

## ANALYSIS OF THE ADVANTAGES AND CHALLENGES OF INFORMATION COMMUNICATION TECHNOLOGY-BASED LEARNING IN ELEMENTARY SCHOOLS

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### Abstract

This study aims to examine in depth the advantages of Information and Communication Technology (ICT)-based learning at the elementary school level. ICT-based learning in elementary schools refers to the integration of information and communication technology in the learning process. The government has adopted initiatives to bring ICT into the basic education curriculum. The population in this study consisted of teachers, students and related parties at Sekolah Dasar Negeri Maguwoharjo 1, Sleman Regency, Yogyakarta. The use of ICT allows wider access to distance learning, increases student learning motivation, makes it easier to understand material, and facilitates independent learning. Apart from that, teachers also find it easy to convey lesson material and minimize their shortcomings in coordinating the class. The use of ICT also provides easier access to learning resources, enriches learning, and facilitates the creation of important documents. Teachers need to address the challenges of technical preparation, device and internet accessibility, and changes in teaching methods. Schools must face the challenges of investment in ICT infrastructure, staff and teacher training, as well as unstable electricity issues. In facing these challenges, support from schools, teachers and other interested parties is very important to ensure the successful implementation of ICT-based learning.

**Keywords:** Advantages, challenges, ICT, elementary school

### Abstrak

Penelitian ini bertujuan untuk mengkaji secara mendalam keunggulan pembelajaran berbasis Teknologi Informasi dan Komunikasi (TIK) pada tingkat sekolah dasar. Pembelajaran berbasis ICT di sekolah dasar mengacu pada integrasi teknologi informasi dan komunikasi dalam proses pembelajaran. Pemerintah telah mengambil inisiatif untuk memasukkan TIK ke dalam kurikulum pendidikan dasar. Populasi dalam penelitian ini terdiri dari guru, siswa dan pihak terkait di SDN Maguwoharjo 1 Kabupaten Sleman Yogyakarta. Pemanfaatan TIK memungkinkan akses pembelajaran jarak jauh lebih luas, meningkatkan motivasi belajar siswa, memudahkan pemahaman materi, dan memfasilitasi pembelajaran mandiri. Selain itu, guru juga mudah menyampaikan materi pelajaran dan meminimalisir kekurangannya dalam mengkoordinasikan kelas. Pemanfaatan TIK juga memberikan kemudahan akses terhadap sumber belajar, memperkaya pembelajaran, dan mempermudah pembuatan dokumen penting. Guru perlu mengatasi tantangan persiapan teknis, aksesibilitas perangkat dan internet, serta perubahan metode pengajaran. Sekolah harus menghadapi tantangan dalam berinvestasi pada infrastruktur TIK, pelatihan staf dan guru, serta masalah listrik yang tidak stabil. Dalam menghadapi tantangan tersebut, dukungan dari sekolah, guru dan pihak-pihak lain yang berkepentingan sangat penting untuk menjamin keberhasilan pelaksanaan pembelajaran berbasis TIK.

**Kata Kunci:** Keunggulan, tantangan, TIK, sekolah dasar

### INTRODUCTION

Education is the main pillar in the formation of a superior and quality generation of the nation. In an increasingly digitalized era, it is important for educational institutions to run ICT competency improvement programs to maintain the relevance and quality of education (Rahayu & Tutie, 2023). ICT-based education is able to provide wider access to information, facilitate online-based learning, and increase student competitiveness in a changing world (Tahar; Achmad; et al, 2022). It has not escaped the huge impact brought about by this technological advancement. At the primary school level, ICT-based learning approaches have become an increasingly relevant and significant topic.

ICT-based learning in elementary schools refers to the integration of information and communication technology in the learning process (Fanny & Mahya, 2020). In recent decades, the use of computers, tablets and internet access has become common in primary schools. In many countries, governments have adopted initiatives to bring ICT into primary education curricula. However, in

implementing ICT-based learning, there are various advantages and challenges that need to be carefully evaluated (Rukmana & Yanto, 2023).

The advantages of ICT-based learning include easy access to digital educational resources, development of essential technological skills in the digital age, increased student involvement in the learning process (Lestari, Indah, & Kurnia, 2023). Other advantages include increased student motivation, easy access to information, and increased interaction between teachers and students through online platforms. In addition, ICT also allows personalization of learning, which can be tailored to the individual needs of students, allowing for more effective teaching (Rahayu & Tria, Analisis Hasil Pengaruh Perkembangan Iptek Terhadap Hasil Belajar Siswa Sd/Mi, 2023). However, along with all the advantages offered, there are some crucial challenges faced in ICT-based learning such as limited access to hardware or internet connectivity, competency gaps among teaching staff, and possible technical and security constraints. While there are many benefits associated with ICT-based learning, there are also a number of challenges that must be overcome. Some of these include limited access to devices and internet connections in some regions, inequalities in ICT access, and the risk of misuse of technology. In addition, teachers should develop specific skills in integrating ICT into their teaching (Fitriyadi & Herry, 2013).

The importance of understanding the role of ICTs in primary schools is not only related to children's educational outcomes, but also to their preparation for the future (Umayah, Urip, & Riwanto, 2020). In an increasingly connected and technology-driven world, proficiency in using ICT is a must. However, as we move in this direction, we must also be careful not to miss out on crucial issues such as access, teacher skills, privacy, and even the potential for over-reliance on technology (Ahmadi, Farid, & Ibda, 2019).

This study will discuss in more detail the advantages of ICT-based learning, including how access to diverse resources can enrich learning, while interactive and personalized learning provide additional advantages. It also delves into emerging challenges, including limited access to technology, teachers' role in dealing with these changes, privacy concerns, and the dangers of possible dependency.

In support of this study, researchers refer to several previous studies. One of them is research conducted by Aulia Rika Harahap (Harahap, 2020) with the title "Advantages and Disadvantages of ICT-Based Learning in Al-Khoiriyah IT Elementary School in Online-Based Application". In his research, he found that in the online-based learning process for the elementary / MI level, information and communication technology, such as audiovisual media (film strips, television, and video), LCD (infocus), computers, mobile phones, and the internet are used.

ICT-based learning in an online context has several advantages, such as increasing student enthusiasm in learning, improving student memory, allowing teachers to send learning materials to students through applications such as WhatsApp, facilitating easier access to learning resources via the internet, eliminating the limitations of face-to-face interaction between teachers and students, and strengthening the relationship between teachers and parents in the learning process. However, there are also drawbacks associated with the use of this technology, such as misuse of mobile phones by students, teacher preferences for face-to-face explanations, student boredom while studying at home, and the burden that may be felt by parents due to the implementation of online-based learning (Ahmadi & Farid, Guru SD di era digital: pendekatan, media, inovasi, 2017).

Then research conducted by Yatini (Maulana, 2019), stated that the use of ICT-based learning media has proven to be very effective in increasing student participation and achievement. However, it is important to remember that the effectiveness of using ICT-based learning media will achieve maximum results if there is no support from various parties. The government is expected to provide supportive regulations in facilitating access and use of ICT network systems in the context of education. While educational institutions, especially principals or madrasahs, must provide ICT facilities needed by teachers and students in the learning process. The role of parents is also very important, namely supporting school efforts in implementing ICT technology as a means of education.

This study aims to examine in depth the advantages of Information and Communication Technology (ICT)-based learning at the elementary school level. The main focus is to identify significant benefits that arise from the application of ICT, such as increased access to learning, higher student motivation, as well as ease of understanding of the material and drivers for independent learning. In addition, this study also seeks to reveal concrete challenges faced in the implementation of ICT-based learning in elementary schools, both in terms of technical, motivation, and digital distraction. As an integral part of this research, we will explore the crucial role teachers play in addressing these challenges. Special focus is given to the steps taken by teachers to prepare technically, improve device and internet accessibility, and adapt teaching methods to optimize ICT-based learning. This research aims to make a real contribution to the understanding of the extent to which ICTs can provide benefits at the primary school level, while detailing concrete efforts that teachers can make to overcome these emerging barriers.

## METHODS

The methodology of this research is qualitative research with a descriptive approach. This research was conducted in a field environment or field research, which will allow researchers to understand the phenomenon of Information and Communication Technology (ICT)-based learning in elementary schools in more depth (Ismayani, 2019). This research was conducted in a basic education unit in an elementary school Negeri Maguwoharjo 1, Sleman, Yogyakarta. The population in this study will consist of teachers, students, and related parties in elementary schools that implement ICT-based learning. The respondents were selected purposively with consideration of certain relevant characteristics.

Data was collected through various methods, including classroom observation, interviews with teachers and students, and analysis of documents related to curriculum and ICT-based learning materials. The validity of the data was checked through data triangulation, by combining results from different sources of information. Data reliability was ensured by following consistent procedures in data collection and analysis. The results of the study will be analyzed by identifying advantages and challenges in ICT-based learning, and these findings were used to provide relevant recommendations to improve the effectiveness of ICT-based learning in primary schools.

## RESULTS AND DISCUSSION

### 1. Advantages of Information and Communication Technology-Based Learning in Elementary Schools

The use of information and communication technology (ICT) in a learning in schools, brings various significant advantages. This approach allows for greater access to distance learning as well as self-paced learning that can be tailored to student needs. Learning information and communication technology can increase learning motivation, student understanding of the material presented with various digital learning tools such as videos presented with LCD and active speakers that are available in each class. The use of information and communication technology helps bring learning to life, making it easier for students to understand abstract concepts and be able to present something that cannot be reached directly.

This is in accordance with the results of an interview by P1 which revealed *“kalau menurut saya ya, mengajar dengan media itu anak-anak lebih menarik, lebih tidak bosan, tidak monoton dengan penjelasan guru dan mereka melihat secara langsung/lebih konkret daripada hanya membayangkan. Kalau saya menjelaskan dari buku tanpa adanya media secara langsung seperti video, mereka mungkin berfikirnya belum bisa, karena anak SD harus konkret, jadi ini membantu dan dapat meningkatkan kualitas pembelajaran”*. *“In my opinion, yes, teaching with media does make learning more engaging for children. It prevents*

*boredom and monotony that can come with traditional teacher explanations, and allows students to directly observe and interact with concrete examples, rather than just imagining them. If I were to explain concepts solely from a textbook without any visual aids like videos, they might think it's not possible, because elementary school children need concrete experiences. So, incorporating media into teaching not only helps but also enhances the quality of learnin".* In addition, learning also becomes more interesting, less bored, less monotonous with the teacher's explanation and they see directly/more concretely than just imagining. Apart from students, teachers also feel ease in delivering lesson material, and can minimize shortcomings or teacher abilities in coordinating classes (Widianto & Edi, 2021).

The use of ICT enables the presence of visual and auditive elements in learning materials, creating a more engaging and interactive environment for students. It encourages students to be more excited in the learning process and can improve their memory. For example, teachers can easily send learning videos to students through communication platforms such as WhatsApp. Information and communication technology provides easier and wider access to a variety of learning resources. Students and teachers can access materials and references from the internet quickly and easily (Nurdyasnyah & Andiek, 2015). This allows them to gain additional information, deepen understanding, and enrich their learning. The use of ICT facilitates the process of making important documents such as Report Cards (Learning Advancement Records) and RPP (Learning Implementation Plans). With computers and word processing software, educators can more efficiently structure these documents. In addition, the document can also be more easily corrected if there are errors (Rahmat & Stephanus Turibius, 2015).

Information and Communication Technology-based learning can also facilitate independent learning. Students can access learning resources independently and study according to their level of understanding. This can help students to develop independent skills and learn effectively. Further, the use of technology in learning can improve students' technological skills, which is especially important in this digital age. In addition, Information and Communication Technology-based learning in elementary schools can open the door to access to a wider range of educational resources. With the internet, students can access learning resources from all over the world. This can help in broadening students' horizons and introducing them to various cultures and global knowledge. Lastly, ICT also enables better collaboration among students and teachers. Students can communicate with teachers and fellow students through a variety of online tools, facilitating discussions and group work efficiently (Rahmansyah & Arif, 2023).

Based on the results of interviews with two grade IV teachers of Maguwoharjo 1 State Elementary School, researchers found statements that teachers were greatly helped by the technological tools used during the learning process. Teachers more easily access subject matter that can attract attention and increase student understanding. In addition, teachers can also overcome or replace a role that the teacher cannot play because of an improficiency, this is reinforced by one of the teacher's statements which states that the use of information communication technology can minimize his ability to sing. P2 says: *“di pembelajaran tematik kan banyak lagu-lagu, daripada kita menyanyikan langsung, dan saya juga kurang mahir dalam bernyanyi, suara saya jelek, jadi kita pakai video itukan anak2 lebih ada musiknya, lebih menarik, lebih tertarik, oh nadanya seperti ini, tinggi rendahnya seperti ini jadi dia lebih paham, jadikan otomatis meningkat”* {In thematic learning, there are many songs, than we sing directly, and I am also less proficient in singing, my voice is bad, so we use that video the children have more music, more interesting, more interested, oh the tone is like this, the high and low are like this so he understands better, make it automatically increase}. Singing is something that teachers do not master, but all of it can be overcome by playing or showing videos containing music and singing in the learning process.

Learning based on information communication technology with all media and technological devices, able to attract students' attention, make learning not monotonous, help clarify difficult material, students are more involved in learning, student learning motivation and student learning outcomes increase, and teachers are greatly helped in explaining material with technology-based learning equipment.

## 2. Challenges in the Implementation of ICT-Based Learning in Primary Schools

### a. Student Challenges

The application of information and communication technology (ICT)-based learning in schools presents a number of challenges that must be overcome by students. One is that students have to overcome technical challenges. Using various online learning software and platforms may require a deeper technical understanding. Students have to learn how to operate the device, for those who are not familiar with technology, this can be an obstacle.

In addition, motivation and personal discipline are also a challenge. Online learning often requires greater autonomy from students. They must have the ability to manage time, stay focused, and manage themselves without the direct supervision of the teacher in the classroom. For some students, this can be difficult and requires strong self-management skills. Another challenge is digital

distraction. Students are often faced with the temptation to use their devices for non-educational activities such as social media or games during online learning. This can disrupt the learning process and reduce productivity.

b. Teacher Challenge

The application of information and communication technology (ICT)-based learning in schools poses a number of challenges that must be faced by teachers. One of them is technical preparation. Teachers need to master various software, applications, and online platforms used in the learning process. Learning and adapting to new technologies can be a time-consuming task and requires teachers to constantly update their knowledge.

Furthermore, the issue of device and internet accessibility is also a big challenge. Not all teachers have access to adequate hardware and internet connectivity. This can make it difficult for teachers to integrate Information and Communication Technology in their learning. The application of Information and Communication Technology requires changes in teaching methods and learning approaches. Teachers need to learn how to teach effectively in using digital facilities and tools. This requires ongoing adjustment and training.

Based on the results of P1 teacher interviews which stated “*anak-anak tidak mau menulis, lebih suka buk nonton aja buk, main game aja bu, nulis malas, jadi motivasi menulisnya itu berkurang, trus kualitas tulisannya juga berkurang*” {Children do not want to write, prefer to just watch books, just play games, write lazy, so the motivation to write is reduced, then the quality of writing is also reduced}. This is another challenge that arises from students after the use of information technology-based learning is applied, namely the decrease in writing motivation and the quality of student writing, students become lazy to write because they are comfortable with digital media such as videos and educational games presented by teachers. Therefore, it is a challenge for teachers to find the right solution to overcome the problem of students lazy to write.

c. School Challenges

*The introduction of information and communication technology (ICT)-based learning in schools involves a number of challenges that educational institutions must overcome. According to the results of the interview by P2 who said “kendala listrik sering anjlok, kemudian tagihan listrik yang membengkak, artinya wattnya itu kurang standart” (Electricity constraints often plummet, then electricity bills swell, meaning that the wattage is less standard).* This is one of the investments in adequate Information and Communication Technology infrastructure. Schools must ensure adequate hardware availability, stable internet access, and necessary software. Reliance on electricity and the internet requires significant budgets, and not all schools have sufficient resources. The instability of electricity due to the large number of electronic devices often makes the power



go out, resulting in obstacles to the learning process in the classroom. Therefore, this challenge was immediately overcome by the school by providing electric tools such as gansets.

Training of staff and teachers is an important issue. Effective use of Information and Communication Technology in the learning process requires a deep technical understanding. Schools should organize regular training for teachers so that they can integrate technology into the curriculum well. This requires a commitment of time and resources. Addressing these challenges requires commitment and collective effort from schools, staff and other interested parties to ensure that ICT-based learning can be implemented successfully and deliver maximum benefit to students.

d. **The Role of Teachers in Overcoming Information and Communication Technology-Based Learning Challenges**

Information and Communication Technology (ICT)-based learning has become an integral component in the world of modern education (Andriani & Tuti, 2016). However, along with technological advances, there are also various challenges that need to be overcome so that ICT learning can run effectively. In this context, the role of teachers becomes very important in overcoming these challenges. The teacher acts as a facilitator of learning. They not only teach the material, but also guide students in the use of Information Communication Technology tools and platforms. Teachers can provide clear guidance on utilizing technology, help students understand various software and applications, and provide solutions when students experience technical difficulties (Setiawan & Zunan, Pendidikan Multimedia: Konsep dan Aplikasi pada era revolusi industri 4.0 menuju society 5.0, 2023).

The teacher acts as an assessor and supervisor. They can monitor students' progress in learning through Information Communication Technology, ensure that students follow rules and ethics in the use of technology, as well as provide constructive feedback. Teachers can also assess the quality of student work delivered through online platforms. Furthermore, teachers have an important role to play in creating a safe and inclusive learning environment. They must address challenges such as online bullying, data security, and inequality of technology access. Teachers can help students understand the importance of ethics in cyberspace and encourage them to participate with a sense of security.

In addition, teachers can be a source of inspiration and motivation for students. They can present successful examples in the use of Information Communication Technology to enhance learning and open up new opportunities. Thus, teachers can help students see real value in Information Communication Technology-based learning and motivate them to participate actively. Teachers have a role in the development of technology-relevant curricula. They need to

keep abreast of Information Communication Technology developments and integrate innovation in learning. That way, teachers can ensure that Information Communication Technology-based learning remains relevant and in accordance with student needs in the digital era.

The role of teachers in overcoming ICT-based learning challenges is crucial. They are not only teachers, but also facilitators, assessors, and supervisors, as well as drivers of change in technology-based education. With the right commitment and knowledge, teachers can help students overcome the challenges that arise in ICT learning and help them succeed in this digital age.

## **CONCLUSION**

Information Information and Communication Technology (ICT)-based learning in elementary schools has various significant advantages. The use of ICT allows wider access to distance learning, increases student motivation, facilitates material understanding, and facilitates independent learning. In addition, teachers also find it easy to deliver lesson material and minimize their shortcomings in coordinating classes. The use of ICT also provides easier access to learning resources, enriches learning, and facilitates the creation of important documents.

However, the implementation is learning-based Information Communication Technology in schools also faces a number of challenges. Students must overcome technical challenges, motivation, and digital distractions. Teachers need to address the challenges of technical preparation, accessibility of devices and the internet, as well as changes in teaching methods. Schools have to face the challenges of investing in Information Communication Technology infrastructure, staff and teacher training, as well as unstable electricity problems. In facing this challenge, support from schools, teachers, and other interested parties is essential to ensure the successful implementation of Information Communication Technology-based learning.

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