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Demand for Digital Skills in Primary Education

Zapotrzebowanie na umiejętności cyfrowe w szkołach podstawowych

KEYWORDS

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digital skills, digital
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ABSTRACT

The content and philosophy of education are subjects of constant review, evaluation and changes that are reflected in school curricula. This should also be reflected in the content of teacher studies as proper reforms might change the skills and competences of graduates, making it easier for them to achieve success in the job market. The article discusses the use of digital tools in primary education, reflecting on the situation in Slovak schools. The aim of this study was to analyze teachers' readiness to apply such tools, as well as their perception of the effectiveness of using ICT in the educational process after the pandemic. A total of 122 Slovak teachers took part in the study, which involved completing a questionnaire. The results indicate that, in general, teachers use technology and see the benefits of its use. However, regardless of the length of their teaching practice, they do not feel prepared for its effective application. The results of this study further support the idea of implementing ICT in university courses for future teachers, which will help them in their work. This study is the basis for future research on the problem of implementing ICT in university courses for future teachers.

SŁOWA KLUCZE   **ABSTRAKT**

ICT, technologie,   Edukacja i filozofia edukacji są przedmiotem ciągłej rewizji, oceny
kwestionariusz,   i zmian, które odzwierciedlane są w programach nauczania szkół. Po-
kursy   winno to również znaleźć wyraz w treści studiów nauczycielskich, po-
uniwersyteckie,   nieważ reformy mogą zmieniać wymogi dotyczące kompetencji, które
umiejętności   ułatwiają osiągnięcie sukcesu nowym absolwentom na rynku pracy.
cyfrowe,   Artykuł omawia wykorzystanie narzędzi cyfrowych w edukacji podsta-
kompetencje   wowej, odnosząc się do sytuacji w słowackich szkołach. Celem niniej-
cyfrowe   szej pracy było zbadanie gotowości nauczycieli do ich stosowania oraz
                      postrzegania skuteczności wykorzystania technologii informacyjno-
                      -komunikacyjnych w procesie edukacyjnym po okresie pandemii.
                      W badaniu wzięło udział łącznie 122 nauczycieli ze Słowacji, którzy
                      wypełnili kwestionariusz. Wyniki wskazują, że na ogół nauczyciele ko-
                      rzystają z technologii i dostrzegają korzyści z jej używania, ale niezależ-
                      nie od długości praktyki pedagogicznej nie czują się przygotowani do
                      jej skutecznego stosowania. Wyniki tego badania dodatkowo popie-
                      rają ideę wprowadzenia technologii informacyjno-komunikacyjnych
                      do kursów uniwersyteckich dla przyszłych nauczycieli, co pomoże
                      im w pracy. Niniejsze badanie stanowi podstawę dalszych badań nad
                      problemem wprowadzania technologii informacyjno-komunikacyj-
                      nych w kursach uniwersyteckich dla kandydatów na nauczycieli.

Introduction

Today's pupils, referred to as "digital natives" or Generation Z (post-millennials, zoomers), and Alpha (born after 2010), were born into the digital era, and the use of technology is natural for them. Hutton et al. (2020), who carried out research on the impact of using screens by children (using magnetic resonance imaging), state that 90% of children under the age of one year are exposed to screens. They report conducting several studies in which children use them as early as 2 or 3 months of age. The authors also note that this is the first study documenting the links between more frequent use of screens and lower brain structure and skill values in preschool children, while stressing that the brain develops fastest in the first five years. There is no doubt that greater attention should be paid to this area.

It is not advisable to criticize millennials for being online 24 hours a day and look-ing for information online rather than in books. It's natural for them. We must realize that teachers (who are not millennials) use classical teaching methods that belong to the pre-digital era, while the pupils use their natural ways to achieve the same goal. It should be noted that the use of technology cannot completely replace traditional teaching methods, but multimedia in education can make learning more engaging, in-teresting, and inspiring for both pupils and teachers (Kožuchová & Višňovská, 2009).

In recent years, the need to reassess teacher training, especially in working with technology, preparing for online work, or creating multimedia tools, has been significantly accelerated by the COVID-19 pandemic. It has also had a significant impact on the methods teachers use in teaching today. They had to find new ways of teaching or use approaches they had previously avoided or were hesitant to employ. However, this challenging situation has provided important feedback on the knowledge and skills that teachers largely need today.

Education is a part of our lives, just like technology. However, we often see that technology remains at the door of the school. Teachers are expected to transform learning, adapt their teaching to the latest trends and, inter alia, use technology to support and improve their teaching. The turning point occurred in 2020, which really forced most teachers to realize the strengths and potential benefits of using technology in teaching.

Stauffer (2022) described skills for the 21st century, including critical thinking, creativity, communication, collaboration and digital skills. Also in this context, we need to realize that universities are preparing future graduates who will be active in the period 2030–2060 and, if we are talking about graduates of teacher study programmes, they will prepare pupils who will be active between 2045 and 2075. For this reason, it is also necessary for future teachers to be prepared to apply and evaluate different forms and methods of teaching. Their preparation also needs to reflect the latest trends, so that they are then ready to apply them in practice. For this reason, it is also good that the current Recovery Plan notes:

> A gradual digital transformation and a better link between education and the labour market will help reduce mismatches and skills shortages, increase labour market participation and contribute to long-term and sustainable growth. An essential objective in this component is to improve teachers' skills. Due to new demands and trends in education, changes in the teacher training process will need to be made. The application of new learning content to everyday practice will be conditional on the creation of new higher education programmes and courses. Digital competence will become a core skill for all educators and staff in the fields of education and training (Plán Obnovy, 2021).

Computer-supported teaching has also penetrated our schools, but it is also necessary that the preparation of future educators includes the creation of multimedia tools with which they should also have experience as learners.

Literature review

The existing literature on using ICT in education is extensive and focuses particularly on its effectiveness (Bernátová, Kochová, 2013; Huľová, 2013; Stebila, 2011;

Abdulrahaman et al., 2020; Xu, 2017; Aloraini, 2012; Sousa et al., 2017). The studies describe both the method of use and the selection criteria, but they also examine the impact of the use of technologies in various conditions and the impact on motivation, effectiveness of teaching, attitudes of pupils to the subject, etc. The studies were generally positive about the efficiency but they sometimes described the teachers' resistance towards its use (except for MS Office, esp. PowerPoint).

Quite surprisingly, the systematic review (Abdulrahaman et al., 2020) shows that the longest used multimedia in teaching is text. At about the same time, images began to be added to education, followed by animations, audio and video. The last addition to the multimedia used is the use of 3D technology. The evaluation of the multimedia technology used for teaching and learning is important in determining the effectiveness of this tool. Experimental evaluation is more important than research to determine the impact of the multimedia tool used in teaching. However, the results of the analysis showed that the survey method was used almost as frequently as the experiment. While experiments were used to examine the impact of multimedia in teaching pupils in lower grades, a survey method was used for the target group of university students, secondary school pupils or university teachers to determine respondents' opinion on the impact of the use of multimedia in teaching and learning. In a system study, research from different fields of education, from natural sciences to social sciences, to education as a subject of research, has been compared. In general, we can say that in research, except in one case in which the respondents preferred rather structured texts with colour differentiation, they appeared to use multimedia in the process of learning and learning obtained positive opinions. As a major problem in the above-mentioned research, the study authors state that their results cannot be generalised due to the insufficient sample size, exposure limited to one lesson or sampling method, and the duration of the experiment that has not been explicitly mentioned. As a result, the study revealed a number of problems that could be an obstacle to the use of multimedia tools in teaching and learning. This, in particular, concerns attitudes and opinions on the use of technology. Respondents expressed a high resilience to change and a negative attitude towards the introduction and use of ICT in education. Other problems in this area are teachers' lack of confidence in the use of multimedia, a lack of knowledge and skills, a lack of technical equipment for educational institutions and a lack of time to learn to use new technologies.

A great deal of previous research into using technologies in teaching has focused on teachers' attitudes. Numerous studies have attempted to explain why teachers struggle to use technologies (e.g. Hartman et al, 2019; Varank & Tozoglu, 2006) and how to reduce teacher resistance to change and innovation (for example, Howard & Mozejko 2015; Oriji & Amadi, 2016).

The pandemic significantly influenced the implementation of technologies in education. Distant forms of education forced the majority of teachers to use different tools, and even the most resistant teachers had to switch to e-teaching. One of the aims of the study was to see how teachers perceive their ability and facilities to use technologies in their teaching practice.

Research

Spiteri and Chang Rundgren (2020) published an interesting *Literature Review on the Factors Affecting Primary Teachers' Use of Digital Technology*. They point out that important factors for integrating technology include teachers' readiness to use it. Interestingly, novice teachers showed higher readiness compared to veterans. Additionally, when citing research results, they note that "the use of technology was not influenced by the teachers' age but by the number of years in service" (Gu et al., 2013 as cited in Spiteri & Chang Rundgren, 2020).

The aim of the research was to examine the use of digital tools in primary education and teachers' self-evaluation in the field of using technologies. We also tried to look for possible association between the variables.

The data was collected in February 2022 using the questionnaire. The only criterion for the inclusion was that the respondents were teachers with at least 5 years of teaching practice. To increase the number of returned questionnaires, the personal contacts were used.

The sample consisted of 122 teachers, with a sample teaching practice length mean of 17.877 and a standard deviation of 8.72.

Table 1. The length of teaching practice of participants

	Count	Cumulative count	Percent	Cumulative percent
5–9 years	25	25	20.49	20.49
10–19 years	48	73	39.34	59.84
20–30 years	37	110	30.33	90.16
More than 30 years	12	122	9.84	100.00
Missing	0	122	0.00	100.00

Source: the author's own work.

The questionnaire consisted of 14 questions focusing on source of knowledge, self-awareness, technical equipment at schools and the software and tools used in education.

There is a statistically significant moderate positive correlation ($r = .384$, $p = .000$) between the length of teaching practice and the source of information in ICT education teachers use.

Graph 1. Correlation between the length of teaching practice (Q1 in years) and the source of information on ICT use in education
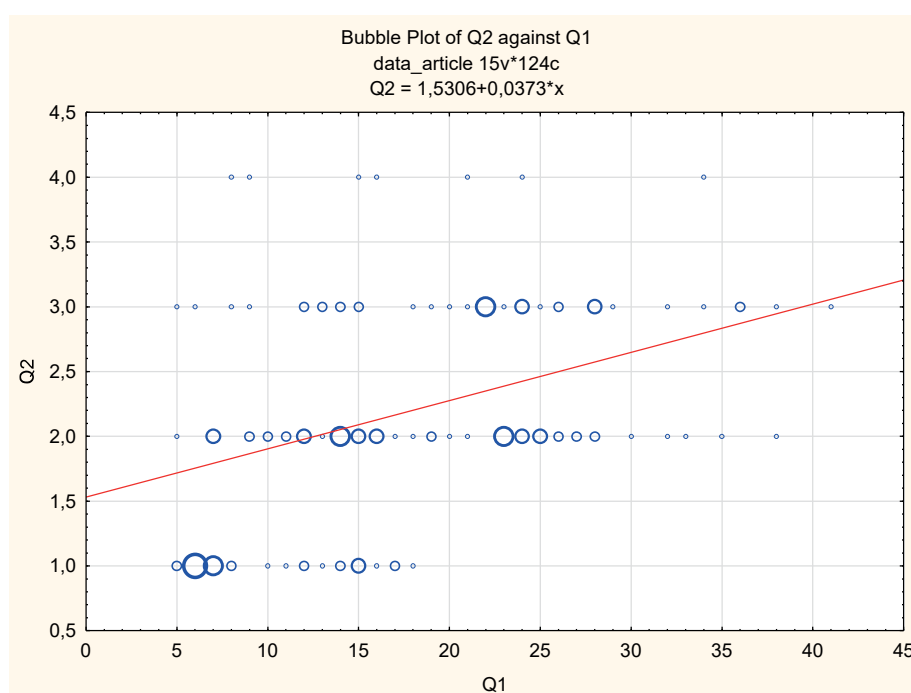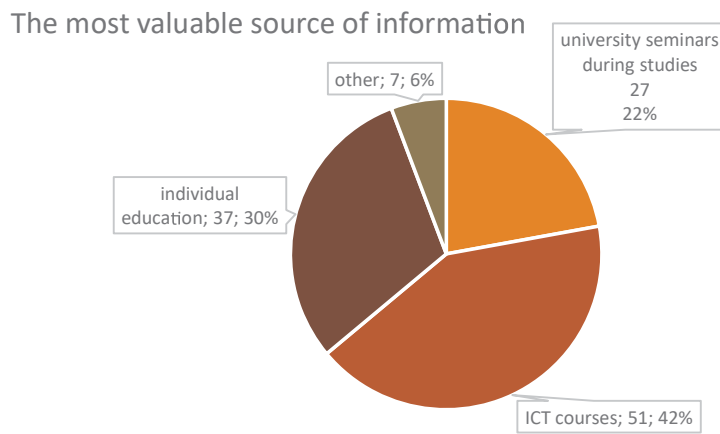

Source: the author's own work.

The result is not surprising: the majority of teachers with shorter teaching practice (we can assume they finished their studies when universities had already introduced some courses on ICT) rely mostly on information from their university study (see table 2).

On the other hand, considering the fast development of educational digital tools, we would expect that they take part in the courses and/or self-study.

More than a half of teachers claimed they use the information from different courses and as many as 30% consider individual education to be the most valuable source of information.

Graph 2. The source of information on ICT use in education

The most valuable source of information

other; 7; 6%

university seminars during studies
27
22%

individual education; 37; 30%

ICT courses; 51; 42%

Source: the author's own work.

This is a very interesting finding which indicates that teachers are interested in the topic and they are ready to self-develop and invest their time to become better professionals.

Table 2. The source of information on ICT use in education

	University seminars	ICT courses	Individual education	Other
5–9 years	13	6	4	2
10–19 years	14	22	10	2
20–30 years		18	17	2
More than 30 years		5	6	1
Total	27	51	37	7

Source: the author's own work.

The next question focused on teachers' self-evaluation. The results were surprising. We expected that, after experiencing the pandemic situation, teachers would perceive their abilities positively. On the contrary: the results revealed low self-esteem regarding digital skills or their use in teaching. Looking at Graph 3, it is apparent that a relatively high number of teachers (n = 77; 63%) need professional development in this area.

Graph 3. Self-reflection on digital skills in education

Self reflection – digital skills in education
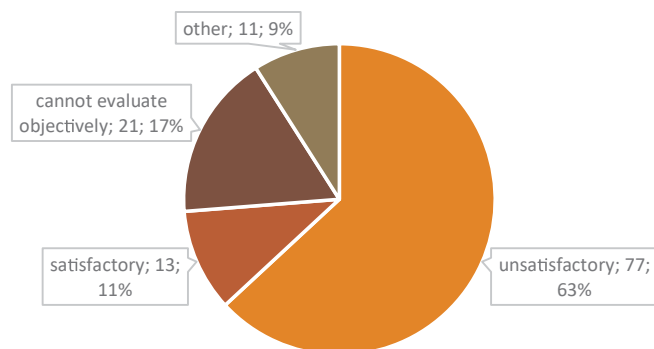
Source: the author's own work.

Only 11% of teachers consider their skills to be adequate. One might expect that younger teachers would be more comfortable using technology in teaching, but among those self-satisfied teachers there are 2 teachers with 5–9 years of experience, 6 teachers with 10–19 years of experience, 4 teachers with 20 to 29 years of experience, and 1 teacher with more than 30 years of experience (precisely 36 years).

In the next question (How often do you use ICT in the teaching process?) we wanted to learn whether teachers use the tool regularly, rarely or seldom). There is a positive correlation of the answers (r = .222, p = .44) concerning the frequency of using digital tools and the phase of the lesson when they use the tools (see the following table).

Table 3. Phase in which teachers mostly use digital tools use in education

	Motivation phase	Exposition	Fixation	Other
Several times a day	13	6	4	2
Several times a week	14	22	10	2
Several times a month		18	17	2
Several times a year		5	6	1
I never use	27	51	37	7

Source: the author's own work.

Graph 4. Phases in which teachers use digital tools

Digital tools used mostly in the phase of

Other; 9; 7%
fixation 41 34%
motivation 52 43%
exposition 20 16%
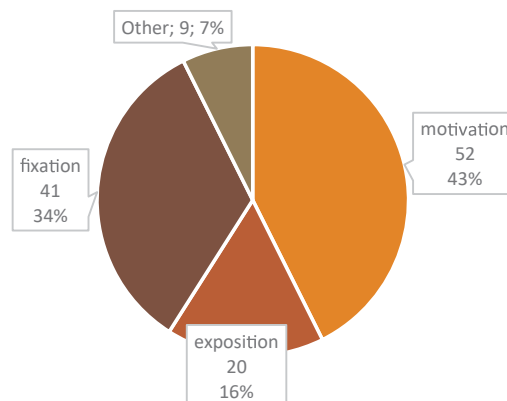
Source: the author's own work.

The majority of teachers use technology during the motivation phases and in the final part of the lesson. Although teachers in primary education often integrate the content of individual subjects, we asked the respondents to name one subject in which they most often use digital tools. The majority of teachers use ICT mainly in teaching Slovak language (38%), Mathematics (33%) followed by Nature sciences (14%) and Slovak studies (15%).

A remarkable majority of respondents agreed on the efficiency of using technologies and digital tools in teaching.

Table 4. Efficiency of using digital tools in primary education (teachers' perception)

	Count	Cumulative count	Percent	Cumulative percent
Very effective	54	54	44.262	44.262
Effective	65	119	53.278	97.541
Rather inefficient	3	122	2.459	100.000
Not effective at all	0	122	0.000	100.000
Missing	0	122		

Source: the author's own work.

The alarming finding shows that not all schools have an employee responsible for technologies and they do not have a consultant, adviser, guide at schools who would provide technical and/or methodological support in this area.

Graph 5. Technology support at schools
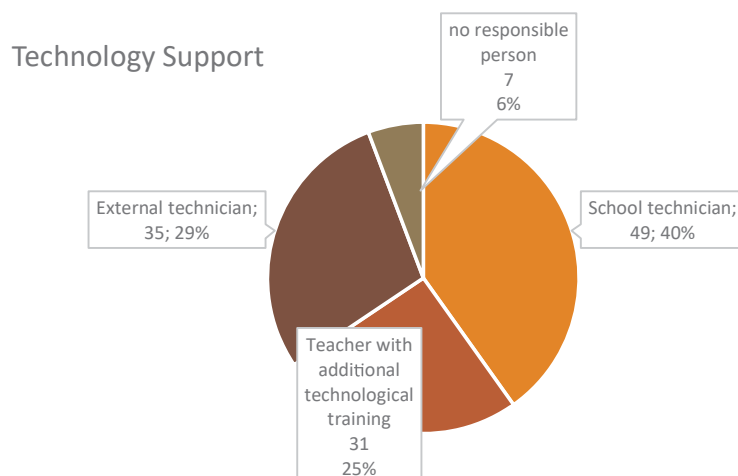
Source: the author's own work.

The schools are advised and supported to introduce the position of a school digital coordinator, which might positively affect the use of digital tools in teaching.

Conclusion

The results prove that even though schools are technologically equipped, in-service teachers are aware of the significant benefits of digitization in terms of educational quality. However, they do not feel confident enough to use digital tools, and educational and support processes should be established to address this issue. This finding was also reported by García-Martín et al. (2023), Al-Awidi & Alghazo (2012) and Winter et al. (2021). The findings also reveal that at least 30 percent of teachers actively pursue professional development in the field of digitization and are willing to engage in self-study.

The results indicate the need to transform pre-service education and respond to the necessity of developing digital skills, which are defined as key 21st-century skills. Similar recommendations have been made by researchers not only in Slovakia and the Czech Republic (Burgerová et al., 2020) but also in other countries such as Georgia (Cuenca, 2010), Saudi Arabia (Alnasib, 2023), Italy, Poland (Tomczyk et al., 2022), and Ghana (Kwaah et al., 2022).

Several limitations need to be noted regarding the present study. The study used a convenience sample of participants willing to participate in the research. The inclusion of additional research tools would have enhanced the reliability of the data. Nevertheless, we believe that the present study contributes to highlighting the significant and urgent need to revise the content and format of pre-service primary school teacher education to address the authentic needs of in-service teachers.

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