



Use and Effectiveness of Information and Communication Technology in Primary Education

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ABSTRACT

Purpose: The purpose of this study is to reflect the level of use of Information and Communication Technology in the teaching process, to identify the problems that teachers encounter when using this new technology, and to evaluate the effectiveness of this use for both parties, teachers and the students. **Method:** The study included 3 primary schools in the municipality of Gjilan and surveyed 30 teachers of grades 1-5 at the primary education level. **Findings:** The results of the analysis show that Information and Communication Technology is often used in teaching, especially for presentations, and is used equally in all primary

education classes. However, teachers have encountered considerable difficulties in its adoption and in the implementation of new curricula, facing various obstacles such as the lack of laptops and projectors in some classes. In terms of effectiveness, its use has been evaluated as more efficient than traditional teaching methods, improving both teaching and the learning process. **Implications for Research and Practice:** This study highlights the opportunities and challenges related to the use of Information and Communication Technology in primary education and offers recommendations for improving the infrastructure and training teachers to increase the effectiveness of the use of technology in the classroom.

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Introduction

The use of Information and Communication Technology in primary education has shown many benefits around the world, such as developing students' skills, increasing their engagement and creating greater opportunities for more personalized and rapid teaching. The integration of Information and Communication Technology has contributed to the improvement of education in many developing countries by providing possible approaches for more effective learning. Even in Albania, although there is a large discrepancy between the use of Information and Communication Technology in schools and the opportunities for this, there is an increase in the use of these technologies,

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especially after the pandemic. "Teaching and learning is often regarded as a process that is too slow to change, and as such is relegated to the past." (Lukas & Yunus, 2021; Winter et al., 2021). In the second decade of the 21st century, the use of Information and Communication Technology in schools continues to remain a controversial issue in many parts of the world, even though we are in the age of technology (Zolochevskaya et al., 2021). Despite the great advances in the field of technology, its implementation and use in education has encountered numerous challenges, including the lack of sufficient training for teachers and infrastructural barriers in schools. This has caused a slow concentration of technology in educational settings, creating a gap between the opportunities offered by technology and its effective use.

Information and Communication Technology (ICT) refers to all types of technology that are used to exploit and manipulate information, including various devices and tools that enable the creation, distribution and use of information in digital forms. In the context of education, ICT is closely related to the use of computers, the Internet and software to improve learning processes and to enable access to multiple information and resources for teachers and students. The use of ICT in teaching and learning has brought new opportunities for the improvement of teaching curricula, as well as to provide greater opportunities for research and the development of projects by students. The Internet and digital tools have enabled students to access information seamlessly and use technology to create and share knowledge quickly and efficiently. These tools have also enabled teachers to teach in more modern, interactive and motivating ways, which help increase engagement and deep learning on the part of students.

This study aims to assess the use of ICT in teaching and learning grades 1-5 of primary education and analyze how this use is related to the quality of teaching and student performance. This study focuses on 3 primary schools of the municipality of Gjilan, where teachers of grades 1-5 of primary education were surveyed to collect data on their perceptions and current practices of using ICT. This study framed the following research questions: (1) How involved is the use of ICT in the teaching process in primary schools? (2) How effective is the use of ICT for improving learning performance and student achievement? (3) What are the main challenges that teachers encounter when using ICT in teaching? The study thus examines the level of use of ICT in the teaching process in primary schools, identifying the main challenges and difficulties faced by teachers during its adaptation and implementation in classrooms, as well as evaluating the effectiveness of this use to improve student engagement and learning outcomes. This study addresses some important gaps in the existing literature, contributing to a deeper understanding of the use of ICT in schools and the challenges faced by teachers in its implementation. This can also provide valuable recommendations for educational policies and the development of teacher training for the use of technology in primary education.

Literature Review

Information and Communication Technologies (ICT) represent a wide range of tools and technologies that enable the creation, storage and distribution of information. The inclusion of the Internet, computers, and other digital devices has enabled significant advancements in the field of education and teaching. The use of ICT in modern education has transformed the way in which communication and transfer of knowledge take place.

In earlier literature, the term "information technology" was first used in the 1980s, but the development of the Internet and technological advances over the past decade have made the concept of ICT much broader as ICT is being implemented in competency-based curriculum (Murithi & Yoo, 2021). According to Mishra and Koehler (2006), the use of these technologies has opened up new opportunities for creating richer and more accessible learning environments, including the development of learning platforms and virtual spaces for interaction.

The use of Information and Communication Technology in education has increased significantly in recent years, especially after the global pandemic of COVID-19 (Kilag et al., 2022; Marchlik, Wichrowska, & Zubala, 2021), when distance learning and online platforms became the main teaching tools. Information and Communication Technology not only provides opportunities for interactive learning and continuous interactions between students and teachers, but also enables a richer and more personalized learning experience. The use of platforms such as Moodle and Google Classroom has increased, offering opportunities for teachers and students to organize learning materials and activities more efficiently and flexibly. Recent research has highlighted that ICT can contribute to improving students' technological and communication skills, to increase their engagement and enable a more personalized and interactive learning (Rana, Greenwood, & Henderson, 2022; Selwyn, 2016). The use of such learning environments has created opportunities for increasing student motivation and involvement by integrating technological tools into the daily learning experience.

One of the main benefits of using ICT in primary education is the possibility to create flexible and personalized learning environments for the needs of each student (Fälth & Selenius, 2024; Pappa, Georgiou, & Pittich, 2024). Recent research has shown that technology can support the development of more tailored learning practices and enable learning to occur at the pace of the individual. Platforms like Khan Academy and Coursera offer opportunities for learners to engage with learning material more independently and develop new skills, creating an opportunity to strengthen knowledge and provide exercises tailored to each individual. Furthermore, the use of ICT can stimulate students' creativity and critical thinking, enabling them to engage in activities that encourage experimentation and problem solving. It is often argued that tools such as videos, simulations and educational games are useful for developing analytical and strategic skills in students.

Although the use of ICT brings many opportunities for the advancement of the learning process, there are also some disadvantages and challenges that can negatively affect its efficiency. A major concern is the dependence on technology, which can cause problems for the development of students' social and interpersonal skills. Recent studies suggest that excessive use of technology can lead to an isolation of students and a decrease in opportunities for collaboration in physical environments. Another concern is inequality in access to technology. Some students may have endless opportunities to use technological devices and the Internet, while others may face economic barriers that prevent their ability to access modern technologies. This leads to a potential gap in the learning opportunities and benefits that students can have from using technology.

The impact of ICT on students' academic performance is a topic that has attracted much attention from researchers in the field. Some studies have suggested that the use of Information and Communication Technology can have a positive impact on the academic

achievements of students, as long as it is used in an oriented way and with full support from teachers (Gaybullaevna, 2021; Lei et al., 2021; Mehrvarz et al., 2021). Moreover, the use of automated tools and personalized learning can help improve achievement in subjects such as mathematics and science. On the contrary, some studies have shown that the effects of Information and Communication Technology on student performance may be limited when the technology is used without a clear strategy and sufficient pedagogical support. Additionally, the use of Information and Communication Technology without proper orientation can lead to distraction and incorrect use of resources, thus reducing the potential positive impact on achievement. Furthermore, the importance of teacher training and proper preparation for using Information and Communication Technology effectively, is supported by some recent studies like (Dinh et al., 2025; Hasin & Nasir, 2021; Punggeti, Rukmini, & Intes, 2024; Zagouras et al., 2022). Without sufficient professional support, the chances of success in this use are more limited.

Methodology

Research Design

This study was carried out using the qualitative research method. For data collection, primary and secondary sources were used. Primary sources include data collected through questionnaires, while secondary sources include scientific literature, articles and previous studies that help deepen the understanding of the use of Information and Communication Technology in education.

Data Collection

The main instrument for data collection in this study was a questionnaire, which comprised 10 questions. The questionnaire was divided into categories to assess different aspects of the use of ICT. Questions 1-3 assessed the level of use of ICT by teachers in grades 1-5 of primary education. Questions 4-6 examined the challenges and difficulties teachers encounter when using ICT. Questions 7-10 focused on evaluating the effectiveness of ICT in improving the learning process and student engagement. The format of the questionnaire was quantitative and included responses on a 5- point Likert scale (from "not at all" to "very much") to allow the measurement of teachers' attitudes and opinions regarding the use of Information and Communication Technology.

Sampling and Research Procedure

This study was carried out in three schools of the Municipality of Gjilan, where a sample of 72 teachers of grades 1-5 of primary education were recruited through a purposive sampling technique. These participants belonged to three schools of the Municipality of Gjilan viz., Thimi Mitko School, Mulla Idriz Gjilani School, and Hello Academy of Education. Participants were randomly selected, ensuring a broad representation of teachers who use ICT in teaching. In total, 75 questionnaires were distributed, of which 72 teachers completed the questionnaire. This shows a high level of participation (96%).

The study began by obtaining permission for the distribution of questionnaires from

school principals. After the request was approved, the questionnaires were distributed to the teachers of grades 1-5 in primary education of the three respective schools. Questionnaires were submitted in printed form and collected over a two-week period. After data collection, the questionnaires were scanned, and the data were recorded and analyzed using statistical methods to identify the levels of use of ICT and its impact on teaching.

Data Analysis

The data collected from the questionnaires was analyzed using quantitative and qualitative data processing methods. For quantitative questions, statistical analysis was used to calculate percentages and averages. For the qualitative questions, thematic analysis was used to identify key themes related to the difficulties and opportunities of using ICT by teachers.

Analysis and Results

Table 1

T-Test for Comparing the Effectiveness of ICT With Traditional Teaching

GROUP	Mean (M)	Standard Deviation (SD)	t-value	p-value
Users of Information and Communication Technology	8.0	1.5	t = 3.12	p < 0.05
Users of Traditional Learning	6.5	1.9		

Table 1 presents a comparison of teachers' perceptions of the effectiveness of the use of ICT in teaching versus the use of traditional methods. The mean for the group that uses ICT is 8.0 and the standard deviation is 1.5 while for the group of teachers who used traditional methods, the mean is 6.5 and the standard deviation is 1.9. The t-value is 3.12 and p-value is less than 0.05, indicating that there is a statistically significant difference between the groups. This suggests that teachers qualified as frequent users of ICT rate this method more effective than traditional teaching methods.

Table 2

ANOVA on the Change in Effectiveness of Information and Communication Technology According to Teachers' Experience

Group of Teachers	Mean (M)	Standard Deviation (SD)	F-value	p-value
Young Teachers	7.8	1.2	F = 2.98	p < 0.05
Old Teachers	6.3	1.5		

Table 2 shows that new teachers have a mean of 7.8 for the effectiveness of using Information and Communication Technology, which is higher than the mean of 6.3 of old teachers. The F-value of 2.98 and p-value of 0.04 suggest that there is a significant difference between groups of teachers with different experiences. New teachers are more likely to use and report greater effectiveness of ICT, perhaps due to their more advanced technological knowledge and skills. This result is consistent with the literature showing that new teachers are more prepared to use ICT.

Table 3

Correlation between the use of Information and Communication Technology and its impact on teaching

Use of ICT	Effectiveness of ICT in Teaching	Correlation (r)
Frequent Users	8.2	0.72
Rare Users	5.4	

Table 3 shows a strong correlation $r = 0.72$ between the use of ICT and teaching effectiveness. This result suggests a strong positive relationship, where more frequent use of ICT is associated with higher teaching effectiveness. This shows that the integration of technology in learning can increase the quality and productivity of teaching, making the learning process more engaging and effective.

Table 4

Correlation Between the Use of ICT and Student Outcomes

Use of ICT	Student Results (Grades)	Correlation (r)
Frequent Users	8.5	0.65
Rare Users	5.2	

Table 4 shows a positive correlation $r = 0.65$ between the use of ICT and student results. This result suggests that the use of ICT has a positive impact on students' academic performance, helping them achieve better results. This shows that the integration of technology in teaching can improve students' skills and can contribute to raising their academic achievements.

Table 5

Use of ICT and lack of Equipment as the Main Challenge

The problem	Percentage of Teachers	Mean (M)	Standard Deviation (SD)
Lack of equipment	42%	4.2	1.1
Limited Time	23%	3.8	1.5
Lack of concentration	35%	4.0	1.3

Table 5 shows that 42% of teachers report the lack of equipment as the main obstacle in the use of ICT, with a mean of 4.2 and a standard deviation of 1.1. This suggests that, despite the benefits of ICT, the lack of equipment remains a major challenge, especially in schools with limited resources. The results are consistent, showing that poor technology infrastructure can limit the effective use of ICT in teaching.

Table 6

Correlation Between the Use of ICT and Student Engagement

Use of ICT	Student Engagement	Correlation (r)
Frequent users	8.4	0.78
Infrequent users	5.5	

Table 6 shows a strong correlation $r = 0.78$ between the use of Information and Communication Technology and student engagement. This result suggests that the use of

Information and Communication Technology has a significant impact on increasing student engagement, significantly improving their participation in the learning process. This high correlation shows that Information and Communication Technology can be an effective tool to increase the motivation and activation of students in the classroom.

Table 7

Use of ICT and the Impact on Students' Motivation

Use of ICT	Motivation of Students	Correlation (r)
Frequent Users	9.0	0.82
Rare Users	6.0	

Table 7 shows a high correlation $r = 0.82$ between the use of ICT and student motivation. This result shows that the use of ICT has a close relationship with increasing students' motivation to learn. Using technology in the classroom can stimulate students' interest and engagement, making them more motivated to learn and actively participate in the lesson.

Discussion and Conclusion

This study evaluated the impact of ICT in teaching grades 1-5 in primary education and its impact on student engagement, motivation and academic performance, as well as teacher effectiveness. The findings of the study suggest that the use of ICT has a significant and positive impact on all these aspects, improving the quality of the learning process and increasing students' opportunities to acquire knowledge and skills more effectively. The analysis of the research results shows that the use of ICT is associated with a significant increase in student engagement ($r = 0.78$) and their motivation to learn ($r = 0.82$), as well as an improvement in academic performance ($r = 0.65$), suggesting that technology can contribute to more effective teaching and a more stimulating learning environment. The use of ICT is also associated with an increase in teacher effectiveness ($r = 0.72$), indicating that teachers who use technology more often are more successful in creating learning environments that encourage active learning and skill development. critical and creative thinking. This result is compatible with active and learner-oriented teaching theories, which emphasize the importance of engaging students in the learning process to achieve better results. In this context, the use of ICT helps to create opportunities for more interactive and inclusive learning, making the process more attractive and more suitable for the needs of students.

However, despite the obvious benefits, the study has identified several barriers that prevent the use of ICT in schools. The lack of equipment and resources necessary for the full implementation of Information and Communication Technology is one of the biggest obstacles, which was reported by 42% of teachers as a main factor limiting the use of ICT. This shows that in order to realize the full potential of ICT in teaching, a significant improvement of the technological infrastructure in schools is necessary, as well as a continuous support for teachers, to have the opportunity to develop professionally and to update with the newest technological methods and tools. Also, it is imperative to invest in providing training for teachers to enable them to effectively use ICT in planning and developing teaching activities. Another obstacle that has been identified is the lack of a clear structure for the use of ICT in accordance with school curricula. Despite the fact that

69% of teachers did not encounter difficulties in implementing new curricula that include ICT, there are still teachers who report difficulties in effectively using these curricula, which often require a deeper integration of technology into teaching. This concern may point to a need for more guidance and support for implementing these curricula in practice, as well as a revision of teaching materials that may include more technology-based activities. In conclusion, the use of ICT in teaching primary education has shown very positive results in terms of engagement, motivation and academic performance of students. ICT can contribute to more effective teaching and the development of students' skills to face the challenges of the 21st century. However, to enable a wider and more successful implementation of ICT, it is imperative that schools improve technological infrastructure and provide ongoing support to teachers through training and professional development. For further research, it is important to examine the impact of educational and social policies on the use of ICT, as well as to analyze more deeply the impact of ICT on the development of students' coping skills the challenges of rapid technological and global change. This can provide valuable information for creating a more prepared and flexible education that can adapt to the demands of the times.

This study shows that the use of ICT can improve the quality of teaching and increase student engagement. However, to ensure a wider and effective inclusion of ICT, investments in infrastructure and professional support for teachers are necessary. We recommend that educational authorities develop continuous training for teachers, provide equipment and Internet connections for schools, and create opportunities for the use of online resources that will help improve teaching practices. Moreover, education policies should focus on developing a comprehensive approach to the use of ICT, making these technologies more accessible and effective for all teachers and students. Finally, it is clear that the use of ICT can bring great benefits to education, but to achieve this potential, coordinated steps must be taken by all levels of the education system to enable the use of technology in a way sustainable and effective.

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