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Internet platforms in an open educational environment in the organisation of students' independent work

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Abstract. In the age of digitisation and information, open educational resources and technologies are an integral element of the learning infrastructure, ranging from podcasts to electronic libraries, textbooks and games. The purpose of this paper was to study various Internet platforms in an open educational environment designed for independent study of students. For this, the methods of analysis, synthesis, comparison, deduction, systematisation and generalisation were used. As a result of the conducted research, a wide range of Internet platforms was discovered that make the learning process interactive and interesting. It has been established that foreign resources occupy leading positions in the world, many of which can be translated into most common languages. During the study, the main platforms, their advantages and disadvantages were analysed. The obtained results indicated that educational

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resources are constantly developing, new ones are created, which allows each teacher to find a suitable tool for implementation in his own educational approach. The findings so far indicated that the use of these digital platforms significantly improves student engagement in the educational system and promotes the development of self-directed learning. The results of this study represented valuable information for teachers of higher educational institutions, which allows them to optimise the structuring of the student's independent work. In addition, these results can be used by developers of educational programs for flawless integration of innovative technologies into the pedagogical process. Ultimately, students themselves can benefit from this research by improving their self-directed learning strategies

Keywords: educational activity; technologies in education; integration digitalisation; network model

Introduction

Technological advancements are driving significant and transformative shifts in various sectors, including education. By integrating digital tools and resources into the learning environment, institutions can substantially enhance productivity and outcomes. These technologies facilitate the proliferation of course offerings, expand access to learning materials, and enable round-the-clock, on-demand learning. Moreover, they equip students with the competencies essential for success in the contemporary, technology-driven world. In addition, they greatly increase the involvement and motivation of students and schoolchildren, allow improving and accelerating the learning process.

Technological advancements have facilitated the emergence of innovative network-based learning paradigms. These models foster interconnectedness among educators, learners, and external professional networks, enabling personalised and enhanced learning experiences (Chugh *et al.*, 2017; Bin, 2017). Consequently, technology has ushered in a new era of digital learning tools and platforms. The integration of online learning, open educational resources, and various technologies has the potential to optimise learning outcomes by accelerating the pace of acquisition, minimising costs associated with instructional materials and program development, and streamlining instructional processes for educators.

Contemporary scholarly discourse is centred on the potential integration of internet platforms into the framework of independent student work. R. Huang *et al.* (2020) elucidated that open educational resources (OER) distinguish themselves from open learning by primarily comprising educational materials, whereas open learning encompasses a broader spectrum including data and supplementary educational services. J. Arcebuche (2022) provided a comprehensive overview of OER examples, encompassing online textbooks, video lectures, digital media content, self-study materials, simulations, visual aids, massive open online courses, and even automated assessment tools. Furthermore, the researcher identified presentation slides and lecture notes as additional components within the OER landscape. According to S. Aljawarneh (2020), OER must be freely accessible, at least for educational purposes, to be classified as such. The researcher also underscored the pivotal role of educators in ensuring the efficacy of independent student work. Q. Feng & B. Feng (2021) concluded that internet platforms serve as repositories for a substantial volume of data, which students can leverage to explore relevant topics and augment their knowledge through the amalgamation of educational resources. This study established that the aforementioned strategies facilitate personalised learning experiences, sustain student engagement, and provide valuable support to educators throughout the instructional process. A study by J. Komljenovic (2021) found that digital learning platforms allow students to actively interact with learning materials. In addition, the researcher was

able to determine that depending on the type of platform, the teacher can ask the students to use the software in the classroom during the lesson or interact with it at home for additional practice during the course. M. Al-Emran (2020) investigated the functions of educational platforms that provide the organisation of adaptive learning. As a result, it was found that their tool dynamically changes tasks and lesson plans depending on the results of each student. Thus, the following classification was proposed: digital learning platforms aimed at different educational goals, including tools designed for students to accumulate knowledge in specific subjects, such as natural or social sciences, and other tools aimed at developing interdisciplinary skills, such as reading or writing.

This study was aimed at a comprehensive assessment of the effectiveness and potential impact of the inclusion of foreign Internet platforms in the educational landscape in order to increase the ability of students to independently study. It aimed to thoroughly assess the functionality of these platforms, identify exemplary implementation strategies, and formulate recommendations for educators and institutions planning to integrate these technologies into their distance learning programs. The specific objectives of this study included a comprehensive analysis of open education opportunities and technologies supporting independent learning on a global scale, culminating in a benchmarking of these resources. An innovative aspect of this study was the exploration of Internet platforms as valuable tools for individualised student learning.

Materials and Methods

During the conduct of this research, a comprehensive approach was applied, which included the methods of analysis, synthesis, comparison, deduction, systematisation and generalisation. The analysis method was used for a detailed study of various foreign Internet platforms, their functionality and features. With its help, the structure, interface, and capabilities of each platform for organising students' independent work were carefully analysed, including Canvas, Coursera, Khan Academy, Nearpod, GoReact, and others. Synthesising the collected analytical data, common attributes characterising effective foreign digital platforms designed to promote independent student learning in an open educational environment were distinguished. This synthesis made it possible to identify the main components that should be included in a reliable educational platform. A comparative analysis was conducted to assess the relative merits of various foreign digital platforms, focusing on their functionalities, user-friendliness, opportunities for student-teacher interaction, and efficacy in facilitating independent student work. Through a deductive approach, these findings were contextualised within the broader theoretical frameworks of open educational environments and the organisation of independent student work. This process facilitated the formulation of guiding principles for the development of effective online learning platforms.

A systematic approach was employed to categorise the collected data pertaining to a diverse array of foreign digital platforms, their functionalities, and their potential applications in facilitating independent student learning. The resultant findings were meticulously organised into tabular formats to highlight the key attributes of these platforms. Subsequently, a process of generalisation was undertaken to derive overarching conclusions regarding the significance and efficacy of foreign digital platforms within open educational environments in fostering independent student work. These conclusions were drawn from a comprehensive analysis of the accumulated data.

This research endeavour was conducted in a multi-phased approach. The initial theoretical stage involved a comprehensive review of existing scholarly literature on the research topic, culminating in the precise definition of key concepts and the underlying theoretical framework governing the integration of digital platforms into education. The subsequent analytical phase entailed a meticulous examination and analysis of a diverse array of foreign internet platforms, delving

into their functionalities and distinctive features. The third stage, systematisation, focused on the meticulous organisation and categorisation of the collected data pertaining to these platforms, resulting in the creation of comparative tables and visual representations. The fourth and final stage, generalisation, involved the formulation of conclusions regarding the efficacy of various platforms, the identification of their respective strengths and weaknesses, and the development of recommendations for their effective utilisation. The concluding phase encompassed a comprehensive discussion of the research findings, a contextual analysis of the obtained data within the framework of contemporary educational trends, and a thoughtful consideration of both the potential benefits and limitations of employing internet platforms to facilitate independent student work.

Results

To qualify for inclusion in the category of digital learning platforms, the product must:

- be intended for use by teachers of K-12 schools (which refers to the sum of primary and secondary education in the United States, covering grades from kindergarten to 12th grade, typically for students aged 5-18 years old) or higher educational institutions;
- conduct interactive educational lessons;
- include multimedia or gamification elements designed to increase student engagement;
- personalise the learning process for each student;
- create reports based on student performance data.

When organising independent work, it is necessary to take into account the characteristics of students, such as:

- each student builds their own future with the teacher's support;
- the purposes are set with the help of the teacher, but the work plan is compiled solely by the student;
- in accordance with the teacher's tasks, the student plans the purposes of future activity;
- the work is performed at the request of the students, they understand the content, plan, and perform tasks without the help of a teacher.

Independent student work exerts a significant influence on the acquisition, organisation, quality, and applicability of knowledge and skills. Consequently, it is imperative to integrate individual study, knowledge assimilation, and assessment within a cohesive learning framework. S. Dhawan (2020) underscores the multifaceted nature of learning in contemporary knowledge societies, characterised by a diverse range of contexts and methods that encompass both formal and informal, intentional and incidental learning experiences. This complexity is visually represented in the accompanying diagram (Fig. 1).

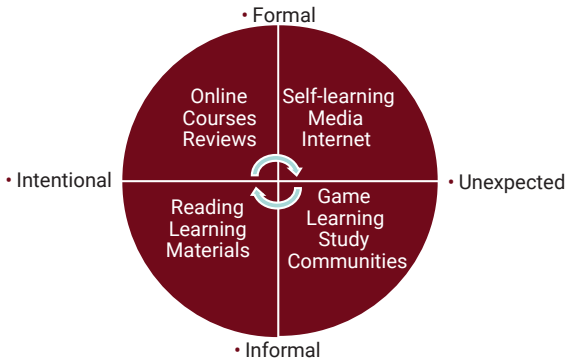

Figure 1. *Methods of learning*

Source: *compiled by the authors*

The synthesis of high-quality teaching in an online environment is described in detail in the study of G. Marinoni *et al.* (2020), evaluating three types: cognitive, social, and educational (Table 1). These three elements form the foundation of effective online learning experiences. The cognitive aspect focuses on the intellectual processes involved in learning, including critical thinking, problem-solving, and knowledge construction. Social interaction is crucial in online environments to foster a sense of community and collaborative learning. The educational element encompasses the instructional design and facilitation aspects that guide the learning process.

Table 1. *Educational interaction in the online learning environment*

Elements	Categories	Indicators
Cognitive skills	Initiating event: ➤ research; ➤ integration; ➤ solution.	➤ a feeling of perplexity; ➤ information exchange; ➤ combining ideas.
Social interaction	➤ affective measurement; ➤ open communication; ➤ group cohesion.	➤ expression of emotions; ➤ free self-expression; ➤ teamworking.
Learning	➤ design and organisation; ➤ discursive study; ➤ clear guidance.	➤ establish the content of the programme and the methodology; ➤ create meaning together; ➤ concentrate the discussion.

Source: *compiled by the authors*

Every component within this framework is indispensable in crafting a holistic and captivating digital learning environment. Cognitive abilities are cultivated through thoughtfully constructed activities that stimulate critical thinking and the application of acquired knowledge. Moreover, the platform fosters social interaction by providing a range of communication tools and collaborative projects, thereby enabling learners to benefit from peer-to-peer learning and cultivate a collaborative learning community. The educational aspect ensures that the course is structured effectively, with clear objectives and appropriate guidance to help students navigate the learning materials (INTEF, 2017). By integrating these three elements, online learning platforms can create a rich, interactive environment that supports deep learning and student engagement. This holistic approach recognises that effective online education goes beyond simply delivering content and instead focuses on creating meaningful learning experiences that promote active participation and knowledge construction (Table 1). These three elements and their interaction create an environment for analysing educational interaction in an online learning environment. It is necessary to find a place for the intersection of innovation and research practice in distance education. This issue was considered in the study of K. Anwar & M. Adnan (2020), researchers discovered that the development of appropriate tasks and the evaluation procedure are crucial for the involvement of students in the learning management system. To foster effective learning, digital learning environments should be designed to meet institutional quality standards, including certification requirements and accessibility features. Digital learning involves an educational break, since it causes a sharp change in support and methods, but since it is gradually gaining a place among conventional formats, the authors of the study M. Suresh *et al.* (2018) identified more than 20 factors that accelerate the development of distance independent education: openness, flexibility, ubiquity, self-control, spontaneity, etc. L. Garcia-Aretio's (2017) research offers a set of guiding principles and conclusions for designing robust online learning programs and platforms, as detailed in (Table 2).

Table 2. *Principles of Internet platform development*

Principles	Design implications
Active participation	The teaching staff can participate in the creation and offer new ideas or learn from experience
Using the practice and previously obtained knowledge	The teaching staff can analyse and extract valuable experience from their practice, work, and data of their colleagues and offer it for implementation
Evaluation of expected results	The programme coordinators present and propose new guidelines for action
Respect and satisfaction towards students	programme models influence the learning environment in which employees and students feel valued and respected

Source: *compiled by the authors based on the research materials of S. Dhawan (2020)*

Digital learning platforms serve as effective frameworks for structuring the educational process, facilitating optimal content organisation and student interaction. These platforms are widely adopted by educational institutions, particularly at the university level (Survey on online and distance learning, 2020). In the context of virtual instruction, it is imperative to leverage the unique characteristics of the digital environment and adapt courses and disciplines accordingly. Learning platforms emerge as virtual spaces that catalyse educational innovation and professional growth, emphasising personalised learning experiences and collaborative approaches. In the realm of distance and independent learning, the learning platform should be meticulously aligned with the knowledge and practices of virtual environments, thereby enhancing the efficacy of the educational process, fostering autonomous learning, and facilitating seamless interaction with educators in completing educational tasks and utilising communication tools (Moreno *et al.*, 2017). The accompanying article presents a visual representation of student navigation processes, offering valuable insights into student behavior and informing the design of effective virtual courses (Table 3).

Table 3. *Student navigation processes*

Process	Description
Understanding	Overview of the course structure All parts/areas of the course are clear and accessible
Learning	Logical organisation of the course Easy access to course components
Functional	The links for the course work properly The course content has been verified

Source: *compiled by the authors based on the research materials of G. Marinoni (2020)*

The rapid advancement of technology has spurred a proliferation of diverse online learning platforms, each tailored to meet specific pedagogical requirements (Yuriychuk & Dadak, 2024). As a result, these platforms have become essential tools for both educators and learners, revolutionising traditional classroom experiences and fostering more dynamic and interactive learning environments. To provide a comprehensive overview of the options available, Table 4 presents a curated list of some of the most widely used and popular online education platforms. This collection highlights a variety of platforms spanning different educational levels and disciplines. From K-12 to higher education, these platforms offer a variety of functionality, including content delivery, assessment, communication, and collaboration tools. Table 4 describes the features and capabilities of these platforms, which provided an understanding of their potential impact on teaching and learning processes.

Table 4. *Online platforms for education*

Name	Description
Canvas	With the open, convenient cloud technologies, the platform provides easy integration of educational materials, tools, and services that teachers and students need. In addition to the training management system, a repository of training objects, a customisable universal catalogue of courses, a registration system, and a payment gateway are offered.
Coursera	The platform provides universal access to the best education in the world, in partnership with leading universities and organisations, offering free courses for everyone.
Khan Academy	The platform provides a flexible learning environment that accommodates diverse learning styles, offering a rich array of resources such as practical exercises, instructional videos, and personalised learning dashboards. These features empower learners to progress at their own pace, both within and beyond the traditional classroom setting.
Nearpod	By incorporating dynamic media and assessment tools, the platform enables educators to design lessons that foster active student engagement.
GoReact	Designed to support formative assessment, this interactive platform provides students with the tools to collaborate, receive personalised feedback, and demonstrate their learning through various media. By enabling teachers to provide targeted feedback using customizable rubrics and annotations, the platform promotes ongoing skill development and enhances student engagement.
Discovery Education Inc	As a leading provider of standards-aligned digital resources for students up to the age of 12, this platform is revolutionising education through a comprehensive suite of digital textbooks, multimedia content, professional development opportunities, and a robust online community for educators.
McGraw-Hill Connect	By providing a comprehensive suite of learning resources and adaptive technologies, this platform empowers students to take ownership of their learning. The platform's flexible design encourages exploration and experimentation, allowing students to make mistakes in a low-stakes environment and develop practical skills. The platform automatically evaluates assignments and tests, providing the teacher with easy-to-read reports for making recommendations. Moreover, the platform allows combining all the course materials in one place, creating a digital version of the course textbook.
Renaissance Accelerated Reader	This comprehensive reading program is designed to cultivate a lifelong love of reading in students aged 12 and under. By providing access to a vast library of over 200,000 fiction and nonfiction texts at various reading levels, the program empowers students to make independent reading choices and engage in sustained, independent practice. The collection of articles provides additional opportunities for daily reading of scientific literature, and detailed reports support regular conversations between teachers and students about reading time, reading comprehension, and reading development.
Lumio by SMART Learning Suite	Designed to enhance accessibility and adaptability, this digital tool enables teachers to create engaging and interactive learning experiences that can be accessed from any device. By allowing for the seamless conversion of a variety of digital resources, including PDFs, Google Slides, and PowerPoint presentations, the platform supports diverse teaching and learning styles. The platform saves time by creating lessons quickly and sending them to students' devices via Google or Microsoft. This powerful learning tool helps students actively explore, create, collaborate, ask questions, and reflect while participating in lessons on their devices, in the classroom, or at home. It also gives students a choice of the way they learn, making it visible to teachers and other students. The unique ability to support group work and collaboration makes the platform a dynamic and versatile tool for conducting exciting and effective lessons using students' devices.
Blackboard Ally	This user-friendly digital platform empowers learners to personalise their educational journeys, providing flexible and accessible learning opportunities anytime, anywhere.
Pear Deck	A platform for creating vivid, interesting, and interactive lessons, presentations, and grading to interest every student.
TechSmith Knowmia	This innovative asynchronous video platform is designed to enhance student engagement and improve learning outcomes in online and blended courses. The platform's intuitive interface allows educators to easily create and deliver engaging video content, while interactive features such as video quizzes and threaded discussions foster active participation and meaningful interaction. By integrating with learning management systems and providing secure access across multiple devices, the platform ensures a flexible and effective learning experience for students.

Table 4. *Continued*

Name	Description
Kaltura Video Cloud	This versatile video platform is tailored to meet the diverse video content management needs of organisations across industries. As a leading video cloud solution, the platform offers a broad spectrum of tools and features to facilitate efficient and effective video workflows.
Vedamo Virtual Classroom	This user-friendly platform offers educators a seamless solution for creating dynamic and interactive virtual classrooms. Requiring no additional software installation, the platform empowers teachers to design engaging lessons with features such as gamification, real-time student monitoring, and customizable templates. By eliminating technical barriers, the platform enables educators to focus on delivering high-quality instruction.
MindTap	With this platform, there is no need to search for markers and notebooks, since it makes it possible to highlight and take notes on the Internet directly on web pages.
Kiddom	Kiddom is a versatile educational platform that streamlines the learning process by integrating curriculum, assessments, and communication tools into a single, accessible interface. By offering both customizable and pre-built curriculum options, Kiddom empowers educators to create engaging and effective learning experiences that cater to the needs of diverse learners, regardless of the learning environment. On this platform, teachers can easily adjust the volume and sequence of classes in accordance with the needs of the discipline or class. Teachers and students do not need to leave the platform to record video and audio, assign, view, complete, or evaluate lessons, there is an opportunity to view reports in real-time or communicate in many ways.
NoRedInk	The No Red Ink platform trains qualified writers through a programme based on interesting, adaptive exercises and practical tasks.
Freckle	By offering a rich array of interactive features, including team-based projects, real-world scenarios, and immediate feedback, this adaptive software significantly enhances student engagement and achievement. Designed to support differentiated instruction, the platform enables educators to tailor learning experiences to meet the unique needs of each student. Aligned with K-12 standards, the software provides a robust foundation for academic success across various disciplines.
myON Reader	Designed to foster literacy skills and cultivate a love of reading, this digital platform provides students with a vast repository of engaging texts in multiple languages. By incorporating multimedia elements, interactive tools, and a diverse range of content, the platform creates a dynamic and personalised reading experience. The platform's alignment with literacy standards and its integration with subject area lessons ensures that students develop the essential skills necessary for academic success.
Mentoring Minds	Aligned with K-12 educational standards, this comprehensive learning management platform is designed to enhance student achievement by promoting deep learning and critical thinking. The platform's customizable features allow educators to create engaging and effective learning experiences that cater to the diverse needs of their students. The "ThinkUp!" module, specifically designed for elementary school students, equips learners with the essential skills required to succeed in a complex and rapidly changing world. The reporting and analytics block is aimed at creating, managing, administering, and tracking data from standard-compliant tasks and assessments. The assessment management block "Itematica!" can meet the needs of students and teachers in the context of assessment – it is a comprehensive assessment solution with access to more than 65,000 assignments based on standards of state learning purposes.

Source: *compiled by the authors based on the research materials of K. Anwar & M. Adnan (2020)*

Based on the above, it should be established that the analysis conducted in the study presented a comprehensive description of the landscape of digital learning platforms. It was possible to characterise their main components that define these platforms, emphasising their role in modern education. Central to this research was the importance of personalisation, interactivity, and data-driven approaches in creating an effective learning environment. It highlighted the evolution of education from traditional teacher-centred models to more flexible, student-centred paradigms facilitated by technology. By examining a variety of platforms, the study found a diverse ecosystem that offers a range of features and capabilities to meet a variety of educational

needs. Ultimately, it was found that successful integration of digital learning platforms requires a careful balance of pedagogical principles, learner characteristics, and technological alignment. In addition, it was emphasised that this complex interaction is crucial for maximising the potential of these platforms and achieving optimal learning outcomes.

Discussion

When technologies are integrated smoothly and thoughtfully, students not only become more interested but also begin to have better control over their learning. Effective technical integration changes the dynamics of classroom learning by encouraging student-centred project-based learning. In an era of digitisation and globalisation, teachers need to think about how they use technology with their students. Do they apply technologies in the classroom on a daily basis, using various tools to complete tasks and create projects that demonstrate a deep understanding of the content? If the teacher's answer is negative, the causes for this need to be addressed: insufficient access to technology, the teacher's ill-preparedness, lack of additional support in the class. Depending on the answer, the path to technical integration may differ, but it can successfully occur in any class. Teachers frequently succeed when they provide an opportunity to use technology in the classroom. The use of technologies for educational purposes gives various advantages and effects, but some may argue that not all effects are positive. The endless flow of information and entertainment available at any given time can be considered a distraction, but if the technology is integrated into a classroom with established procedures that are monitored or evaluated, the advantages of using technology in the classroom outweigh the disadvantages.

Active participation of students is a key part of any lesson plan. Regardless of whether students work independently or collaboratively, technology attracts students because it is interactive. Not all students learn and remember information in the same way or at a similar speed. Technology is an opportunity for teachers to differentiate learning in order to change information in accordance with the learning abilities of their students. The use of technology can also allow students to work at their own pace. Technologies have become an independent form of literacy due to their active use in everyday life. Many professions use at least one aspect of Microsoft Office or Google software every day: balancing budgets in spreadsheets, creating presentations or slide shows, or attaching documents to emails to convey important information. Learning and practising these skills by students will prepare them for life outside the classroom. The multifaceted nature and versatility of electronic independent learning hold the potential to significantly enhance the educational process. Nevertheless, to optimise its impact on student interaction and academic outcomes, educators and learners must strategically integrate this modality into the teaching and learning paradigm. P. Holzweias *et al.* (2014) posit that the efficacy of e-learning is contingent upon three key factors:

- teacher engagement: educators who effectively utilise digital tools to facilitate learning can foster meaningful interactions with students, cultivate a supportive learning environment, and creatively engage learners;
- student connection: given the potential for isolation in virtual learning environments, educators must proactively establish connections and build relationships with students to mitigate feelings of disengagement;
- technological infrastructure: the effectiveness of e-learning is also contingent upon the quality and suitability of the technological infrastructure employed.

Educational institutions should actively support the integration of online systems and platforms into their academic programs. As outlined by D. Babu & D. Sridevi (2018), effective online programs must incorporate principles of flexibility, learner-centred design, inverted classroom approaches, inclusivity, scalability, efficiency, and profitability. The design of online courses should

prioritise intuitive navigation, ensuring that students can effectively utilise links and interactive elements to engage with both instructors and peers. M. Sadeghi's (2019) research highlights the positive impact of online learning on student perception, as collaborative activities and knowledge-sharing opportunities foster a meaningful and engaging learning experience. The teaching-learning process, in conjunction with the learning platform, necessitates a diverse range of communication components, including masterclasses, knowledge presentations, and interactive questioning. O. Karintseva *et al.* (2020) emphasise the critical role of teacher communicative competence in facilitating effective educational processes. The utilisation of learning platforms addresses the unique requirements of independent and distance learning by providing opportunities for task creation, tailored material presentation, and the integration of virtual and traditional resources (Tejedor *et al.*, 2021).

The integration of internet platforms into traditional educational settings fosters a dynamic and interconnected learning environment that involves teachers, students, and subject matter. As highlighted by Y. Rizvi & A. Nabi (2021), fostering interaction among these key components is essential for promoting mediated learning. These platforms transcend the limitations of physical space and time, motivating learners, educators, and diverse groups while providing a rich array of learning opportunities. Comparative studies between in-person and online learning have consistently demonstrated the effectiveness of online modalities, particularly for students who may struggle to participate actively in traditional classroom settings. Unlike traditional education, independent online learning has gained prominence due to its flexibility and accessibility, offering learners the freedom to access educational resources at their convenience. This modality plays a pivotal role in enhancing the educational process by enabling personalised and adaptive learning experiences, fostering interaction and collaboration, and empowering students to learn at their own pace while engaging in meaningful discussions and knowledge exchange.

Comparative studies consistently highlight the efficiency and cost-effectiveness of online learning, which eliminates the need for physical commuting and provides access to readily available, up-to-date educational materials. Moreover, research examining the perceptions of students and teachers regarding e-learning has revealed that accessibility is widely regarded as a key advantage, surpassing other factors such as student orientation, flexibility, and collaboration (Guerrero *et al.*, 2021). While e-learning offers numerous benefits, it is essential to acknowledge potential drawbacks. Online learners may face challenges such as distractions, decreased concentration, and missed deadlines due to the virtual nature of the learning environment. Moreover, access to technology, including reliable internet connectivity and computers, is a prerequisite for effective e-learning, and technical difficulties can disrupt the learning process. For students, the self-directed nature of online learning can sometimes lead to decreased motivation due to the time and effort required for organisation. Additionally, the absence of physical interaction with peers and instructors can contribute to feelings of isolation. From a health perspective, prolonged screen time associated with online learning can increase the risk of vision problems, back pain, and reduced physical activity (Kim *et al.*, 2020). A comprehensive analysis of the literature reveals that while online learning offers certain advantages, exclusive reliance on this modality may diminish some of these benefits and amplify existing challenges. Students often report difficulties in information assimilation, concentration, and teaching effectiveness when learning exclusively online. Furthermore, presenting seminar projects in a virtual environment can be daunting for some students, who may fear public speaking and judgment from their peers. Even students who were actively engaged in face-to-face seminars may find it challenging to express their opinions or participate in online discussions due to feelings of vulnerability.

The challenges outlined in the research by S. Eze *et al.* (2020) align with the difficulties encountered by students in online learning environments. The lack of effective teaching strategies that foster concentration and engagement can contribute to student distractions and decreased focus. Additionally, environmental factors, such as noise and inadequate learning spaces, can further hinder concentration during online studies. Another significant disadvantage is the feeling of isolation that can arise from reduced face-to-face interaction, particularly with instructors. As highlighted by N. Morris *et al.* (2020), students often perceive online learning as less valuable than traditional classroom instruction, preferring a blended approach that combines both modalities. Furthermore, students may perceive online learning as less effective in terms of information assimilation and processing, potentially leading to diminished academic outcomes. While these challenges exist, the study suggests that the effectiveness of online learning can be significantly influenced by the quality of instruction and the suitability of course content. By adopting appropriate teaching methods and selecting well-designed courses, educators can mitigate the drawbacks of online learning and create a positive and productive learning experience.

A critical factor to consider is the extent of interaction between students and teachers within the online learning environment. As revealed by this study, students may experience a sense of isolation due to limited interaction with both peers and instructors. While e-learning platforms often incorporate video conferencing capabilities, these sessions may be constrained by scheduling limitations and small group sizes. Nonetheless, video conferences play a vital role in bridging the gap created by the absence of face-to-face interactions. To compensate for reduced personal communication, some educators effectively leverage team projects and collaborative learning tools. Students generally express a positive sentiment towards utilising the platform for independent study, recognising its value as a learning resource. However, technical challenges arising from institutional servers can sometimes lead students to opt for third-party platforms. When selecting online platforms, students prioritise features that enable extended video communication among multiple participants, minimise technical difficulties, and facilitate seamless interaction with both peers and instructors.

As outlined by the Technology Adoption Model (Spirin *et al.*, 2022), the adoption of e-learning platforms is influenced by the user-friendliness and perceived usefulness of the tools they provide. The findings of this study indicate that students encountered minimal difficulties when utilising the tools offered by these platforms, highlighting their intuitive and accessible nature. To further integrate internet platforms into the educational landscape, it is imperative to enhance existing tools and establish seamless integration with commonly used student and teacher applications. Social media platforms, such as Facebook, Snapchat, and Twitter, have become an integral part of contemporary communication and interaction. These platforms enable individuals to stay connected, informed, and engaged with the world, while also fostering creativity and personal expression. A significant number of educators recognise the value of social media as a means to expand their professional networks and access valuable resources. Given the ubiquitous nature of social media in students' daily lives, leveraging these platforms within the classroom emerges as a strategic approach to enhance the interactivity of the educational process and foster deeper engagement (De Moura *et al.*, 2021).

The integration of technology into education presents a paradigm-shifting opportunity to enhance teaching and learning practices. While the studies reviewed underscore the numerous advantages of technology, including increased student engagement, personalised learning, and expanded access to information, successful implementation necessitates careful consideration and deliberate efforts from various educational stakeholders. Key factors identified in the

discourse include robust teacher training, equitable access for all learners, and judicious selection of appropriate technological tools. Moreover, the research underscores the importance of a balanced perspective that acknowledges both the benefits and challenges inherent in online learning environments. To fully capitalise on the potential of technology, educational institutions must strategically invest in infrastructure, professional development, and research initiatives to ensure its seamless integration into the curriculum. By doing so, they can create innovative and effective learning experiences that equip students with the skills necessary to thrive in the digital age.

Conclusions

Based on the results of this study, conclusions can be drawn both at the practical and theoretical levels. On a practical level, the study offered a number of actionable recommendations for educators to improve the quality of online learning. Despite significant progress in addressing technical challenges in educational institutions, persistent problems with Internet connectivity, signal loss, and access to appropriate digital devices continue to hinder students, especially those living in rural or economically disadvantaged areas. To address these disparities, schools and universities must implement targeted programs aimed at bridging the digital divide and ensuring equitable access to educational opportunities for all students.

It found that to effectively navigate the evolving educational environment, it is necessary to implement targeted curricula that equip educators with the skills necessary to adapt to the transformative potential of online learning. raising awareness of the key role of technology in shaping the future of education is essential, emphasising a paradigm shift toward innovative student-teacher interactions. It was noted separately that teachers who are characterised by openness, flexibility and a desire for self-development are more likely to take an independent approach to professional growth and actively seek to improve their teaching methods. However, some teachers may resist the use of new technologies in the classroom, relying solely on the basic functions of e-learning platforms and following traditional teaching practices. Within the educational ecosystem, it has been identified that there is a reluctance of some educators to seek support in using specific platform tools, possibly due to concerns about recognising knowledge gaps. While technical prowess is undoubtedly important, educators must also possess the pedagogical skills necessary to adapt their teaching methods to the unique demands of the online environment. Future research should delve into the effective integration of artificial intelligence technology into the educational context, with a particular focus on strategies for organising students' independent work.

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Conflict of Interest

None.

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Інтернет-платформи у відкритому освітньому середовищі в організації самостійної роботи студентів

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Анотація. В епоху оцифрування та інформатизації відкриті освітні ресурси та технології є невід'ємним елементом навчальної інфраструктури, починаючи від подкастів і закінчуючи електронними бібліотеками, підручниками та іграми. Метою дослідження було вивчення різних інтернет-платформ у відкритому освітньому середовищі, призначених для самостійної роботи студентів. Для цього було використано методи аналізу, синтезу, порівняння, дедукції, систематизації та узагальнення. У результаті проведеного дослідження було виявлено широкий спектр інтернет-платформ, які роблять процес навчання інтерактивним та цікавим. Встановлено, що провідні позиції у світі займають міжнародні ресурси, багато з яких можуть бути перекладені на більшість поширених мов. Під час дослідження було проаналізовано основні платформи, їх переваги та недоліки. Отримані результати свідчили про те, що освітні ресурси постійно розвиваються, створюються нові, що дозволяє кожному вчителю знайти відповідний інструмент для впровадження у власний освітній підхід. Встановлено, що використання цих цифрових платформ значно покращує залучення студентів до освітньої системи та сприяє розвитку самоспрямованого навчання. Результати цього дослідження є цінною інформацією для викладачів вищих навчальних закладів, яка може дозволити їм оптимізувати структурування самостійної роботи студента. Крім того, ці результати можуть бути використані розробниками освітніх програм для бездоганної інтеграції інноваційних технологій у педагогічний процес. Зрештою, самі студенти можуть отримати користь від цього дослідження, вдосконалюючи свої стратегії самостійного навчання

Ключові слова: освітня діяльність; технології в освіті; інтеграційна діджиталізація; мережева модель