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Research article

Adapting the Education and Training System to Technological Evolution

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Abstract

Teachers have faced the challenge of adjusting their pedagogical approaches and teaching methods to help students with disabilities adapt to the distance education context, often without specific training or adequate resources. To address these challenges, the "Do IT Yourself" project aims to increase the involvement of students with disabilities in digital education. Its primary focus is promoting "innovative practices in the digital age" with a two-fold approach: encouraging social inclusion and using technological means to integrate vulnerable student groups. This study aims to highlight teachers' digitisation needs and the digital tools they use in the classroom. The data obtained supporting this quantitative study are part of the Erasmus Plus "Do It Yourself" project, of which Romania is a part, together with Portugal, Italy, Finland and Slovenia. The main objective of this study is to obtain data on the digitisation of education in Romania. The present study applies a research method that focuses on completing structured questions. In this research, 79 participants were involved, representing both pre-university teachers and school principals. The data collection process was carried out using a questionnaire consisting of 12 questions to evaluate the type of digital resources used in the teaching environment, the frequency of their use, and the level of training of the participants regarding the training courses for the integration of the tools digital or self-taught learning.

Keywords:
pedagogical approach; technology; education; learning; digital resources; pedagogy.

Zusammenfasung

Lehrkräfte standen vor der Herausforderung, ihre pädagogischen Ansätze und Lehrmethoden anzupassen, um Schülern mit Behinderungen bei der Anpassung an den Kontext des Fernunterrichts zu helfen, oft ohne spezielle Ausbildung oder angemessene Ressourcen. Um diesen Herausforderungen zu begegnen, zielt das Projekt „Do IT Yourself“ darauf ab, die Beteiligung von Studierenden mit Behinderungen an der digitalen Bildung zu erhöhen. Sein Hauptaugenmerk liegt auf der Förderung „innovativer Praktiken im digitalen Zeitalter“ mit einem zweifachen Ansatz: der Förderung der sozialen Inklusion und der Nutzung technologischer Mittel zur Integration gefährdeter Studentengruppen. Diese Studie zielt darauf ab, den Digitalisierungsbedarf von Lehrkräften und die digitalen Tools, die sie im Unterricht verwenden, hervorzuheben. Die für diese quantitative Studie gewonnenen Daten sind Teil des Erasmus Plus-Projekts „Do It Yourself“, an dem Rumänien zusammen mit Portugal, Italien, Finnland und Slowenien beteiligt ist. Das Hauptziel dieser Studie besteht darin, Daten zur Digitalisierung der Bildung in Rumänien zu erhalten. Die vorliegende Studie wendet eine Forschungsmethode an, die sich auf die Beantwortung strukturierter Fragen konzentriert. An dieser Untersuchung waren 79 Teilnehmer beteiligt, darunter sowohl voruniversitäre Lehrkräfte als auch Schulleiter. Der Datenerhebungsprozess wurde mithilfe eines Fragebogens durchgeführt, der aus 12 Fragen bestand, um die Art der im Unterrichtsumfeld verwendeten digitalen Ressourcen, die Häufigkeit ihrer Nutzung und den Schulungsstand der Teilnehmer in Bezug auf die Schulungen zur Integration der zu bewerten digitale Tools oder autodidaktisches Lernen.

Schlüsselworte:
pädagogischer Ansatz; Technologie; Bildung, Lernen; digitale Ressourcen; Pädagogik.

1. Introduction

The inexorable march of technological and digital evolution has fundamentally reshaped the dynamics of human interaction with information and the process of learning. Within this transformative context, education and training systems stand at a pivotal juncture, confronted by an array of formidable challenges and promising opportunities as they endeavor to recalibrate themselves in response to this evolving landscape. It is imperative for these systems to embark on a comprehensive reassessment of their theoretical underpinnings, meticulously realigning their strategies to ensure the delivery of education that remains pertinent and practical within an increasingly digitized world. The conventional, teacher-centric instructional model, a mainstay for centuries, is undergoing a profound metamorphosis, giving way to pedagogical approaches that place the student at the epicenter of the learning experience. Technology is not merely an accessory but an indispensable cornerstone in this shifting paradigm, enabling students to access an unprecedented wealth of information while concurrently nurturing the cultivation of critical thinking and problem-solving skills (Smith, 2018). This dynamic transformation underscores the urgency for educational institutions to embrace innovation and adapt to the ever-evolving educational landscape.

2. Theoretical foundation

One of the cornerstone theories guiding the transformation of educational systems in response to the ever-evolving technological landscape is constructivism. As elucidated by Piaget (1972), this theory posits that learning is a dynamic process unfolding as students construct knowledge based on their prior experiences and interactions within their social milieu. Within this framework, technology emerges as a powerful ally, as it can be seamlessly integrated into the educational journey to furnish students with interactive experiences and authentic learning environments. Such integration, in turn, fosters the cultivation of critical thinking and problem-solving skills, nurturing adaptable, tech-savvy learners.

Furthermore, the infusion of technology into education opens a Pandora's box of flexible and distance learning possibilities. Online learning platforms and collaborative tools have ushered in an era of unprecedented accessibility, enabling individuals to partake in educational pursuits at their own convenience, unfettered by geographical or socio-economic constraints (Garrison & Kanuka, 2021). However, maintaining a delicate equilibrium between virtual learning and the traditional classroom environment's social interactions becomes paramount (Rheingold, 2019). Striking this balance ensures that students benefit from the best of both worlds, reaping the rewards of technology's outreach while honing their interpersonal skills and enriching their educational experience with face-to-face encounters.

The incorporation of technology in education finds a solid theoretical foundation in connectivism, as proposed by Siemens in 2004. This paradigm contends that learning is inherently tied to the vast networks of connections and digital resources available in our modern age (Pascariu, 2017). In alignment with this model, education systems can harness the power of online resources, collaborative learning platforms, and social networks to foster learning environments where students can draw knowledge from diverse sources and refine their abilities to navigate the intricate digital landscape. In essence, this perspective underscores the importance of creating a learning ecosystem that is not confined to the boundaries of a traditional classroom but rather spans the vast digital expanse, enabling students to develop crucial digital literacy skills alongside their academic knowledge (Muntean, 2017).

The theory of differentiated pedagogy, articulated by Tomlinson in 1999, can seamlessly transition into the digital era, offering the potential for highly personalized instruction through technology. By meticulously analyzing the data generated by digital platforms, educators gain insights into the unique needs, learning paces, and preferences of each individual student. Armed with this information, they can adeptly tailor their teaching strategies, ensuring that students receive instruction that is finely tuned to their specific requirements. This personalized approach transcends the one-size-fits-all model, maximizing the potential for student success while fostering a more inclusive and supportive learning environment. In sum, the marriage of connectivism and differentiated pedagogy with technology in education not only broadens the horizons of learning but also enhances its depth, enabling students to navigate the digital realm while receiving instruction finely tuned to their distinctive needs. The theory of Constructivism, as originally proposed by Vygotsky in 1978, offers invaluable guidance for shaping the educational landscape in the digital age. The evolution of technology has paved the way for innovative educational tools, such as e-learning platforms, simulations, and educational games, which align perfectly with the core tenets of Constructivism. In this educational framework, students are regarded as active participants in their own learning journey, responsible for constructing knowledge through their experiences and interactions. In the digital realm, these experiences can manifest as immersive simulations, engaging e-learning modules, and interactive educational games. These technologies captivate students and facilitate practical skill development by providing hands-on experiences in a safe and controlled environment.

However, a well-rounded approach to digital education must encompass more than just practical skill development. The theory of critical pedagogy, first elucidated by Freire in 1970, plays a pivotal role in shaping the holistic development of students. Critical pedagogy emphasizes cultivating critical thinking skills, empowering students to become conscious and active citizens who can analyze and contribute meaningfully to society. In the digital landscape, technology has become a potent ally in this endeavor. It grants students access to a wealth of information, diverse perspectives, and a multitude of voices, fostering an environment where healthy debates and critical analysis thrive. By leveraging technology in this manner, educators can equip students with the tools and mindset necessary to engage with complex issues, challenge established

norms, and participate in constructive discourse (Muntean et al., 2021).

Constructivism theory (Vygotsky, 1978) can be applied to guide learning in the digital environment. E-learning platforms, simulations, and educational games can stimulate students' active participation and practical skill development.

The theory of critical pedagogy (Freire, 1970) can be brought up to ensure a well-balanced approach. This theory emphasises the importance of critical learning and developing critical thinking among students to transform them into conscious and active citizens. Technology can facilitate access to diverse information and multiple perspectives, encouraging debate and critical analysis.

3. Research methodology

The research method employed in this study is centered on utilizing a meticulously crafted structured questionnaire. This questionnaire has been designed to delve into various dimensions of incorporating technology within the educational realm. The cohort of participants selected for this research endeavour encompasses 79 individuals from the pre-university education system. Among these participants, we find a mix of educational professionals, including teachers and school principals.

The primary objective underpinning the deployment of this questionnaire, which consists of a comprehensive set of 12 inquiries, is to shed light on the multifaceted landscape of digital materials used in educational instruction. Additionally, it endeavours to discern the frequency with which these digital resources are integrated into the teaching and learning processes.

Beyond merely scrutinizing the technical facets of technology integration in education, our study takes a holistic approach by honing in on the participants' professional development with regard to technology. The questionnaire thoughtfully encompasses inquiries about the participants' engagement in training programs geared towards harnessing digital tools in education. Moreover, it delves into their self-perceived confidence levels concerning their aptitude for self-directed learning within this technological context. This multi-dimensional approach ensures a comprehensive examination of the influence of technology on the educational landscape, encompassing both its practical application and the preparedness of educational professionals to embrace its advantages. The study conducted in Romania regarding the use of digital technologies in education. It includes various tables, graphs, and survey questions along with responses. Here's a summary of the key findings from the data:

Participants' Positions: The study included participants from Romania, primarily educators/teachers (93.7%). A smaller percentage included school managers/department heads (5.1%) and other education system employees (1.3%).

Table 1. Participant batch from Romania

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Educator/Teacher	74	93.7	93.7	93.7
	Other	1	1.3	1.3	94.9
	School manager/Head of the department	4	5.1	5.1	100.0
	Total	79	100.0	100.0	

Use of Digital Lessons: Most participants (94.9%) from Romania reported using digital tools and digital lessons in their teaching, learning, and school assessment activities. This suggests a strong adoption of digital teaching methods in Romanian educational institutions.

Table 2. The use of digital lessons in school-type activities in educational institutions in Romania

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	5.1	5.1	5.1
	Yes	75	94.9	94.9	100.0
	Total	79	100.0	100.0	

Ways to Implement Digital Lessons: The primary ways participants in Romania implemented digital lessons in school activities were through videos (38%), interactive content (35.4%), and online teacher's digital teaching materials (21.5%).

Table 3. Ways to implement digital lessons in school activities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	As interactive content	28	35.4	35.4	35.4
	As videos	30	38.0	38.0	73.4
	As virtual reality technology	1	1.3	1.3	74.7
	I don't teach digitally	1	1.3	1.3	75.9

	No	1	1.3	1.3	77.2
	Online teacher's digital teaching material	17	21.5	21.5	98.7
	As PDFs,	1	1.3	1.3	100.0
	Total	79	100.0	100.0	

Digital Technologies in the Classroom: The most commonly used digital technologies in the classroom by Romanian participants were computers/laptops (55.7%), smartboards, tablets with apps (12.7%), and smartphones (11.4%).

Table 1.4. The categories of digital technologies used in the classroom in educational institutions in Romania

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	computers, Smartboards, Tablets with apps	2	2.5	2.5	2.5
	Computers/laptops	44	55.7	55.7	58.2
	Interactive online software (3D)	1	1.3	1.3	59.5
	No	2	2.5	2.5	62.0
	Smart boards	10	12.7	12.7	74.7
	Smartphones	9	11.4	11.4	86.1
	Tablets with apps	10	12.7	12.7	98.7
	the teacher uses	1	1.3	1.3	100.0
	Total	79	100.0	100.0	

4. Results

The results of this study could provide significant insight into how teachers and school principals integrate technology into the educational environment. By analysing the answers to the questionnaire, a deeper understanding of the types of digital materials preferred, the frequency of their use and the professional training needs in this area can be gained. Thus, the study can contribute to the future development of continuous training strategies and educational policies to support a more effective and beneficial integration of technology in the learning and teaching process.

The recent study on the use of technology in the education system has provided significant insight into how educators and teachers approach modern teaching and learning methods. The results of this study revealed that the majority of participants (93.7%) are educators or teachers, which underlines the commitment of the educational community to exploring and implementing technological innovations in the educational process.

Among the findings, a significant proportion (94.9%) of participants were found to integrate digital tools and digital lessons in their teaching, learning and assessment activities. This approach indicates an increased concern for adopting didactic strategies based on modern digital technologies, aiming to stimulate students' interest and involvement in lessons.

Regarding preferred technologies for classroom use, students indicated that using computers/laptops was the most prevalent (55.7%). They also mentioned using bright tables and tablets with apps (12.7%), and a small percentage opted for smartphones (11.4%). Less commonly used technologies included 3D online interactive software (1.3%). Our study on integrating technology in education highlights the commitment of teachers to adopting technological innovations. About 94.9% of respondents use digital tools in their teaching activities, highlighting an increased interest in technology-based strategies. The majority preference for computers/laptops (55.7%) and other devices underlines the diversity of tools used.

However, there are challenges related to the availability and relevance of digital educational materials. While 62% believe that a wide range of resources are available, 34.2% believe that they do not always fit the school context. Thus, despite the progress made, a careful approach is needed to ensure an effective integration of technology in the learning and teaching process, supported by continuous training and well-founded educational strategies.

5. Conclusions

Overall, these findings highlight the positive shift towards technology integration in the Romanian education system. It is evident that digital tools and resources have become integral components of the teaching and learning process. The prevalence of digital materials and the wide variety of technologies used in the classroom signify a commitment to creating dynamic and engaging learning environments.

One of the notable aspects of this study is the focus on professional development. The survey examined participants' engagement in training programs aimed at enhancing their digital skills and their confidence levels in self-directed learning within a technological context. This dual approach not only assesses the practical application of technology but also the preparedness of educators to adapt to a rapidly

evolving digital landscape. Such insights are crucial as they can inform future strategies for professional development and educational policy.

The study's findings hold valuable implications for the future of education in Romania and beyond. They emphasize the importance of ongoing training for educators, which is essential for ensuring that teachers remain well-equipped to harness the full potential of digital tools. Furthermore, the strong integration of digital materials into teaching practices reflects a commitment to providing students with a well-rounded, modern education that aligns with the demands of the 21st century.

In conclusion, the study underscores the ongoing transformation of education in response to the digital age. It provides evidence that Romanian educators are actively embracing technology and adapting their teaching methods to create more interactive and effective learning experiences. As the education landscape continues to evolve, this research serves as a valuable resource for shaping policies and strategies that will enhance the integration of technology in education and ultimately benefit both educators and students.

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