BARRIERS TO DIGITALIZATION IN A PRESCHOOL INSTITUTION

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Abstract

This thesis explores the barriers to implementing digital applications in a small group setting from the perspective of early childhood care and education organizations. The author discusses the benefits and challenges of digitalization in early childhood education institutions and maps the current opportunities and limits in transforming some traditional practices into digital form, with an emphasis on defining the barriers from the perspective of educators. The study defines the barriers to the implementation of digital applications from the perspective of direct participants in the educational process, from the perspective of school management and educators. A mixed method research design was used for the study, which draws conclusions using quantitative and qualitative methods based on the principle of sequential design implemented in two steps, a questionnaire survey among respondents and direct observation of the phenomenon under study. The study concludes that although digitalization in early childhood education offers significant potential for improving learning and development, it also presents challenges that need to be addressed through careful implementation, teacher training and ongoing research. Barriers to digitalization in pre-school are mainly inadequate equipment (resources) on the part of schools, insufficient teacher qualifications, and perceived attitudes of teachers and parents towards the use of digital technologies in early learning.

Keywords: Pre-school, ICT, digitalization.

1. Introduction

Preschool age is a very important developmental stage in a person's life, which affects the whole future life. It is the age of play, of close attachment to a caring person, it is the time when a person's involvement in society is emerging, when innate potential is developing, it is the age when basic life needs need to be met. Digital technologies are becoming part of school policy in most European countries, learning in the age of digitalization carries the potential to promote changes in education, leading to thinking about so-called modern pedagogy, the context of educational research is changing as a result of digitalization. Digital competence is becoming a key cross-cutting competence in the Czech Republic (Neumajer, 2014) and most European countries (MŠMT, 2020), it would be interesting to compare the state of digitalization of Czech schools with other countries. Caregivers often use technology as babysitters (Lafton, 2015), parents gain time for their responsibilities through digital play (Magdalena et al., 2023), increasing numbers of children can use a mobile phone before they can talk (Sundus, 2018) , the average length of screen use can be up to two hours per day (Stewart et al., 2019). Digitalization is a growing trend (Atış Akyol et al., 2023), which aims to incorporate digital technologies (Tan & Mo, 2024). The process brings with it both opportunities and challenges as it seeks to improve educational outcomes while addressing concerns about potential negative impacts on young children (Paulus & Gerstner, 2023). A large-scale study in European schools has shown that the level of digitalization is improving, but many barriers remain, not only on the material side, but also on the operational and human side. Based on the above, this study will mainly address these research questions.

2. Literary research

The current rapid rise in the capabilities of digital technologies is affecting many areas of our lives, digitalization is not only present especially in industry, commerce, services, but is also gaining a prominent place in the field of education (Richert et al., 2016). The current digital world makes demands for a positive attitude towards the adoption of information technology and its aspects are also entering the education sector (Kundu et al., 2022). Digital technology in education has the potential to develop the effectiveness

of the learning process (Alia & Irwansyah, 2018), however, in preschool it is good to keep in mind the potential threats of exposure to digital technologies (Nurdiantami & Agil, 2020). Digitalization in early childhood education and evaluation offers not only the benefits of new possibilities and approaches to the educational process, benefits for students (Chen & Ding, 2024), but it is also important to be aware of the challenges associated with digitalization (Shykyrynska et al., 2024), which have a major impact on the effectiveness and way of educating preschoolers and the role of educators (Ciarko & Paluch-Dybe, 2021). Educational methods themselves have also seen rapid developments, such as open courses, personalized learning and gamification (Kursch, 2018) and the focus of society on creating optimal educational environments (Ciarko & Paluch-Dybe, 2021) or diversifying them (Otterborn et al., 2024). Digital technologies can improve learning outcomes, make learning more effective especially in mathematical (Preradovic et al., 2016) as well as the development of computational thinking (Su et al., 2024), literacy (Rakhimova et al., 2024) and social skills (Yadav & Vyas, 2021), emotional intelligence (Iksanova, 2022), the development of creativity (Kavak et al., 2024), and the quality of education of educators themselves (Yang, 2024), thus depending on the digital skills of educators. Preschool children are in quite intensive contact with digital technologies from early childhood(Palaiologou, 2016), i.e. they possess a certain level of computer literacy (Su, 2024), i.e. it is in the hands of families and especially young educators to work with this fact (Zevenbergen, 2007), for example through the teaching method of digital games (Behnamnia et al., 2023) , where children's increasingly frequent contact with digital devices can be taken into account (Pervolaraki et al., 2016).

The integration of digital technologies in preschool and early childhood education therefore presents both opportunities and challenges, as mentioned above. The strongest debate is generated by those who consider computers to be detrimental to health and learning, and those who believe that computers can be a key asset for children's social and intellectual development. An example of the conservative approach in the U.S. is the view of the Alliance for Childhood (Cordes & Miller, 2000), which calls for an immediate moratorium on the further introduction of computers in early childhood, except in the special cases of students with disabilities.

3. Data and methods

Based on the literature search, the main barriers to the implementation of digital technologies in kindergartens appear to be parameters in the following areas - technical barriers, barriers on the part of teachers, low digital competence, lack of training, lack of methodological materials, and inconsistency with traditional pedagogical methods. Last but not least, personal barriers, fear, mistrust, attitudes, low motivation and organizational and systemic barriers. At the same time, the relatively short time to define the risks for the children themselves and the associated cultural and social barriers in terms of the ambiguity of the impact of digitalization. Based on this research question - **RQ1:** What technical, financial, organizational or educational barriers do schools perceive to the adoption of new technologies and digitalization of learning? The following hypotheses were established:

H1: If teachers have the opportunity to use a sufficiently equipped classroom for teaching with digital technologies, they include these teaching methods more often.

H2: If teachers are supported with training opportunities in digital competences, they feel more confident in teaching children and use digital teaching methods more often.

Thus, the research aims to describe the main obstacles that hinder the implementation or integration of digital technologies in the environment of pre-school education institutions, kindergartens, children's groups mainly from the perspective of school management and teachers, from the perspective of the school organization. The aim of the research is to identify the main barriers (from the perspective of direct participants in the pedagogical process) that affect the implementation of digital technologies in the teaching and daily practice of preschool institutions, with the sub-goal of providing suggestions for overcoming these barriers. It seems optimal to design the research as a mixed-method study according to Tashakkori & Creswell (2007), who defined mixed-method research as "research in which the researcher collects and analyzes data, integrates findings, and draws conclusions using both qualitative and quantitative methods". Mixed methods research can facilitate a deeper understanding of research questions (Akyar et al., 2024). The research procedure is designed based on the principle of sequential design, implemented in two steps. The first step is data collection through a questionnaire and then data collection through observation of the phenomenon under study, which is done in order to clarify the situation more accurately. The questionnaire survey was conducted in 2025 among nannies and preschool teachers, employees of a non-profit organization providing preschool education in the country. The questionnaire on preschool teachers' attitudes towards ICT consists of three parts.

4. Results

Children may have better motor skills, better cognitive skills and competitive skills, while conversely, children may face serious problems such as speech delays, attention deficits, learning problems, even mental disorders that can impact their characters. Therefore, serious attention is needed from the environment where children grow and develop such as parents, caregivers, early childhood educators and the community holistically to minimize the negative effects of the internet on their character and moral edifice. The conclusions of this paper are in line with those of a large study in European countries. Teachers still believe that the biggest barrier to ICT use is lack of equipment, ICT is used for lesson preparation rather than actual teaching, and teacher training in ICT is rarely compulsory. If schools combine policies on the integration of ICT into teaching and learning, this area is more widely used by pupils and teachers, but most schools do not yet have such an overarching policy and this area awaits more radical change (Commission et al., 2013) Virtually all primary and secondary schools in the Czech Republic are already equipped with computers, with 24 computers per 100 pupils in 2023. Over 46% of schools operate a school information system and 75% of schools provide their own internet connection. Almost 100% of Czech students have a smartphone and use it to connect to the internet. Therefore, investment in technical equipment, the organization of regular training courses on digital literacy for teachers and, last but not least, the introduction of support programmes at national or regional level seems to be suggestions for improvement. Based on this brief initial research exploration, the possibilities for further research open up; in particular, it would be useful to investigate the impact of digitalization on learning outcomes in pre-school institutions, or the effectiveness of training.

5. Discussion and conclusion

Similarly to the study (Çelik et al., 2023), barriers within the sub-themes of physical conditions, teacher-parent collaboration, administrative barriers, policies and teachers' beliefs and opinions, and teachers' competencies appear to be barriers in the Czech context. Teachers encountered the following problems in incorporating digital tools in their teaching such as classroom facilities, lack of variety of digital tools in the school, parents' biases, lack of knowledge and negative attitudes towards the use of digital tools. As mentioned above, the digitalization of early childhood education presents both opportunities and challenges. While digital tools can enhance learning(Marklund, 2022), adapt to change and prepare children for the future (Çelik et al., 2023), their implementation faces several obstacles. These include insufficient facilities and connections, lack of teacher competence and lack of administrative support (Area-Moreira et al., 2020). Teachers' beliefs and pedagogical philosophies also play a crucial role, with many not fully exploiting the potential of ICT (Magen-Nagar & Firstater, 2019). The integration of digital technologies in kindergartens varies, reflecting different views on democracy and digital competence, digital tools can enhance social learning and inclusion in science education, but concerns remain about their impact on children's well-being and social development (Fleer, 2017) .

The results of this study confirm that digitalization in pre-school education has significant potential, but its implementation faces a number of barriers. Key barriers are the technical limitations of schools, low digital competences of teachers and persistent scepticism among some professionals. The analysis shows that effective integration of digital technologies into the educational process requires not only adequate technological infrastructure, but above all systematic training of teaching staff and well-thought-out implementation strategies. The study also pointed out that digitization can have a positive impact on the development of children's cognitive abilities if it is used adequately to their age needs. Although digitalization offers new opportunities to personalise learning and to assess pupils' progress more effectively, the extent to which technology should be integrated into early education remains a question. This issue requires further research focusing on the long-term implications of the use of digital technologies in early childhood settings. Recommendations based on this study include investing in technical equipment in schools, developing comprehensive methodological materials for teachers and introducing across-the-board training programmes aimed at developing teachers' digital competences. Research on measuring the effectiveness of digital tools in pre-primary education also needs to be strengthened in order to accurately identify their benefits and potential risks. Only in this way can it be ensured that digitalization will not only represent an administrative or technical challenge, but a real qualitative contribution to the educational process of the youngest generation.

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