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Tanulmány / Study Article

Supporting In-Service Teachers in Selecting Digital Learning Materials Based on Didactic Criteria

Results of an exploratory study

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Abstract:

The aim of our study was to explore whether didactic criteria can support teachers in searching for digital learning materials, and how digital pedagogy is influenced by equipment availability, professional competence, and teachers' attitudes toward digital resources. The results of an online questionnaire completed by in-service teachers (N = 435) show that access to digital tools is generally ensured, and most teachers consciously integrate them into classroom practices. The use of digital learning materials is widespread and generally positively evaluated, although their perceived quality is heterogeneous, indicating a need for quality assurance and development. Correlation analyses revealed that digital tool use is primarily influenced by equipment availability and methodological competence, while teaching experience and students' age are marginal factors. The demand for searching materials based on didactic criteria emerged as a relevant supporting function. The non-representative nature of the sample limits the generalizability of the findings. In summary, the integration of digital learning materials is largely determined by teachers' methodological competencies and the availability of tools, while didactic-based search options provide additional opportunities for more specific classroom design.

Keywords:

digital learning materials, primary education, didactics

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Introduction

Justification and Aim of the Preliminary Research

Although the preliminary research was conducted some time ago, we believe it still has relevance for our current study. While the topic is related to digitalization, as will become clear later, the main principles are primarily concerned with didactic approaches rather than digital implementation. This perspective reflects different temporal and conceptual dimensions compared to digital education. Therefore, considering teachers' attitudes and the conditions of digital learning material use, it can serve as a useful starting point for the research presented in this study. As will be discussed, there are interesting similarities and overlaps between the preliminary research and our current investigation, indicating that certain foundational principles and approaches remain valid even within the framework of digitalization. The digital environment is constantly changing, yet it still follows pedagogical organizing principles. These principles evolve much more slowly than digital hardware and software, which creates potential challenges This difference can also be seen as a potential source of challenges.

The starting point of the preliminary research was the assumption that digital learning materials play an increasingly important role in pedagogical practice. This was already true in 2013, before the pandemic, when the digitalization of education was still in its early growth phase. Over the past decades, public education has gradually integrated information and communication technologies; however, the selection of learning materials based on didactic criteria has not yet been a central focus.

Since the evaluation of digital learning materials has important pedagogical relevance both in Hungary and internationally, it is useful to give a concise overview of the key issues of selection and evaluation. Systems for evaluating digital learning materials serve several functions in education. They support teachers in selecting appropriate digital materials and, through accreditation, they make it possible to purchase these materials with state funding or through grants. Accreditation also helps enforce basic quality standards, which contributes to maintaining the professional level of educational content. In international practice, several well established and functioning evaluation frameworks are known (Trgalová et al., 2024).

In Germany, the SODIS system supports the selection of digital learning materials. The evaluation process is usually carried out by professional evaluators, and the procedure follows a partly fixed format. In the United Kingdom, the TEEM evaluation system had similar aims to SODIS, but in the past the evaluation could be completed not only by experts but also by teachers, which allowed wider user involvement. In Ireland, the NSTE framework uses a multidimensional approach, where the evaluation also considers factors such as value for money. The evaluation process does not follow a fixed format, and several aspects can be selected freely, which makes the system adaptable to the needs of the evaluators. In the United States, the discovery-education.com

evaluation system represented an innovative, community-based approach. Its special feature was that not only teachers, but also parents and students could take part in the evaluation. The process followed a partly fixed format, similar to a checklist structure. Also in the United States, the Education Software Evaluation Form was developed to support the selection of learning materials, mainly with the involvement of professional evaluators and teachers. In Hungary, the Digital Learning Material Assessment Committee created a detailed evaluation system consisting of several items, which was actively used for a period of time. In recent years, however, due to changes in regulations and guidelines, its application has gradually decreased.

Based on all these factors, developing a modern and integrated system for evaluating and selecting digital learning materials seems justified. Such a system could build on international best practices while considering the specific characteristics and needs of the Hungarian educational environment. It could support improving the quality of digital learning materials, help teachers make professional decisions, and contribute to the transparent and effective spread of educational innovations (OECD, 2025).

By this time, moving beyond the initial phase of digital education, the main challenge for teachers was no longer the technical use of digital tools, but rather deciding how a given digital learning material fits into the teaching–learning process. The preliminary research hypothesized that teachers need a set of criteria to support the conscious and pedagogically grounded selection of learning materials. The need for this investigation was further reinforced by the observation that existing – mostly foreign – digital learning material evaluation systems often focused on detailed technical or formal criteria, while the question of didactic applicability was not adequately addressed. As a result, teachers were often left to make decisions on the implementation and use of various digital learning materials on their own.

Conditions for the Use of Digital Learning Materials During the Preliminary Research Period

In 2013, digital learning materials primarily included school-purchased CD- and DVD-based programs, online resources, a smaller proportion of school-developed software, and – mainly in upper primary and secondary education – student-created supplementary materials. Although the availability of resources was increasing, practical use often remained limited.

Among teachers, a significant proportion still did not take advantage of these opportunities. Several factors contributed to this: lack of adequate equipment, insufficient pedagogical knowledge, and uncertainty about whether the programs improved learning outcomes.

The aim of the study was therefore not to provide a comprehensive national overview, but to examine whether there exists a group of teachers willing and able to integrate digital learning materials into their everyday prac-

tice. Particular attention was given to the classroom objectives and didactic tasks for which teachers applied or would apply these programs.

Most participating teachers could be considered innovative, partly because they were involved in practical training for students, especially in primary teacher education. This group was particularly suitable for the study, as they were more likely to encounter digital learning materials and were more sensitive to pedagogical innovations.

The sample of 135 teachers ranged from beginners to those approaching retirement, allowing for an investigation of whether years of experience influenced attitudes or usage patterns. However, the study showed that teachers' attitudes toward digital tools were largely independent of age. Similarly, the age group of the students taught did not appear to be a determining factor: there was no significant difference in usage frequency between teachers working with 6–10-year-olds and those with 10–12-year-olds.

Measurement Tool and Data Collection in the Preliminary Research

Data were collected using a questionnaire, which consisted of four main sections. The first part focused on the characteristics of the sample, the second assessed material and personnel conditions, the third examined teachers' attitudes, and the final section concentrated on didactic tasks. During the design of the questionnaire, special attention was given to using clear and accessible language for teachers, so that answering did not require specialized technical terminology. Attitudes were measured using a five-point Likert scale, while the range of didactic tasks was defined based on a teaching–learning process model familiar in Hungarian pedagogical practice (building on the work of Sándor Nagy). The response rate was particularly high (86%), thanks to personal contacts and the involvement of students in the process.

Results and Evaluation

One of the main findings of the study was that most teachers had the necessary technical background for more than ten years; however, actual usage lagged behind the available opportunities. Although many teachers felt capable of using the programs, they applied them much less frequently in classroom practice. Approximately one-third of respondents reported that they never used a computer during lessons.

Attitude assessment showed a positive picture: nearly 70% of teachers considered the use of digital learning materials important, and most believed in their potential to improve learning outcomes. However, many rated the didactic usefulness of the programs as only average, suggesting that the available materials did not always meet classroom needs. Particularly notable was that 63% of teachers explicitly requested a set of criteria to facilitate the selection of digital learning materials. This need appeared across almost all teacher groups, regardless of years of experience or the age group of their students.

Statistical analyses revealed a strong correlation between teachers' perceived preparedness to use the programs and the availability of selection criteria. There was also a close relationship between the perceived importance of the programs and belief in their impact on learning outcomes. Interestingly, years of teaching experience did not correlate with either technical knowledge or willingness to use digital materials. This indicates that any selection criteria should be universally applicable, rather than tailored to a specific age group or generation of teachers.

The study's lesson is that while most teachers are open to using digital learning materials, actual application faces obstacles. These are partly technical and partly methodological, highlighting the need for a tool that provides guidance in selecting appropriate programs.

Conclusions

The results of the preliminary research clearly confirmed the hypothesis: already in 2015, there was a real need among teachers for a didactic-based set of criteria to facilitate the use of digital learning materials. Attitudes were positive, technical conditions were often in place, but the actual frequency of use lagged the available opportunities.

It was already evident that a well-developed set of criteria would not only simplify teachers' work but also contribute to more effective, motivating, and engaging learning for students. Based on the findings, it was assumed that in future pedagogical practice, the key to the effective use of digital learning materials would be the development of appropriate didactic frameworks and the support of teachers.

Following these preliminary results, there was an opportunity to continue the research. The intervening period demonstrated the legitimacy of digital education and confirmed our conviction that the success of digital teaching does not depend on teachers' technical skills alone, but on pedagogical awareness and the correct application of methodology. During the pandemic, teachers largely acquired the necessary technical competencies for digital education autodidactically or through self-organized peer-support groups, bringing pedagogical awareness back into focus.

The practical application of the preliminary research took shape in a pictogram system that, according to the conditions at the time, indicated on the packaging or cover of digital learning materials the additional factors justifying their use. However, this system was not widely implemented in practice, except for a few experimental cases. This was partly due to financial reasons, but mainly because the accreditation of digital learning materials was discontinued. To this day, there is no unified organization, set of criteria, or standard to support the evaluation, screening, or selection of digital learning materials.

Further Research Building on the Preliminary Study

In 2023, we had the opportunity to continue our research under the conditions modified by the intervening period. On the one hand, this meant that digital learning materials previously distributed on physical media were almost entirely replaced by online resources. On the other hand, and crucially for the research, digital learning material development environments emerged, allowing anyone- without any IT or pedagogical expertise - to create digital materials with professional appearance and functionality. During the period of the preliminary research, such materials could only be produced by professional developers.

This development is positive, as it has led to a rapid increase in the quantity of digital learning materials. However, it also presents a significant challenge because the quality of the large volume of digital materials is highly variable and professionally designed but pedagogically weak resources have appeared.

This situation further emphasizes the need to promote pedagogical awareness in the use of digital learning materials. Therefore, in 2024, we aimed to examine whether the findings of the preliminary research still hold true. We investigated whether there is still a need for a didactic "additional factor" system that could facilitate teachers' selection of digital learning materials.

Of course, the four-part questionnaire from the preliminary research could not be used in its original form due to changes in the digital environment and, not least, the impact of the pandemic on digitalization and digital teaching. Another question was whether any system supporting selection or evaluation should continue to follow a didactic approach.

Theoretical Background

Didactics, as a key field of pedagogy, shows a specific geographical distinction. In European regions influenced mainly by German educational traditions, didactics has a strong role because it serves as an organizing principle above the different teaching methods and connects theoretical and practical issues of education. In contrast, in Anglo-Saxon educational cultures, especially in the United States and the United Kingdom, a strictly didactic approach is almost unknown. Instead, practice-oriented and method-focused pedagogical perspectives are more dominant.

The concept of didactics is continuously changing in the international field, and a neo-didactic approach is becoming more visible today. This approach understands didactics as a critical and reflective pedagogical phenomenon that includes the examination of teaching goals, teaching techniques, and the theoretical frameworks that enable connections between subjects (Sjöström & Rydberg, 2018).

A key feature of the neo-didactic approach is that it includes the tools of digital pedagogy. Its focus is on exploring the impact of digitalization on pedagogy and renewing didactics in a digital environment. Neo-didactics therefore not only reinterprets teaching and learning but also supports the modernization of pedagogical thinking (Uljens, 2023).

In the early 2000s, a lively debate emerged in educational science about whether didactics and the didactic approach still held significance. For example, one perspective even questioned the existence of didactics as a distinct scientific field (Báthory, 2006; Buda, 2007; Martinkó, 2007; Nahalka, 2002; Ollé, 2007).

To understand this debate, it is important to consider the specific context that explains why only Hungarian-language literature is cited in this section: in the former Eastern region, didactics functions as a scientific discipline embodying a descriptive and unifying organizing principle. Both the preliminary research and the follow-up study focus primarily on teachers who were socialized within this pedagogical context. For them, didactics as a field of study carries far greater significance than in the Anglo-Saxon approach. It forms the backbone and unquestionable foundation of their pedagogical studies, and their perspective is therefore strongly characterized by a didactic-oriented approach.

The debate likely emerged because Anglo-Saxon pedagogy tends to favor a more practice-oriented approach, prioritizing practical solutions over theoretical categories, instead of the classical didactic approach. Many saw the advancement of methodologies as a response to strictly theoretical didactics. This is reflected in the emergence of terms such as subject didactics, mathematics didactics, and informatics didactics. These approaches replaced rigid general didactic categories with those adapted to the specifics of disciplines or subjects. According to several sources, there is as much variation in didactics as there are subjects. For example, József Martinkó distinguishes between general didactics, which he calls "core didactics," and subject-specific professional didactics (Martinkó, 2007). His approach resembles the distinction still present in teacher education today between general didactics and subject pedagogy or methodology.

On the other hand, some approaches emphasize the need for a unified organizing principle that goes beyond individual subject content, examining the teaching–learning process through a consistent set of rules and conceptual categories. When trying to identify trends across diverse perspectives, two clearly distinguishable directions can be observed:

One of these directions is the unification approach, represented for example by András Buda, who argues that by highlighting the common elements of the many didactics, a unified didactics framework is needed (Buda, 2007). Another perspective, represented by Báthory, suggests that didactics will eventually dissolve into the system of methodologies (Báthory, 2006). According to László Balogh, didactics gradually permeates the field of psychology and may continue primarily through a psychological perspective (Balogh, 2007).

The best way to form an opinion on this question is to review the major approaches through some form of categorization. This was attempted in a concise manner in the 2014 study *The Status of Didactics within Educational Science* (Lénárd, 2014).

We believe that in developing a system to support the selection of digital learning materials through didactic additional factors, it is not necessary to delve too deeply into the professional debates surrounding didactics. Didactics will remain relevant for a long time and serves as a unifying principle among teachers working with different age groups.

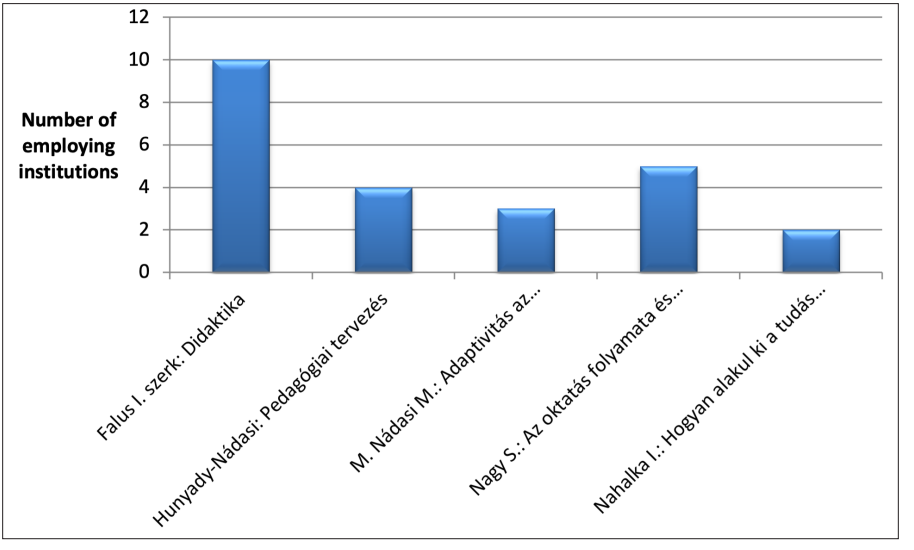
To support this, and considering the age composition of the teaching profession, it is useful to examine the didactic sources that shaped the education of the teachers who form the backbone of today's teacher population (Lénárd, 2014). Of course, without underestimating the continuous learning, training, and self-education that occurs throughout a teacher's career, it can still be assumed that the understanding of didactics presented in the following literature continues to strongly influence the professional competencies of the teaching community.

For example (see Figure1), the classic book *Didactics: Theoretical Foundations for Teaching and Learning*, edited by Iván Falusi, was updated in 2022 as *The Didactics Handbook*, including, for instance, a chapter presenting digital pedagogy (Falus & Szűcs, 2022). This book retains the fundamental didactic categories largely like the original work and can be considered one of the foundational texts in current teacher education.

Therefore, it is reasonable to assume that teachers possess knowledge of basic didactic concepts and categories. A didactic-focused approach is not only understandable but also practical and usable in their everyday teaching practice.

Figure 1

Literary sources (N = 10) Forming the Core of Didactics Education in Teacher Training Higher Education Institutions



We aimed to test or refute this hypothesis using an updated version of the preliminary research. Therefore, we examined a larger sample with both updated paper-based and web-based questionnaires, investigating the conditions of digital learning material use and the types of support teachers would require in their application. We also explored whether there is a need for a didactic-oriented category system that highlights the didactic additional factors of a given digital learning material, moving beyond the traditional subject- or content-centered approach.

We note that subject-based categorization of digital learning materials remains necessary; however, we believe it can be effectively complemented by indicating the didactic additional factors.

A potential challenge is that teachers most likely learned the precise didactic categories during their initial training but have not applied them extensively afterwards. As a result, a mixing of pedagogical terminology and everyday language can be observed even among professionals. In other words, teachers are unlikely to use – or may not correctly apply – the strictly defined didactic categories, which they most recently applied when preparing lesson plans or thematic teaching units for their teacher portfolios. We believe, however, that the opportunities offered by artificial intelligence provide an obvious solution to bridge these gaps.

Research Aim

As mentioned, our research is conducted during the introductory phase of a larger pedagogical innovation. The focus of the innovation is a framework that, by utilizing the opportunities offered by artificial intelligence and moving beyond a subject- and content-centered approach, supports the selection of digital learning materials from the perspective of the intended didactic tasks. This contributes to improving the quality of pedagogical work by helping to determine the conditions for the use of digital materials.

The framework provides support in selecting appropriate methods and working forms for applying a given digital learning material, as well as in solving a specific didactic problem through digital pedagogy. As a supporting tool, it uses the so-called *didactic additional factors* (DAF) developed in our previous research (Lénárd, 2017), which specify in which pedagogical areas the application of a given digital learning material provides added value compared to traditional analogue solutions.

Research Questions

Before fully developing the framework, our research aims to answer the following questions:

- *RQ1.* Do teachers consider it important that, in addition to traditional criteria such as subject, curriculum, or the age of students taught (grade),

didactic criteria are also included among the characteristics of a learning material?
- *RQ2.* Can any relationship be observed between teachers' digital competencies, years of teaching experience, the age group they teach, and their willingness to apply didactic criteria?

We hope that the answers to these questions will support the development of the framework, help refine the individual criteria, and facilitate practical application.

Methods

Sample and Data Collection

In our research, we invited active primary school teachers to complete our questionnaire. To reach a larger sample and facilitate easier completion, data collection was conducted online. The questions were created using Google Forms and distributed to teachers.

The questionnaire was available for one month in various closed social media groups composed of teachers (e.g., *Digital Culture Grades 3–8*, *ICT and Methodology Teacher Room*, *Use of ICT Tools in Lower Grades*, *Mathematics Teaching in Lower Grades*, *Teaching Hungarian in Lower Grades*). Restricting access to closed groups was necessary to ensure that the instrument reached actual teachers. At the end of the data collection period, the final sample consisted of N = 435 participants.

Measures

The online questionnaire included seven questions. Participation was voluntary and anonymous. The questionnaire covered teachers' years of professional experience and the age groups they teach.

In addition, questions were asked about the availability of digital tools and the frequency of their use, which were answered using multiple-choice options. Teachers' opinions regarding the use of digital learning materials were measured on a 5-point Likert scale. The question examining didactic criteria allowed respondents to select multiple options.

Results

Teachers' Professional Experience

Responses regarding years of teaching experience (see Table 1) show that most participants (39.3%) have been actively teaching in primary schools for at least 31 years, while only 8.5% are beginning teachers. The age distribution of respondents closely reflects the national average for teachers.

Table 1

Proportions of Years Spent in the Teaching Profession

Years of teaching experience	% (N=435)
0–5	8,5
6–10	7,8
11–20	15,9
21–30	28,5
31–	39,3

The distribution of respondents by the age group they teach shows that 48.3% teach both lower and upper grades. In the sample, 29.2% teach exclusively in lower grades, while 22.5% work only in upper grades. These results indicate that, in subsequent analyses, no bias is expected based on the age group taught regarding the use of digital tools and learning materials.

Frequency of Digital Tools Availability in Teaching Practice

According to the results (see Table 2), most respondents (75.2%) always have access to digital tools that they can use during their teaching practice. Additionally, 16.3% reported that digital tools are often available to them. These findings indicate that the infrastructure necessary for using digital tools in the classroom is generally available to the sample.

Table 2

Frequency of Access to Digital Devices for Teaching

Do you have access to a digital device that you can (also) use in your teaching?	% (N = 435)
never	0,5
rarely	1,6
occasionally	6,4
often	16,3
always	75,2

Teachers' Digital Competence and Usage

Responses regarding digital tool competence show that most teachers (59.5%) have user-level skills, while 27.4% possess advanced skills. Only 0.2% reported having no digital competence at all, 1.4% had superficial knowledge, and 11.5% reported basic skills. These results indicate that most of the sample has confident digital competence.

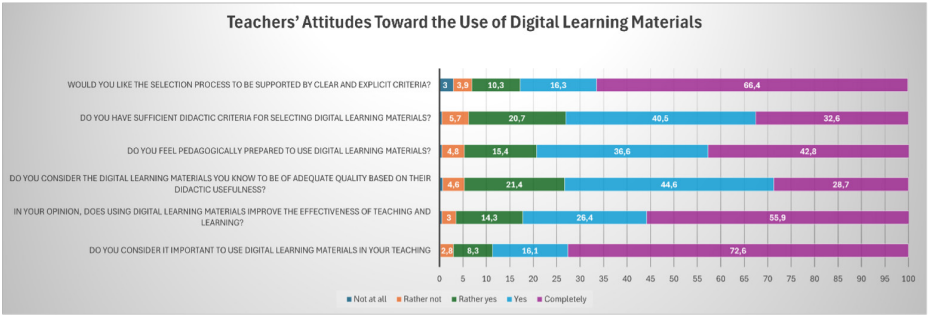
Furthermore, the majority of respondents not only possess the skills but also use digital tools consciously in their teaching. Only 0.2% (one respondent) reported never using digital tools in class, and only 1.6% selected "rarely." Occasional use was reported by 10.3%, while 26.9% use digital tools frequently. For the vast majority of teachers (60.9%), digital tools have become an integral part of daily teaching practice.

Teachers' Views on Digital Learning Materials

Our research examined how practicing teachers perceive the role of currently available digital learning materials in the educational process (see Table 3). The majority of respondents (72.6%) consider the integration of digital content essential, while those expressing a negative view accounted for less than 3%. This clearly demonstrates broad recognition of the educational relevance of digital tools.

Figure 2

Teachers' Attitudes Toward the Use of Digital Learning Materials



The vast majority of respondents positively assessed the impact of digital learning materials on teaching and learning outcomes. According to the data, 55.9% fully agreed, and an additional 26.4% largely agreed that digital tools contribute to more effective learning processes.

However, teachers' opinions regarding the quality of currently available digital learning materials were more varied. Among respondents, 44.6% considered them rather adequate, and 28.7% fully adequate. Meanwhile, 21.4% rated them as moderate, and over 5% as poor. This indicates significant heterogeneity in perceived quality, highlighting the need for further development and systematic organization of digital content.

Regarding pedagogical preparedness, nearly half of the respondents (42.8%) rated their competence at the highest level, and an additional 36.6% reported high-level competence. Only 5.3% placed themselves in the low-preparedness category. These findings suggest that most teachers feel

confident in using digital learning materials, although a smaller group still experiences methodological uncertainty.

The presence of didactic criteria necessary for selecting digital learning materials was confirmed by 73.1% of respondents, who answered "yes" or "fully." Meanwhile, 20.7% rated their competence as moderate, indicating that the organization and conscious application of criteria is often lacking. This result reinforces the need for additional support for practicing teachers, even when existing pedagogical competencies are present.

Supporting this, responses to the final question showed that 66.4% of teachers would fully, and 16.3% would largely, welcome clear and explicit criteria for selecting learning materials. Overall, the survey indicates that teachers are open and motivated to use digital content, but quality assurance and standardized guidance are crucial for further progress.

Regarding the didactic purposes of digital learning materials, teachers most frequently identified knowledge acquisition as the primary function (94.7%). Similarly high values were observed for organization (91.5%) and consolidation (87.6%), showing that digital learning materials effectively support knowledge delivery and deepening. The application function received slightly lower ratings (85.5%). The most critical area was assessment, where only 76.1% of respondents considered digital tools useful. This suggests that while digital learning materials are mainly valued as effective tools for knowledge transfer and organization, their role in assessment still requires further development.

Correlation Analysis Results

Our study examined which factors influence the use of digital tools and digital learning materials in classroom practice. Pearson correlation analysis revealed several significant relationships regarding teachers' digital tool usage. A very weak but significant correlation was found between pedagogical practice and tool availability ($r = 0.164$, $p < 0.001$), while a moderate correlation existed between teachers' knowledge of tool usage and actual use during teaching ($r = 0.472$, $p < 0.001$).

A significant, although weaker, correlation was also observed between knowledge of tool use and tool availability ($r = 0.237$, $p < 0.001$). The strongest correlation was between digital tool availability and actual use in teaching ($r = 0.536$, $p < 0.001$), indicating that the quantity and quality of available tools directly determine their practical pedagogical application.

In contrast, neither didactic purposes nor teachers' perceptions of digital learning materials were significantly related to years of professional experience or the age group taught. These findings suggest that digital pedagogical practice is primarily influenced by tool availability and digital competence, while professional experience and the age of students taught are less determining factors.

According to the correlation analysis, teachers' perceptions of the effectiveness of digital learning materials are strongly associated with several pedagogical factors. The strongest correlation was found among respondents who consider the use of digital learning materials particularly important ($r = 0.750$, $p < 0.001$), clearly indicating the interconnection between belief and attitude.

A moderate and significant correlation was also observed with the perceived quality of digital learning materials ($r = 0.505$, $p < 0.001$) and with teachers' self-assessed pedagogical preparedness ($r = 0.474$, $p < 0.001$). The presence of didactic criteria indicated by teachers was also associated with perceived effectiveness ($r = 0.480$, $p < 0.001$). A weaker, yet still significant, correlation was found with the need for criteria supporting material selection ($r = 0.259$, $p < 0.001$).

These results suggest that perceptions of the effectiveness of digital learning materials are mainly influenced by how important teachers consider their use and how high they rate their quality, while criteria supporting selection play a more supplementary role.

The analysis also showed that pedagogical preparedness is closely linked to attitudes towards digital learning materials. Strong correlations were found with how important teachers consider the use of digital learning materials ($r = 0.566$, $p < 0.001$) and with whether they have the necessary didactic criteria for selection ($r = 0.754$, $p < 0.001$). Pedagogical preparedness was moderately correlated with the belief that digital tools enhance teaching and learning effectiveness ($r = 0.474$, $p < 0.001$). A significant, moderate correlation was also found between preparedness and evaluation of the quality of digital learning materials ($r = 0.438$, $p < 0.001$).

These findings indicate that pedagogical preparedness is closely related not only to the willingness to use digital learning materials but also to the assessment of their quality and effectiveness. Methodological competence thus plays a key role in the conscious and pedagogically informed use of digital learning materials.

Discussion

The age composition of the examined teacher sample and the distribution of the taught age groups correspond to the national average. Therefore, no bias is expected in the analysis of digital device and learning material usage based on age groups.

The results indicate that teachers have sufficient access to digital devices, and most are confident and capable of integrating them into their classroom practice. As a result, the use of digital tools has become an integral part of their everyday pedagogical activity.

The findings also show that the use of digital learning materials is widely accepted and positively evaluated among teachers. Most respondents con-

sider the use of digital tools important in education and believe that they enhance teaching and learning effectiveness. This suggests that teachers are motivated to implement digital pedagogical practices. At the same time, perceptions of the quality of learning materials are more differentiated, indicating a need for further development and quality assurance. Pedagogical preparedness and the presence of didactic criteria are closely related to the use of digital learning materials and the perception of their effectiveness, while the need for supporting selection criteria plays a more supplementary role.

Correlation analyses revealed a weak but significant relationship between teaching experience and device availability, whereas a moderate or strong correlation was found between digital competence and actual use in practice, as well as between device availability and practical use. This indicates that teachers' use of digital tools is primarily influenced by the availability of devices and their competencies, rather than by years of experience or the age of students taught.

When applying materials according to didactic goals, teachers mainly use them to support knowledge acquisition, organization, and consolidation, whereas the assessment-related function is less emphasized, indicating a potential direction for further pedagogical development.

The results suggest that perceptions of the effectiveness of digital learning materials are most strongly influenced by the belief in their importance and experiences of their quality. Pedagogical preparedness is strongly correlated with material usage, perception of effectiveness and quality, and the application of didactic criteria, confirming that methodological competencies are key to establishing a conscious digital pedagogical practice.

Overall, the successful integration of digital learning materials into teaching depends on multiple factors: teachers' attitudes, preparedness, and access to devices are all decisive, while professional experience and students' age are less influential. Our findings also indicate that future teacher training and institutional development should focus on strengthening methodological competencies, ensuring access to high-quality digital learning materials, and developing clear criteria to support material selection.

Limitation

Although the introductory research was conducted on a relatively large sample, due to the selection method, the sample cannot be considered representative. Considering that the instrument was an online questionnaire, it can reasonably be assumed that most respondents were active users of digital tools and environments. Therefore, their awareness of digital usage and their positive attitude toward digital environments likely exceed the average of the overall teacher population. While this does not diminish the significance of the study, our research avoided generalizations that would apply to the entire population of teachers. Nevertheless, we believe that the system to be developed could be useful for all teachers.

Another limitation of the study, which was already noted during the analysis of the results, is that there is no fully standardized terminology for didactic tasks and processes either in Hungary or internationally. This largely depends, for example, on the terminology and language used in teacher training literature, and, in the case of foreign literature, on the quality and method of translation. It may occur that the same aspect is indicated by several different terms, which may have identical meanings or only minor differences (e.g., "working form" vs. "organizational method").

A current effective solution to this problem may be the use of artificial intelligence, which can help bridge the gap between synonyms, everyday language, and pedagogical terminology. As a result, the search interface could become truly universal, independent of teachers' terminology and the varying interpretations of specific didactic categories. If AI-supported search proves effective, its application could be extended to other areas of pedagogy, including didactics and subject-specific pedagogy. This could contribute to the development of a more universal international pedagogical language and support the use of digital learning materials that are independent of countries and languages. Naturally, the educational systems, curricular content, and student characteristics of individual countries will remain important considerations.

Further Research Directions

As indicated in the title of our study, the present investigation represents only a part of a broader research project, serving as the first step in the development of a larger system. Below, we outline some of the planned follow-up activities based on the introductory research.

The introductory research and preliminary investigations confirmed the relevance of the framework for didactic tasks. Building on this, a detailed search interface is being developed, which will enable teachers to consider not only the didactic criteria but also additional didactic factors. These additional factors are elements that provide added value when using digital learning materials compared to traditional (analogue) pedagogical solutions.

Since the research results indicate that the demand for didactic criteria does not depend on the number of years a teacher has been in the profession, and is only partially related to existing digital competencies, the system to be developed can be widely applicable. It is common that a given digital learning material can be used in multiple didactic situations, which may require different methodological approaches from teachers. The design of the system will support this process as well.

In the long term, the research may contribute to the pedagogically conscious use of digital learning materials, facilitating their integration into classroom instruction. Naming and structuring didactic elements and additional factors allows for a more professional pedagogical approach, en-

hancing the effectiveness, quality, and adaptability of teaching. Adaptability manifests both in the use of materials tailored to students' abilities and in a more deliberate pedagogical approach to the teaching materials themselves. This can contribute to the development of teachers' methodological culture and improve problem-solving quality in digital environments. Following experiences during the COVID-19 period, a broader group of teachers may evolve from instinctive users of digital learning materials to pedagogically conscious, methodologically prepared professionals.

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