



Original Article

Digital Education Strategies in the Development of Interactive Multimedia-Based LKPD: An Analysis of the Indonesian and Irish Education Systems

Mirnawati^{1✉}, Mery Noviyanti², Muhammad Irfan³

^{1,2}Universitas Terbuka

³State University of Yogyakarta, Indonesia.

Correspondence Author: mirnawati290989@gmail.com✉

Abstract:

Digital education is an important aspect of the transformation of global education systems, which has gained significant attention in various countries. This study examines the implementation of digital education in Indonesia and Ireland, with a focus on the development of interactive multimedia-based Student Worksheets (LKPD). Although Indonesia has launched various initiatives such as the Digital School program, the main challenges faced are the digital divide between urban and rural areas, as well as limitations in infrastructure and teacher training. Meanwhile, Ireland has successfully integrated technology through the Digital Strategy for Schools 2022-2027, which aims to improve the use of technology in education. However, the main challenge faced is the need to update teacher training to keep pace with rapid technological developments. The use of interactive multimedia-based LKPD has been proven to increase student motivation and learning outcomes, although its application in both countries is still limited. Therefore, to improve the quality of education, both Indonesia and Ireland need to strengthen teacher training and update the curriculum to be more adaptive to technological developments. This study suggests that Indonesia leverage Ireland's experience in improving infrastructure, providing continuous training for teachers, and developing multimedia-based LKPD to support a more effective learning process.

Keywords: Interactive Multimedia, Educational Technology, Educational Infrastructure

Introduction

Digital education is an important element in the transformation of the global education system, which has developed rapidly in recent decades (Brown, 2021). Indonesia and Ireland, despite having different education systems, have made significant progress in integrating technology into the learning process. Although these two countries have different approaches to implementing digital education



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policies, the challenges they face are often similar. In this context, analyzing digital education policies, the infrastructure supporting them, and the challenges they face are important aspects that require further understanding.

In Indonesia, although the government has launched various initiatives to improve digital education, such as the “Digital School” program, there are many challenges that must be addressed. One of these is the uneven access to technology, which creates a digital divide between urban and rural areas ([Sinambela, 2024](#)). This program aims to integrate technology into the education curriculum by providing hardware, software, and training for teachers. However, the reality on the ground shows that many schools in remote areas still lack adequate access to this technology, hindering the effectiveness of the policy's implementation ([Ofianto, 2025](#)).

Meanwhile, Ireland has implemented a more structured digital education policy through its “Digital Strategy for Schools 2022-2027,” which aims to increase the use of technology in education. The Irish government is committed to investing in teacher training and curriculum development focused on digital skills. An official report from the Irish Department of Education and Skills, through the Digital Strategy for Schools to 2027, states that over 80% of schools in Ireland have integrated digital technology into their teaching. This strategy emphasizes the importance of developing digital skills for all individuals, from primary education to lifelong learning, with the goal of increasing the proportion of adults with basic digital skills to 80% by 2030 (Irish Department of Education and Skills, 2022). However, challenges related to curriculum updates and ongoing teacher training to keep pace with technological advancements remain, as do issues of data security and student privacy, which are increasingly gaining attention.

Significant differences in policy and infrastructure highlight the challenges faced by each country. Indonesia is still struggling with infrastructure equity and teacher training, while Ireland, despite having better infrastructure, continues to strive to update its curriculum and protect student data. In Indonesia, despite initiatives to improve access to digital education, the digital divide in remote areas remains a major challenge affecting the quality of education ([Sinaga, 2025](#)). On the other hand, Ireland has more inclusive policies and adequate infrastructure, but the need to continuously update technology and ensure data security remains a key concern.

Along with the challenges faced by both countries, there are also opportunities that can be exploited, especially in terms of developing interactive multimedia-based Student Worksheets (LKPD). Interactive multimedia-based LKPDs have proven to be an effective tool in increasing student motivation and learning outcomes. In Indonesia, although access to technology is still limited, the use of interactive LKPDs can significantly increase student engagement. Recent research indicates that students using multimedia-based LKPD show increased learning motivation compared to traditional teaching methods. In Ireland, with better technological infrastructure, the use of digital technology can increase learning motivation and improve overall student learning outcomes ([Kilcoyne, 2021](#)). These LKPDs combine various elements such as text, images, videos, and animations to create a more engaging and interactive learning experience, enabling students to learn independently and become more involved in the learning process.

However, despite the many advantages of using interactive multimedia-based LKPD, its implementation is still limited in many schools, both in Indonesia and

Ireland. The main factors influencing this implementation are uneven infrastructure and the level of teacher readiness in using this technology. In Indonesia, a major challenge is the lack of adequate training for teachers to effectively utilize technology in learning (Fauziah, 2024). Many teachers still feel unsure about using multimedia tools in their teaching, which hinders the full potential of multimedia-based LKPD. In Ireland, although the majority of teachers have access to training, the challenge that arises is the need to continuously update their training to keep pace with rapid technological developments (Galway, 2023). In addition, the integration of multimedia into the existing education curriculum in both countries is also a major challenge that must be overcome.

In addition to these challenges, the use of multimedia-based LKPD also opens up various opportunities to improve the quality of education. One of the main opportunities that can be exploited is personalized learning. In Indonesia, where many students have different learning styles, the use of multimedia in LKPD can help meet the individual needs of students. With access to materials that can be accessed anytime and anywhere, students have the opportunity to learn at their own pace. In Ireland, flexible multimedia features allow teachers to tailor learning to students' needs, giving them more control over their learning process.

The use of multimedia-based LKPD can also enhance global collaboration. With the advancement of digital technology, students in Indonesia and Ireland have the opportunity to connect with students around the world, share knowledge, and learn from various perspectives. In Indonesia, despite challenges in infrastructure and access, the potential to enhance global collaboration through multimedia LKPD is significant. Ireland, with its superior technological infrastructure, can leverage international partnerships to enhance students' learning experiences.

However, to maximize the potential of interactive multimedia-based LKPD, both in Indonesia and Ireland, appropriate strategies are needed. One key strategy is to enhance teacher training and integrate technology more effectively into existing curricula. In Indonesia, this strategy could include ongoing training for teachers and improvements to technological infrastructure, particularly in underdeveloped areas. In Ireland, although technology is already more integrated, ongoing curriculum updates and further professional training would be very helpful in maximizing the use of this technology. Furthermore, both countries need to ensure that existing policies continue to evolve to keep pace with technological developments, as well as address issues related to data security and student privacy.

In conclusion, despite significant differences in the context of digital education in Indonesia and Ireland, both countries have great potential to improve the quality of education through the use of interactive multimedia-based LKPD. By overcoming existing challenges, such as uneven infrastructure and teacher readiness, and taking advantage of the opportunities offered by digital technology, both countries can improve student motivation and learning outcomes, as well as prepare them to face the challenges of the digital age.

Methods

The research method used in this study is a comparative qualitative method, which allows for an in-depth comparison between the implementation and effectiveness of the use of interactive multimedia-based Student Worksheets (LKPD) in Indonesia. The descriptive approach in this method relies on data collected from

relevant literature, including educational journals, scientific articles, and related case studies, to understand the dynamics of digital education implementation in both countries. With this method, researchers can identify differences and similarities in policies, infrastructure, and the impact of the use of educational technology in Indonesia and Ireland.

The research design adopted is comparative, aiming to directly compare the implementation and effectiveness of the use of interactive multimedia-based LKPD in Indonesia. Data collection is conducted through the analysis of relevant documents and literature, such as educational journals, scientific articles, and government policy reports discussing digital-based education strategies in Indonesia and Ireland. The collected data will then be analyzed qualitatively to describe the differences and similarities in implementation, as well as the impact of using this technology in both countries.

The data collection procedure began with data sources obtained through literature studies ([Sahir, 2021](#)). This process involved reviewing various scientific articles, educational journals, and policy reports discussing educational technology. The main focus of the selection of data sources is on journals discussing the implementation of educational technology, articles examining the challenges and successes in the use of educational technology, and government reports that provide insights into digital and education policies in Indonesia and Ireland. Data selection is carried out by selecting articles, journals, and reports that are credible, relevant to the research topic, and published in the last five years to ensure that the information used is up-to-date and reliable.

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research topic, and published in the last five years to ensure that the information used is up-to-date and reliable.

After the data was collected, the data processing stage was carried out descriptively to highlight relevant aspects such as digital education policies, supporting infrastructure, and the impact of using interactive multimedia-based LKPD in Indonesia and the Digital Strategy for Schools 2022-2027 in Ireland. This analysis aims to describe the state of digital education in both countries and produce a clear comparison of the policies and infrastructure underlying the implementation of educational technology. The qualitative analysis technique used in this study is thematic analysis, which aims to identify the main themes that emerge from the collected data ([Najmah, 2023](#)). These themes include digital education policies, challenges faced, and the effectiveness of digital technology implementation in supporting learning in both countries.

The data analysis process involves classifying and categorizing data based on relevant issues, such as educational technology policies, the use of multimedia-based LKPD, as well as the challenges and opportunities that arise in its implementation. This interpretation of the data will enable researchers to identify differences and similarities in the digital education policies implemented in Indonesia and Ireland. Furthermore, researchers will compile a synthesis of the findings to provide a more comprehensive picture of the state of digital education in both countries, as well as provide deeper insights into digital education strategies that can be adopted or adapted in each country.

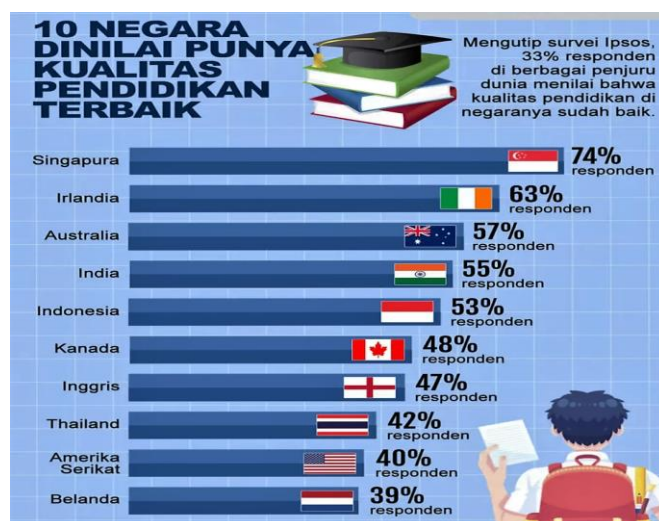
To analyze the data in depth, researchers used thematic analysis techniques that focused on identifying the main themes that emerged from the data. This thematic analysis aimed to find patterns or trends in digital education policies, the application of educational technology, and the challenges and successes faced by both countries in the use of digital technology. Furthermore, a descriptive comparison will be conducted to assess the differences and similarities in the implementation of digital technology in both countries. This comparison will cover aspects such as education policy, technology infrastructure, and the impact of technology on student learning outcomes.

Based on the thematic analysis and descriptive comparison, the researcher will compile a synthesis of the main findings obtained from the case studies in Indonesia and Ireland. This synthesis aims to provide a deeper understanding of effective and contextual digital education strategies in both countries. The results of this synthesis are expected to provide useful recommendations for education policymakers to develop and improve the implementation of educational technology in the future.

By using this comparative qualitative method, this research will provide a clear picture of the differences and similarities in digital education policies in Indonesia and Ireland, as well as evaluate the impact of using interactive multimedia-based LKPD on student learning outcomes. This research is expected to make a significant contribution to the development of more effective digital education strategies, as well as improve the quality and accessibility of education in both countries. This approach allows researchers to draw conclusions based on strong and relevant data, which can be used to formulate better digital education policy recommendations in the future.

Results

Based on an Ipsos survey conducted in June-July 2023, the quality of education in Ireland was rated as very good, with 63% of respondents giving it a positive rating, placing it in second place. Meanwhile, Indonesia also received a positive rating, with 53% of respondents stating that education in the country is already good, placing it in fifth place. Despite being in fifth place, Indonesia still shows a better rating compared to some major countries such as the United States and the United Kingdom in terms of education quality (Afril, 2025).



Source: SINDONEWS.Com

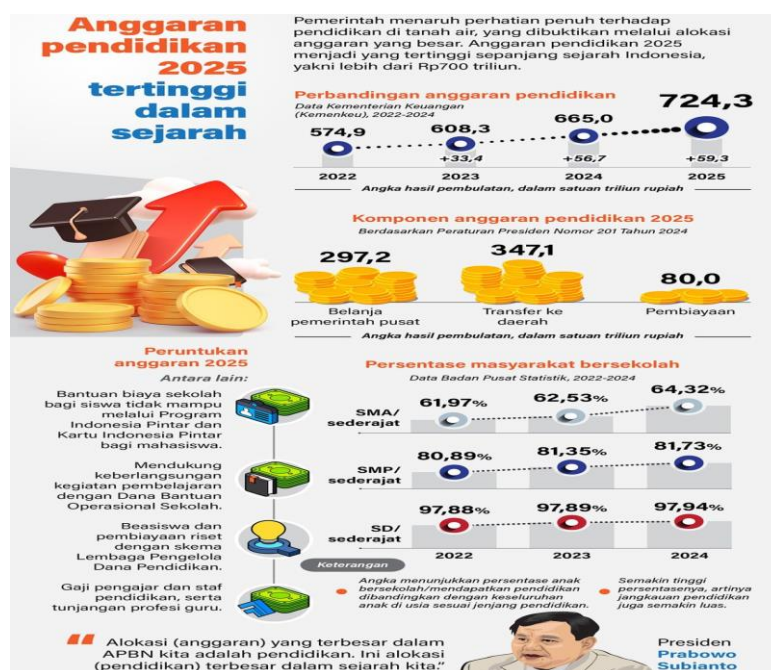
Figure 1. 10 Countries with the Best Quality of Education

In an effort to improve the quality of education in Indonesia, the adoption of a digital education system that has been successfully implemented in Ireland could serve as a relevant model. Ireland, through its Digital Strategy for Schools to 2027, has demonstrated a strong commitment to integrating technology into the learning process (Education, 2025). This strategy focuses on three main pillars: (1) supporting the implementation of digital technology in teaching, learning, and assessment; (2) providing adequate technological infrastructure; and (3) preparing policies, research, and digital leadership for the future.

One important aspect of this strategy is the development and implementation of interactive multimedia-based Student Worksheets (SWs). In Ireland, digital SWs not only serve as learning aids but also as a means to enhance students' digital skills. The use of technology in LKPD allows students to interact directly with learning materials through elements such as videos, animations, and interactive quizzes. This aligns with Ireland's strategic goal of ensuring that all students have the opportunity to acquire the knowledge and skills necessary to navigate the ever-evolving digital world (Department of Education and Youth, 2024).

In Indonesia, despite efforts to integrate technology into education, significant challenges remain, particularly regarding infrastructure, teacher training, and the digital divide in remote areas. However, some schools have begun developing and implementing interactive multimedia-based LKPD. A study conducted at SMP Negeri 2 Marga showed that the use of Liveworksheets-based E-LKPD can increase student motivation and learning outcomes. Before the implementation of E-LKPD, the average student score was 74 with a classical graduation rate of 72%. After

implementation, the average score increased to 85 with a classical graduation rate of 94% (Wahyuniyati, 2025).



Source: ANTARA News

Figure 2. Education Budget for 2025 in Indonesia

However, the implementation of interactive multimedia-based LKPD in Indonesia still faces several obstacles. Limited access to stable internet, lack of training for teachers in the use of technology, and resistance to changes in traditional learning methods are the main challenges. Therefore, it is important for Indonesia to learn from Ireland's experience in overcoming these challenges. Ireland has implemented various initiatives to improve the transparency and accessibility of government financial reports. One of the best practices that Indonesia can adopt is the use of digital technology to present financial reports in an interactive and accessible format. This includes the use of infographics, videos, and mobile applications that allow users to better understand the data. In addition, training programs for government employees and the public on how to read and understand financial reports are very important. Ireland has held workshops and seminars to improve financial literacy (Dewangga Satria Buana, 2023).

In a study titled "Exploring the evolution of educational technology policy in Ireland: From catching-up to pedagogical maturity" written by Oliver McGarr and Karen Johnston, which discusses educational technology policy in Ireland, they observe a shift from simply catching up with technology to a more mature and pedagogically-based approach to integrating technology into the classroom (Johnston, 2021). This research is highly relevant to the situation in Indonesia, which is also striving to integrate more technology into education.

In both countries, there is an emphasis on overcoming infrastructure limitations, professional development for educators, and the need to update curricula to better accommodate new technologies. Ireland's more advanced policies, which focus on teacher training and continuous curriculum updates, provide valuable insights for Indonesia's digital education strategy, particularly in developing

interactive learning platforms such as multimedia-based LKPD, which have already begun to be implemented in Indonesia. By analyzing Ireland's digital education strategy, Indonesia can improve the effectiveness of educational tools such as LKPD, with a focus on overcoming challenges such as internet access and ensuring teacher readiness. Therefore, although both countries face similar challenges, their levels of implementation and policy maturity differ.

The scientific study titled, "Digital competence in teacher education: comparing national policies in Norway, Ireland, and Spain" by Oliver McGarr, Louise Mifsud, and Juan Carlos Colomer Rubio discusses the integration of digital competencies in teacher education by comparing policies implemented in Norway, Ireland, and Spain. The main focus of this scientific research is how national policies facilitate the development of teachers' digital competencies so that they are able to integrate technology into the learning process effectively (Oliver McGarr, 2021).

This study shares similarities with research conducted in Indonesia on technology-based education systems, particularly in the development of interactive multimedia-based LKPD. Both the Indonesian and Irish studies emphasize the importance of digital competencies for teachers. Both also face similar challenges, namely infrastructure limitations and teacher readiness in implementing new technologies in education. In addition, in Indonesia and Ireland, there are ongoing efforts to integrate digital-based learning tools, such as multimedia-based LKPD, which aim to increase student engagement and learning outcomes. Therefore, the importance of curriculum updates and ongoing training for teachers, which is the focus of Irish education policy, can serve as an example for Indonesia in strengthening the implementation of multimedia-based LKPD. As explained in the article, Ireland emphasizes the development of a curriculum that is adaptive to technological developments and provides consistent training to teachers to ensure the effective use of technology in teaching. Therefore, the policies adopted by Ireland can provide valuable insights for Indonesia in developing more effective digital education strategies, especially in improving the quality of multimedia-based LKPD that can increase student motivation and learning outcomes.

The adoption of educational technology policies implemented in Ireland, as discussed in this study, provides important insights for Indonesia in developing interactive multimedia-based LKPD. This study shows that in Ireland, there is a strong focus on improving teachers' digital competencies, accompanied by continuous curriculum updates and professional training to ensure the effective use of technology in teaching. A similar approach is also being implemented in Indonesia, where the government is striving to integrate digital technology into learning, although challenges related to infrastructure and teacher training remain major obstacles. Therefore, the policies implemented in Ireland can serve as a reference for Indonesia to improve its digital education system, particularly in improving the quality of effective multimedia-based LKPD to support student learning outcomes and their readiness to face the digital era.

Conclusion

The adoption of the digital education system implemented in Ireland provides a relevant model for Indonesia. By utilizing technology for the development of interactive multimedia-based Student Worksheets (LKPD), Indonesia can improve the quality of education and prepare students to face the challenges of the digital age. In Ireland, through policies such as the Digital Strategy for Schools to 2027, the

government is committed to integrating technology into teaching, learning, and assessment, with a focus on developing students' digital skills. In Indonesia, although there are similar efforts, major challenges such as infrastructure inequality and teacher training must be overcome. Therefore, lessons from Ireland's experience in curriculum renewal, continuous training for teachers, and the use of interactive multimedia-based LKPD can be applied to improve the effectiveness of digital education in Indonesia. This strategy is expected to not only improve student learning outcomes but also help them prepare for the ever-evolving digital age.

Suggestion

Based on the analysis of digital education policies implemented in Ireland, it is recommended that Indonesia accelerate the digitalization of education by emulating some of the steps taken by Ireland. One relevant suggestion is to strengthen ongoing teacher training in the use of digital technology, including interactive multimedia-based LKPD. Ireland has successfully implemented policies for ongoing teacher training and adaptive curriculum updates in line with technological developments. This suggestion is important so that teachers in Indonesia can effectively implement technological tools, improve the quality of learning, and prepare students to face the challenges of the digital era. In addition, updating digital infrastructure in underserved areas also needs to be a priority, as implemented by Ireland by providing equitable access to technology throughout its territory.

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