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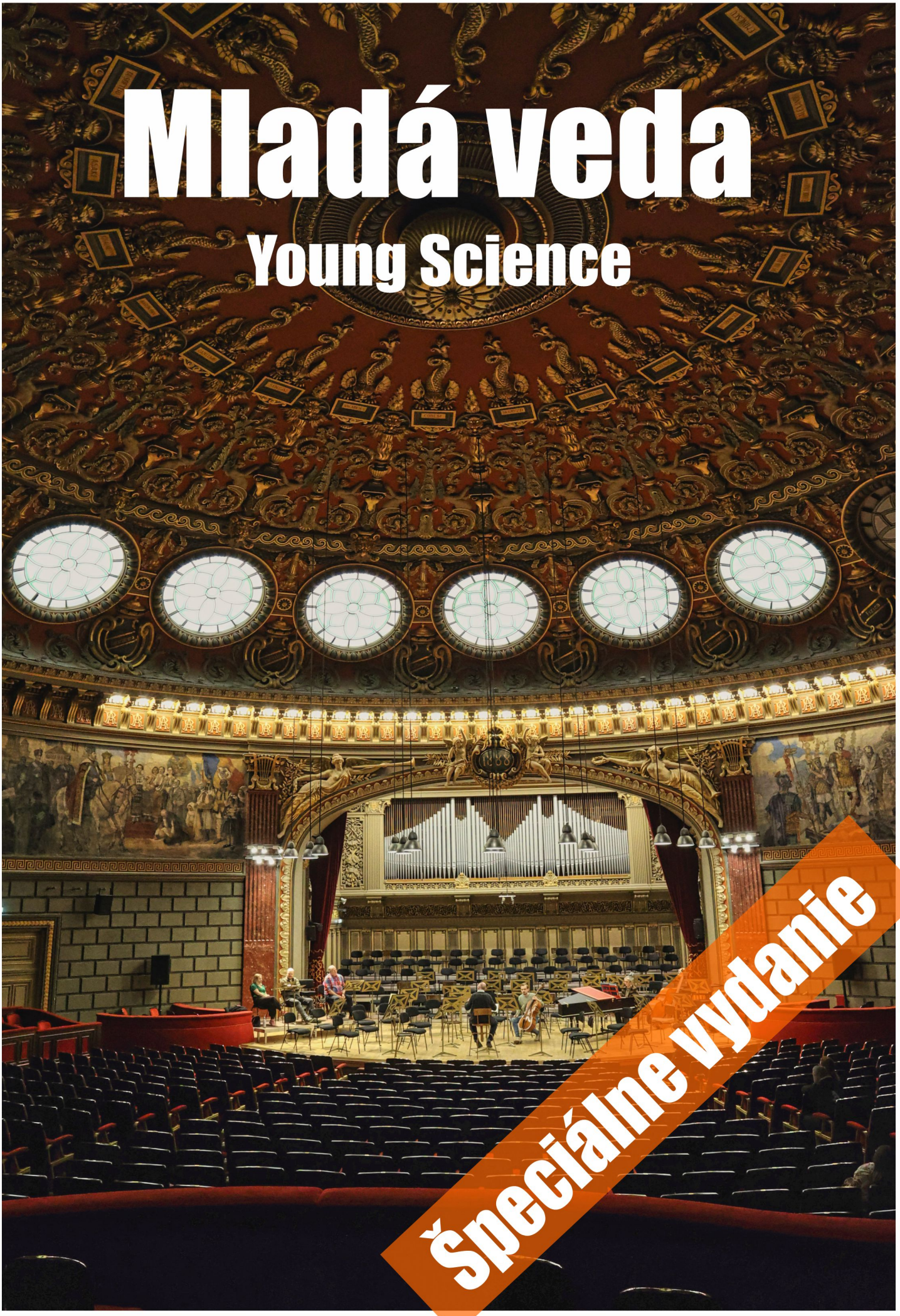

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DIGITÁLNA TRANSFORMÁCIA VZDELÁVANIA: LONGITUDINÁLNA ŠTÚDIA VÝVOJA E-LEARNINGU VO VZDELÁVACÍCH INŠTITÚCIÁCH

DIGITAL TRANSFORMATION OF EDUCATION: A LONGITUDINAL STUDY OF THE EVOLUTION OF E-LEARNING IN EDUCATIONAL INSTITUTIONS

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Milan Klement je profesorom na Katedre technického vzdelávania a informačných technológií Pedagogickej fakulty Univerzity Palackého v Olomouci. Vo svojej odbornej, publikačnej a pedagogickej činnosti sa zameriava predovšetkým na otázky týkajúce sa využívania informačných a komunikačných technológií vo vzdelávaní, využívania virtualizačných technológií vo vzdelávaní a rozvoja digitálnej gramotnosti a digitálneho myslenia. Miroslav Juriček pracuje ako externý doktorand na Katedre technického a informačného vzdelávania Pedagogickej fakulty Univerzity Palackého v Olomouci a jeho dizertačná práca sa zaoberá využívaním vzdelávacích robotických nástrojov vo vzdelávaní. Štěpán Kudláček je interným doktorandom na Katedre technického a informačného vzdelávania Pedagogickej fakulty Univerzity Palackého v Olomouci. Jeho dizertačná práca sa zameriava na využívanie elektronických foriem vzdelávania s využitím jazykových modelov.

Milan Klement is a professor at the Department of Technical Education and Information Technology at the Faculty of Education, Palacký University Olomouc. In his professional, publishing, and educational activities, he focuses primarily on issues related to the use of information and communication technologies in education, the use of virtualization technologies in education, and the development of digital literacy and digital thinking. Miroslav Juriček works as an external doctoral student at the Department of Technical and Information Education of the Faculty of Education at Palacký University in Olomouc. His dissertation focuses on the use of educational robotics tools in education. Štěpán Kudláček is an internal doctoral student at the Department of Technical and Information Education of the Faculty of Education at Palacký University in Olomouc. His dissertation focuses on the use of electronic forms of education with the use of language models.

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Abstract

This paper maps the dynamic development of digital education and its implementation in contemporary educational institutions. It focuses on e-learning as a key tool of modern pedagogy, which brings flexibility, interactivity and personalisation to the teaching process. It examines in detail innovative forms and tools of e-learning that can be used in modern educational environments – from adaptive learning platforms and gamified teaching modules to blended learning and mobile learning. Based on quantitative research, the paper provides current data on how primary and secondary school students and teachers perceive and use digital forms of teaching. The research reveals that while awareness of e-learning is high among respondents and most actively encounter it in a school environment, its potential remains untapped – digital tools are still perceived as a supplement rather than an integral part of the teaching process. The article therefore not only discusses the transformative potential of e-learning in the context of 21st-century education, but also outlines directions for moving digital education from the position of a supplementary tool to the role of an equal pillar of modern pedagogy.

Key words: e-learning, distance learning, blended learning, m-learning, ICT in education, LMS systems, digital education

Abstrakt

Tento článok mapuje dynamický rozvoj digitálneho vzdelávania a jeho implementáciu v súčasných vzdelávacích inštitúciách. Zameriava sa na e-learning ako kľúčový nástroj modernej pedagogiky, ktorý prináša flexibilitu, interaktivitu a personalizáciu do procesu výučby. Podrobne skúma inovatívne formy a nástroje e-learningu, ktoré možno využiť v moderných vzdelávacích prostrediach – od adaptívnych vzdelávacích platforiem a gamifikovaných výučbových modulov až po kombinované vzdelávanie a mobilné vzdelávanie. Na základe kvantitatívneho výskumu článok poskytuje aktuálne údaje o tom, ako žiaci a učitelia základných a stredných škôl vnímajú a využívajú digitálne formy výučby. Výskum odhaľuje, že hoci je povedomie o e-learningu medzi respondentmi vysoké a najaktívnejšie sa s ním stretávajú v školskom prostredí, jeho potenciál zostáva nevyužitý – digitálne nástroje sa stále vnímajú skôr ako doplnok než ako integrálna súčasť procesu výučby. Článok preto nielen diskutuje o transformačnom potenciáli e-learningu v kontexte vzdelávania 21. storočia, ale aj načrtáva smery, ako posunúť digitálne vzdelávanie z pozície doplnkového nástroja do úlohy rovnocenného piliera modernej pedagogiky.

Kľúčové slová: e-learning, dištančné vzdelávanie, kombinované vzdelávanie, m-learning, IKT vo vzdelávaní, systémy LMS, digitálne vzdelávanie

Introduction

In the context of today's digital society, education is undergoing a fundamental transformation, stimulated by the continuous development of information and communication technologies (ICT). This transformation affects all levels of the education system and creates new opportunities for more effective and flexible forms of teaching. E-learning is one of the key innovations in this area, making education accessible to a wide range of users, overcoming time and space barriers, and individualising the educational process according to

the needs of individual students (Zounek et al., 2021). The theoretical foundations of modern e-learning are based on various learning theories, including behaviourism, cognitivism and social constructivism, which provide a pedagogical framework for effective online education (Picciano, 2017).

Although the concept of e-learning may seem like a relatively new phenomenon, it has its roots in distance learning, which has been developing since the 19th century. The first forms of distance learning used correspondence methods, but gradually changed with the development of technology to include radio and television broadcasting, and eventually moved on to the use of computer networks and the internet (Průcha & Míka, 2000). This historical development reflects the ongoing efforts of educational institutions to adapt to technological changes and use them to streamline the educational process. Academic studies of distance learning document its systematic evolution from correspondence courses in the 19th century to today's sophisticated online platforms, with the formulation of the transactional distance theory in 1972 being a key milestone (Moore & Diehl, 2019).

The importance of e-learning has grown significantly, especially in the last two decades, when the internet became a commonly available medium and mobile devices became an integral part of everyday life. The COVID-19 pandemic in 2020-2021 then acted as a significant accelerator of the digitisation of education, with educational institutions around the world being forced to switch to online forms of teaching. This situation brought both challenges and opportunities for the development of e-learning and demonstrated its potential and limitations (Zounek et al., 2021). Bibliometric analyses of the last 50 years of research in the field of e-learning show a significant shift from basic computer-based learning systems to multimedia environments, mobile learning and virtual reality, with a marked acceleration during the COVID-19 pandemic (Martinez-Garcia et al., 2023).

In the Czech educational environment, e-learning has gradually established itself as a legitimate form of education, used not only in higher education but also increasingly in primary and secondary schools. However, its implementation and use is not uniform and depends on a number of factors, including the technical equipment of schools, the ICT skills of teachers, whose readiness and attitudes towards the use of digital tools play a key role in successful implementation (Klement et al., 2017), attitudes towards educational innovation and the availability of high-quality educational materials (Kopecký, 2006).

E-learning is not just a technological solution, but a comprehensive pedagogical and didactic approach that requires a well-thought-out concept, high-quality content and appropriate methodological procedures. Effective implementation of e-learning requires not only technological infrastructure, but also the pedagogical competence of teachers, student motivation and support from the management of educational institutions (Zlámalová, 2008).

Current research in the field of e-learning focuses on various aspects of this issue. Researchers are investigating the effectiveness of different forms of e-learning, factors influencing its successful implementation, comparisons between face-to-face and online teaching, the role of various technological tools and platforms, and the impact of e-learning on student learning outcomes. Considerable attention is also paid to hybrid forms of teaching, such as blended learning, which combines the advantages of face-to-face and online education (Zounek & Sudický, 2012). Meta-analytical studies show that blended learning achieves

better results than purely face-to-face teaching, with the effect being particularly pronounced in science and technology subjects (Cao, 2023).

In the context of rapid technological development, new trends and opportunities are emerging in the field of e-learning. Mobile learning (m-learning) using smartphones and tablets, virtual and augmented reality, artificial intelligence and adaptive learning systems represent new directions in the development of digital education. These technologies offer the potential for even more personalised and interactive learning experiences (Kopecký, 2006; Zounek et al., 2021). The use of virtualisation technologies in education has been shown to increase the efficiency of resource use and reduce the time needed to prepare teaching environments, as documented by empirical studies conducted at hundreds of educational institutions (Klement, 2017). Research involving more than a hundred experimental studies shows that the integration of mobile devices into teaching has a positive impact on learning outcomes across different educational levels and subject areas (Sung et al., 2016).

Despite all the advantages and opportunities that e-learning offers, it is also necessary to be aware of its limitations and challenges. The digital divide, which can lead to unequal access to education, issues of digital literacy among students and teachers, technical problems, lack of social interaction, and the risk of students losing motivation are aspects that must be taken into account and actively addressed when implementing e-learning (Zlámalová, 2008).

This article aims to contribute to the understanding of the current state of e-learning in Czech primary and secondary schools. Through a combination of theoretical overview and empirical research, we seek to provide a comprehensive view of the issue of e-learning, its use, perception and potential in the context of the Czech education system. Emphasis is placed not only on the technological aspects, but also on the pedagogical, didactic and social dimensions of this form of education.

Concept and definition of e-learning

The term e-learning emerged at the turn of the 20th and 21st centuries and quickly became the subject of academic and practical interest in the field of education. Etymologically, it comes from the English term "electronic learning". Although this term may seem unambiguous, in the professional literature we encounter a number of different definitions that reflect the different perspectives and focuses of the authors (Kopecký, 2006).

Kopecký (2006, p. 6) defines e-learning as "any use of electronic and didactic means to effectively achieve an educational goal, provided that it is implemented mainly/not only through computer networks." This definition emphasises two key aspects: firstly, the flexibility of using various electronic means and, secondly, the focus on educational goals. It is also important to note that the definition does not limit e-learning to education via computer networks, thus reflecting the diversity of forms that this education can take.

Zlámalová (2008) approaches e-learning from a didactic perspective and characterises it as a modern method of education that uses computer and network technologies to create, distribute and manage educational content. She emphasises the importance of interactivity between the student and the educational system, which is key to effective learning. This definition points out that e-learning is not just passive consumption of information, but an

active process in which the student interacts with the educational content, the system and often with other participants in the education.

For a deeper understanding of e-learning, it is useful to distinguish several key characteristics that are typical of this form of education. First and foremost, it involves the use of digital technologies as the primary medium for delivering educational content. This allows for the use of multimedia elements such as text, images, video, audio and interactive elements, which can make learning more attractive and effective. Systematic reviews show that, for example, the use of video as a supplement to traditional teaching can significantly improve student learning outcomes (Noetel et al., 2021) (Zounek et al., 2021).

The second key characteristic is flexibility in time and space. E-learning allows students to access educational content anytime, anywhere, which is particularly beneficial for those who, for various reasons, cannot attend traditional classes. However, this flexibility places higher demands on self-discipline and the ability to manage one's own learning, which are essential for success in an e-learning environment (Zlámalová, 2008).

Forms and types of e-learning

In practice, e-learning takes many different forms and shapes, which vary in the extent of technology use, degree of flexibility, interactivity, and overall concept of the educational process. Understanding this diversity is key to the effective implementation and use of e-learning in educational institutions. Zlámalová (2008) distinguishes several basic forms of e-learning according to the degree of use of electronic means and the degree of separation between the student and the teacher.

The first form is fully online e-learning, where the entire educational process is carried out electronically without the physical presence of students and teachers in one place. This form is characterised by maximum flexibility and independence from time and place. Students access educational content via internet platforms, communicate with teachers and classmates electronically, and all study materials are in digital form. This form is particularly suitable for distance learning, lifelong adult education, or situations where face-to-face teaching is not possible (Kopecký, 2006).

The second form is blended learning, which combines face-to-face and online teaching. This form has become very popular in recent years because it combines the advantages of both approaches and minimises their disadvantages. Students can learn some parts of the material online at their own pace, while more complex concepts or practical skills are taught face-to-face. Blended learning allows for more effective use of face-to-face teaching, as teachers can focus on more difficult topics, discussion and practical applications, while students can acquire basic theoretical knowledge online (Zounek et al., 2021).

In terms of time synchronisation, e-learning can be divided into synchronous and asynchronous forms. Synchronous e-learning requires the simultaneous presence of participants at a specific time, although not necessarily in the same place. Typical examples include live online lectures or seminars conducted via videoconferencing tools. Asynchronous e-learning, on the other hand, does not require the simultaneous presence of participants. Students can access educational content whenever it suits them and proceed at their own pace (Zounek & Sudický, 2012).

Resources that can be used in e-learning

Effective implementation of e-learning requires the use of appropriate technological resources and tools that enable the creation, distribution and management of educational content, communication between participants in the educational process, and the evaluation of learning outcomes. The range of available resources is very wide and is constantly expanding with the development of technology. In this chapter, we will focus on selected resources that have significant potential for use in educational institutions.

Blogs as a tool for reflective learning

A blog, short for weblog, is an online platform that allows text posts to be published in chronological order. In the context of education, blogs can serve as a tool for reflective writing, sharing thoughts and ideas, documenting the learning process, and developing communication skills. The educational potential of blogs lies in the opportunity for students to express their thoughts in writing, reflect on the material covered, and receive feedback from the teacher and classmates (Zounek & Sudický, 2012).

Blogs can be used in various ways in the educational process. Teachers can create a class blog where they share information about the material covered, assign tasks and publish supplementary materials. Students can then comment on posts, ask questions and discuss topics. Alternatively, each student can maintain their own blog where they document their learning process, write essays or reflective notes. This approach supports the development of metacognitive skills and critical thinking (Zlámalová, 2008).

Video as a multimedia tool

Video is one of the most popular and effective tools for e-learning. Educational videos can take various forms, from classic lectures recorded on camera, to screencasts (computer screen recordings with commentary), to animated explanatory videos. Research shows that video can be very effective for explaining complex concepts, demonstrating procedures, and maintaining student attention. The combination of visual and auditory stimuli can improve memory and understanding of the material (Zounek et al., 2021). Systematic reviews using Cochrane methodology confirm that digital educational interventions, including multimedia tools, are at least as effective as traditional methods and may even be more effective in the development of practical skills (Dunleavy et al., 2019).

There are several approaches to using video in teaching. These can be explanatory videos that introduce new concepts or procedures, demonstration videos that show practical skills, or lecture-style videos that replace or supplement traditional lectures. Effective educational videos should be relatively short (optimally 5-10 minutes), focused on one main idea, have a clear structure, and possibly include interactive elements such as questions or tasks (Kopecký, 2006).

Learning Management Systems (LMS)

LMS are comprehensive software platforms designed for the management, distribution and monitoring of online courses and teaching activities. LMS form the backbone of many e-learning implementations and provide an integrated environment for all aspects of online

education. A typical LMS offers tools for course creation and management, user management, communication, testing and assessment, student progress tracking, and report generation (Zlámalová, 2008). In the context of primary and secondary education, the successful implementation of LMS systems is conditioned by several key factors, in particular the readiness of teachers, access to technology and attention to the developmental needs of students (Johnson et al., 2023).

Among the most popular LMSs is Moodle, an open-source platform widely used in schools and universities around the world. Moodle offers a wide range of features including discussion forums, quizzes, assignment submission and assessment, wikis, blogs and many more. Other notable LMS systems include Canvas, Blackboard, Google Classroom and Microsoft Teams for Education. Each of these systems has its own specific characteristics, advantages and disadvantages, and the choice of a suitable system depends on the needs of the particular institution, budget and technical requirements (Kopecký, 2006).

A key advantage of LMS is the centralisation of all educational activities in one environment. Teachers can create courses, upload study materials, assign tasks, create tests, communicate with students through announcements or discussion forums, and monitor their progress in LMS. Students have a single point of access where they can find everything they need for their studies. LMS also allows for easy reuse of materials, which saves teachers time when repeating courses (Zounek & Sudický, 2012).

Research objectives and methodology

The main objective of this research was to determine the awareness of e-learning and its use in educational institutions, specifically in primary and secondary schools in the Olomouc Region. The research focused on mapping the current state of e-learning implementation in Czech schools and identifying the attitudes of students and teachers towards this form of education. We paid particular attention to comparing the situation between primary and secondary schools and the impact of the COVID-19 pandemic on the development of e-learning.

The main research question was formulated as follows: Do secondary school students know more about e-learning than primary school pupils? To answer this question, sub-research questions were set focusing on awareness of e-learning, the ability to identify its definition, frequency of use, attitudes towards this form of education and the impact of the COVID-19 pandemic.

Research design and methodology

A quantitative research approach was chosen for this research, using a questionnaire method of data collection. The quantitative approach was chosen for its ability to provide statistically processable data from a relatively large number of respondents, allowing for generalisation of findings and identification of patterns in the data. As a data collection method, the questionnaire offers the advantages of standardisation, respondent anonymity, and efficient distribution via online platforms.

The questionnaire was created in Google Forms and distributed electronically via email links to selected schools. The research sample consisted of students and teachers from

one primary school and one secondary school in the Přerov district of the Olomouc region. Respondents had the opportunity to answer the questionnaire anonymously between October 2025 and January 2026. A total of 100 valid responses were obtained.

The questionnaire consisted of a total of 20 questions of various types. Of these, 15 were closed questions with a choice of predefined options, 2 were semi-closed questions (with the option of providing your own answer) and 3 were open questions. A five-point Likert scale was used to measure respondents' attitudes in the 3 closed questions. The first four questions were used to identify respondents (age, type of school, role in school, length of teaching experience). Questions 5-9 assessed awareness of e-learning and the frequency of encounters with it. Question 10 tested the ability to identify e-learning tools. Questions 11-17 focused on the implementation, benefits and application of e-learning in teaching. The last three questions (18-20) examined the impact of the COVID-19 pandemic.

Characteristics of the research sample

For the sake of consistency of the data collected, we also focused on the basic characteristics of the research sample, specifically the age composition and distribution of respondents by type of school and role. These data are key to interpreting the results presented below and allow us to assess the representativeness of the sample.

Age category	Number of respondents	Percentage
15 years old and younger	47	47
16 to 20 years old	39	39
21 years and older	14	14

Table 1 – Age distribution of respondents
Source: authors

The table above shows that the research sample consisted of 47 respondents aged 15 and under, which corresponds to primary school pupils and, where applicable, first-year secondary school students. Another significant group was respondents aged 16 to 20 (39 respondents), which corresponds to secondary school students. The smallest group consisted of respondents over 21 years of age (14 respondents), who represent school employees, mainly teachers. This distribution allows for a comparison of the perspectives of different age groups and roles in the education system.

In terms of distribution by school type, 48 respondents from primary schools and 52 respondents from secondary schools participated in the survey, representing an almost even distribution. Of the total number of 100 respondents, 86 were pupils/students (41 from primary schools and 45 from secondary schools) and 14 were teachers (7 from primary schools and 7 from secondary schools). This distribution provides a representative sample of both types of schools, although the number of teachers is relatively small, which must be taken into account when interpreting the conclusions relating to this group.

Research results

In this section of the article, we present the results of a questionnaire survey focused on awareness of e-learning and its use in primary and secondary schools. From a total of twenty

questions in the questionnaire, we have selected the three most interesting analyses for this purpose, which provide key insights into the current state of e-learning in Czech schools.

Awareness of e-learning and ability to identify its definition

The first analysis presented here focuses on respondents' awareness of the term e-learning and their ability to identify the correct definition of this concept. This analysis is key to assessing whether respondents truly understand what e-learning is, which is a basic prerequisite for the meaningful use of this form of education.

Answer	Primary school	Secondary school	Total
Yes – I know	25 (52%)	24 (46%)	49
Not sure	11 (23%)	22 (42%)	33 (33%)
No - I don't know	12 (25%)	6 (12%)	18 (18%)

Table 2 – Awareness of e-learning by type of school
Source: authors

The table shows that almost half of the respondents (49%) stated that they know what the term e-learning means. It is significant that all teachers (14) answered positively, which indicates their awareness of this form of education. Among primary school students, 52% of respondents answered positively, while at secondary school it was 46%. This is a rather surprising finding that contradicts our research hypothesis that secondary school students would have greater awareness of e-learning. A significant proportion of respondents (33%) were unsure, with this uncertainty being more pronounced in secondary school (42%) than in primary school (23%).

Type of school	Correct definition	Incorrect definition
Primary school	32 (67%)	16 (33%)
Secondary school	49 (94%)	3 (6%)
Total	81 (81%)	19 (19%)

Table 3 – Correct identification of the definition of e-learning
Source: authors

When testing the ability to identify the correct definition of e-learning, we obtained very positive results. A total of 81% of respondents were able to correctly identify the definition of e-learning from the options offered, which also included definitions of digital technologies and education in general. Interestingly, secondary school students achieved significantly better results (94% success rate) compared to primary school pupils (67% success rate). All teachers correctly identified the definition of e-learning. This analysis shows that despite some uncertainty in their awareness of the term itself, the vast majority of respondents have a correct basic understanding of what e-learning is.

Frequency of encounters with e-learning

The second analysis focuses on the frequency with which respondents encounter e-learning and the places where these encounters occur. These data provide important insights into the actual use of e-learning in practice.

Frequency	Primary school	Secondary school	Total
Every day	8 (17%)	5 (10%)	13 (13%)
Several times a month	17 (35%)	15 (29%)	32 (32%)
Very rarely	16 (33%)	22 (42%)	38 (38%)
Never	7 (15%)	10 (19%)	17 (17%)

Table 4 – Frequency of encountering e-learning
Source: authors

Most respondents (38%) stated that they encounter e-learning only very rarely, with this proportion being higher in secondary schools (42%) than in primary schools (33%). The second most common response was "several times a month" with 32% of respondents. Only 13% of respondents encounter e-learning every day, which suggests that e-learning is used in most cases as a supplement rather than as the primary form of teaching. Interestingly, 17% of respondents said they never encounter e-learning, even though most of them said they know what the term means. This may indicate a difference between theoretical awareness and practical experience with e-learning.

Impact of the COVID-19 pandemic

The third analysis presented here focuses on the impact of the COVID-19 pandemic on the use and popularisation of e-learning. This analysis is important for understanding how extraordinary events can influence the adoption and use of educational technologies.

Response	Primary school	Secondary	Total
I use it more	28 (58%)	31 (60%)	59 (59%)
It's the same	14 (29%)	15 (29%)	29 (29%)
I use it less/Not applicable to me	6 (13%)	6 (12%)	12 (12%)

Table 5 – Use of e-learning before and after the COVID-19 pandemic
Source: authors

The results clearly show that the COVID-19 pandemic has had a significant impact on the use of e-learning. A total of 59% of respondents said they use e-learning more than before the pandemic, with this trend being similar in both primary schools (58%) and secondary schools (60%). Only 12% of respondents said that it was the same or that the pandemic did not affect them. However, a significant proportion of respondents (29%) said that the situation had returned to normal and that the frequency of e-learning use was the same as before the pandemic. These findings suggest that the pandemic acted as a catalyst for wider adoption of e-learning, but part of this effect was likely temporary and linked to educational institutions being forced to move online during lockdowns.

Discussion of results

The main objective of this research was to determine awareness of e-learning and its use in primary and secondary schools. The results provide valuable insight into the current state of e-learning in the Czech educational environment and reveal several interesting findings.

The first key finding is that most respondents (49%) have a basic awareness of the term e-learning, with all teachers stating that they know what the term means. A surprising finding was that primary school pupils showed a slightly higher level of awareness of e-learning than secondary school students, which contradicts our original hypothesis. A possible explanation may be that primary school teaching has recently been integrating digital tools and technologies more, while secondary schools may be more conservative in their approaches.

However, the ability to correctly identify the definition of e-learning was significantly higher among secondary school students (94%) than primary school pupils (67%). This finding suggests that although primary school pupils may be exposed to e-learning tools, their conceptual understanding of what e-learning actually represents is still developing. Older students have better abstract thinking and conceptualisation skills, which is reflected in their greater ability to recognise the correct definition among distractors.

An analysis of the frequency of e-learning use revealed that most respondents encounter e-learning occasionally rather than regularly. Only 13% of respondents said they encounter e-learning every day, while 38% said they encounter it very rarely. This finding suggests that e-learning is used in most cases as a supplement to traditional teaching, rather than as its primary form. A comparison with previous studies (Klement, 2017; Vízková, 2011) shows that this situation is relatively stable over time and that e-learning continues to be perceived primarily as a supplementary tool.

A significant finding was the identification of the impact of the COVID-19 pandemic on the use of e-learning. A total of 59% of respondents said they use e-learning more than before the pandemic. This finding confirms that the pandemic acted as a catalyst for the wider adoption and implementation of e-learning in schools. However, it should be noted that 29% of respondents stated that the situation has returned to normal, suggesting that some of the increased use of e-learning during the pandemic was temporary.

The limitations of this research include a relatively small sample size (n=100) and a focus on only two types of schools in one region, which limits the possibility of generalising the conclusions to the entire Czech population. Further research should include a larger sample of schools from different regions and of different types (e.g., grammar schools versus vocational schools) to obtain a more comprehensive picture of the situation. It would also be beneficial to conduct qualitative research through interviews or focus groups to gain a deeper understanding of experiences and attitudes towards e-learning.

Conclusion

This article dealt with the issue of e-learning and its implementation in educational institutions, with an emphasis on the current state of affairs in Czech primary and secondary schools. Through a combination of theoretical overview and empirical research, we have attempted to provide a comprehensive view of this important area of modern education.

The theoretical part of the article provided an overview of the development of e-learning from its roots in distance learning to the current advanced forms using the latest technologies. We showed that e-learning is not a homogeneous concept, but encompasses a wide range of approaches, from fully online courses to blended learning to the use of individual digital tools as a supplement to traditional teaching.

The empirical part of the research, based on a questionnaire survey (n=100), revealed several key findings. First, most respondents have a basic awareness of e-learning and are able to identify its correct definition, with secondary school students showing a better conceptual understanding than primary school pupils. Second, e-learning is used more occasionally than regularly in most cases, suggesting that it still serves primarily as a supplement to traditional teaching. Third, the COVID-19 pandemic has had a significant, albeit partially temporary, impact on increasing the use of e-learning in schools.

The findings of this research have important implications for educational practice and policy. They point to the need for a more systematic and thoughtful integration of e-learning into the educational process, which requires not only technological infrastructure, but also the development of teachers' digital education skills and the creation of e-learning materials.

Future research directions should include longitudinal studies tracking the development of e-learning use over time, comparative research comparing different types of schools and regions, and, in particular, research focused on the effectiveness of different forms of e-learning for different types of learning and different groups of students. Qualitative research could provide deeper insight into the experiences and perspectives of teachers and students and identify barriers and facilitators to the successful implementation of e-learning.

In conclusion, e-learning is an important and promising element of modern education with the potential to improve accessibility, flexibility and quality of education. However, its successful implementation requires a holistic approach that takes into account not only technological but also pedagogical, organisational and social aspects.

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