes in terms of the financial security of the school infrastructure and the creation of an effective digital learning environment are essential steps. A suitable tool may be within the learning management system Moodle. This environment significantly improves not only the digital competences of teachers but also of students. The results of the current study have theoretical implications for broadening the academic spectrum with new insights in the context of digital pedagogy in secondary vocational education. In particular, attitudinal gender differences in the use of digital tools in teaching and the problems associated with it will need to be explored as the research sample expands. Empirical studies contain different conclusions in this respect, and further results and conclusions will have to be found in the Czech Republic. Future research directions will be mainly oriented towards replicating this research due to the expansion of the research sample and socio-demographic factors, taking into account especially the social aspects of education.

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