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**INTEGRATION OF EDTECH IN PRIMARY SCHOOL MANAGEMENT TO IMPROVE LITERACY: A CASE STUDY OF INDONESIA AND FINLAND**

**Hamidah<sup>1</sup>**

[mimiadhiya01@gmail.com](mailto:mimiadhiya01@gmail.com)

<sup>1</sup> Faculty of Teacher Training and Education, Mulawarman University, Indonesia

**Apriliyani<sup>2</sup>**

[april.yasmin84@gmail.com](mailto:april.yasmin84@gmail.com)

<sup>2</sup> Faculty of Teacher Training and Education, Mulawarman University, Indonesia

**Purnawati<sup>3</sup>**

[purnatarna23@gmail.com](mailto:purnatarna23@gmail.com)

<sup>3</sup> Faculty of Teacher Training and Education, Mulawarman University, Indonesia

**Warman<sup>4</sup>**

[warman@fkip.unmul.ac.id](mailto:warman@fkip.unmul.ac.id)

<sup>4</sup> Faculty of Teacher Training and Education, Mulawarman University, Indonesia

**ABSTRACT**

This article explores the role of educational technology (EdTech) in improving literacy outcomes, focusing on diverse contexts such as Indonesia and Finland. In countries like Indonesia, where educational disparities are prevalent, especially in rural areas, EdTech has the potential to bridge resource gaps and provide equitable access to quality educational content. This review synthesizes findings from existing studies on the effectiveness of digital tools such as e-books, learning management systems, and gamified applications in enhancing literacy. The method involves a systematic review of literature, examining the impact of EdTech in multilingual and resource-poor settings, with a comparative analysis of Finland's successful integration of technology in its education system. The results demonstrate that EdTech can improve literacy by providing accessible, engaging, and personalized learning experiences. Furthermore, tools like language translation and adaptive learning platforms can cater to diverse linguistic and educational needs. The discussion highlights how EdTech, when effectively implemented, can foster more inclusive and equitable educational opportunities. In conclusion, the study recommends that governments implement policies supporting EdTech, schools invest in teacher training and infrastructure, and EdTech developers create affordable, context-specific solutions. Future research should focus on longitudinal and quantitative studies to assess the long-term impact of EdTech on literacy development.

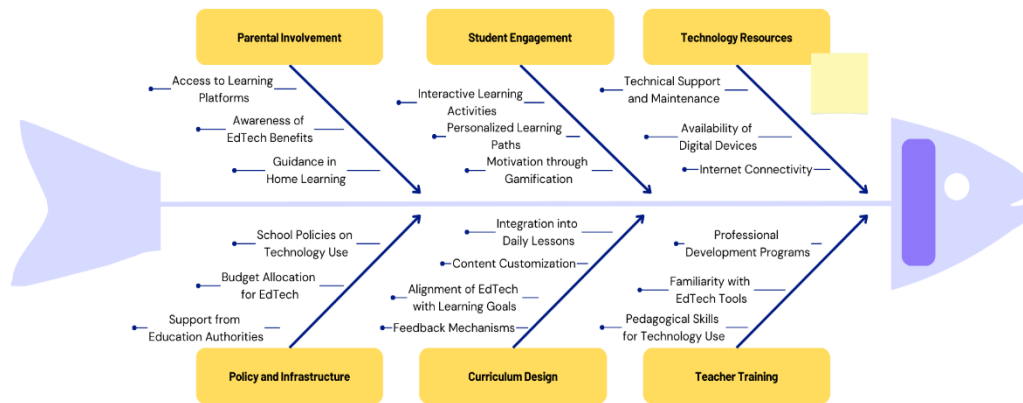
**Keywords:** EdTech, Finland, Indonesia, Literacy, Primary School Management,

## INTRODUCTION

Literacy is widely regarded as a cornerstone of educational development, playing a pivotal role in shaping an individual's ability to engage in society, understand information, and make informed decisions. In primary education, literacy serves as a foundational skill that underpins the development of other cognitive and academic abilities. It not only enhances the learning experience but also empowers students to become independent learners and active participants in their communities (Khumalo & Alhassan, 2021). The significance of literacy extends beyond academic settings, as it contributes to economic productivity, social cohesion, and personal growth. Therefore, improving literacy at the primary school level is crucial to fostering sustainable educational development and addressing broader societal challenges (Zimmerman, 2017).

In the context of global education systems, the integration of technology in literacy development has emerged as a promising approach. Educational technology (EdTech) offers tools and resources that can enhance learning experiences, provide personalized educational pathways, and overcome traditional barriers to literacy improvement (Gabriel et al., 2022). Indonesia has made significant progress in literacy rates since independence, rising from 5% in 1945 to 98.2% in recent years (Lowenberg, 1983; Sakhiyya, 2022). However, challenges persist, with Indonesia ranking 133rd in literacy according to the UNDP in 2016 (Herminingrum, 2018). The government has implemented various initiatives, including the School Literacy Movement, to address these issues. Factors influencing literacy levels include electrification, education, and GRDP. However, the effectiveness of EdTech varies significantly depending on the context in which it is implemented. For instance, Indonesia faces challenges such as unequal access to resources and disparities in teacher training, which impact its literacy outcomes. In contrast, Finland is recognized for its highly successful education system, where technology is seamlessly integrated into classroom management and instruction (Christopoulos & Sprangers, 2021). By exploring the differences and potential synergies between these two countries, this study seeks to understand how EdTech can be optimally utilized to enhance primary school literacy, drawing lessons from both contexts.

The fishbone diagram as illustrated in Figure 1 shows the various factors affecting the integration of EdTech in primary school management to improve literacy. It categorizes contributing factors into six main areas: technology resources, teacher training, curriculum design, student engagement, parental involvement, and policy and infrastructure. Technology resources address the availability of devices, connectivity, and technical support, while teacher training focuses on professional development and pedagogical skills (Audrin & Audrin, 2022; Sosa-Díaz et al., 2022). Curriculum design includes alignment with learning goals and lesson integration, whereas student engagement highlights interactive activities and personalized learning. Parental involvement emphasizes awareness, home guidance, and digital literacy of parents. Lastly, policy and infrastructure involve school policies, budget allocation, and support from education authorities (Lurvink & Pitchford, 2023). Together, these factors play crucial roles in effectively implementing EdTech for literacy enhancement in primary education.



*Figure 1. Fishbone diagram illustrating the various factors affecting the integration of EdTech in primary school management to improve literacy*

Indonesia faces significant challenges in achieving universal literacy, especially in rural and underprivileged areas, where schools lack adequate resources like books, digital tools, and trained teachers. Disparities in infrastructure, such as electricity and internet access, hinder the integration of technology into education, while traditional teaching methods often emphasize rote learning, limiting students' functional literacy (Suwanto et al., 2022). The country's linguistic diversity further complicates the delivery of a standardized curriculum. In contrast, Finland's education system is globally recognized for promoting literacy through a student-centered approach, where teachers receive extensive training and autonomy to innovate. Finland's strong infrastructure, digital literacy policies, and seamless technology integration contribute to its success in literacy, consistently ranking high in international assessments. This comparison highlights the importance of tailored, context-sensitive strategies to address literacy challenges effectively (Nandiasoka Annisawati & Ika Oktora, 2024; Rusydiyah et al., 2023).

The novelties of this research lie in its comprehensive examination of Finland's success in literacy through the lens of infrastructure, digital literacy policies, and seamless technology integration. By analyzing Finland's approach, the research highlights how a robust digital infrastructure and strategically implemented policies can directly impact literacy outcomes. Unlike general studies on literacy, this research focuses on the interplay between technological integration and literacy achievements, showcasing how Finland has created an ecosystem where technology enhances learning and supports literacy development. The novelty also stems from presenting a model where literacy strategies are not isolated but instead embedded within a well-connected, tech-driven educational framework.

Furthermore, this research underscores the significance of context-sensitive strategies in addressing literacy challenges globally. By comparing Finland's success with other regions, it emphasizes that solutions to literacy issues must consider local infrastructure, cultural context, and digital readiness. This comparative approach is innovative because it moves beyond one-size-fits-all recommendations, offering a tailored perspective on improving literacy through a combination of policy, technology, and education. The research, therefore,

provides both a benchmark and a practical guide for other nations to design and implement effective literacy programs based on their unique contexts and challenges.

Educational technology (EdTech) holds significant potential to address literacy challenges, especially in diverse contexts like Indonesia. By using digital tools such as e-books, learning management systems, and adaptive platforms, EdTech can provide equitable access to quality educational content, bridging the resource gap between urban and remote areas (Asmayawati et al., 2024; Hernández et al., 2024). Gamified applications and language translation tools can engage students in interactive learning and make literacy materials culturally and linguistically relevant. In Finland, where EdTech is already well-integrated, tools like AI-powered platforms offer personalized learning, while digital collaboration fosters critical literacy skills. Drawing from Finland's experience, Indonesia can adopt scalable, inclusive EdTech solutions, supported by robust teacher training and infrastructure investment, to enhance literacy outcomes and overcome educational challenges (Bhardwaj et al., 2020).

This research seeks to address two critical questions: What roles does educational technology (EdTech) play in the management of primary schools to improve literacy, and how is EdTech implemented in Indonesia compared to Finland? These questions arise from the growing recognition of EdTech as a transformative tool in education and the stark contrasts between Indonesia's struggles with literacy challenges and Finland's success as a global model. While Indonesia grapples with infrastructural gaps, limited teacher training, and resource disparities, Finland exemplifies an education system that seamlessly integrates technology to enhance literacy outcomes. By exploring these research questions, this study aims to uncover the potential roles of EdTech in improving literacy and identify effective practices that can be adapted to the Indonesian context. Hence, the objectives of this research are twofold: first, to examine the differences in the implementation of educational technology (EdTech) in primary school management between Indonesia and Finland, particularly analyzing how these variations influence literacy development. Second, this research focuses on primary education because this stage is a critical period for laying the foundation of literacy skills, which are essential for lifelong learning and future academic success. Primary education serves as a pivotal phase where early intervention, the integration of technology, and effective management strategies can have the most significant impact on developing strong reading and comprehension abilities. By comparing two contexts with differing infrastructure, policies, and technological readiness, this research seeks to identify best practices that can be adapted to address literacy challenges. Finland, with its proven success in literacy and technology integration, provides a benchmark for understanding how tailored EdTech strategies at the primary level can enhance student learning outcomes. Meanwhile, analyzing Indonesia's context offers insights into the challenges and opportunities faced by developing countries in adopting technology for literacy improvement. This focus on primary education ensures that the findings are both timely and relevant, highlighting the importance of building strong literacy skills from the earliest stages of formal education.

## **LITERATURE REVIEW**

### **Definition and dimensions of literacy**

Literacy encompasses the ability to read, write, and critically engage with information in various contexts. It is not limited to textual comprehension but also includes digital, cultural,

and financial dimensions, reflecting its evolving role in modern societies. In education, literacy serves as a foundational skill that shapes students' cognitive development, problem-solving abilities, and participation in global conversations (Dąbrowska, 2019). The dimensions of literacy—functional, informational, and critical—underscore its multi-faceted nature, aligning with broader goals of lifelong learning and societal empowerment. Understanding these dimensions is crucial for integrating effective strategies that enhance literacy in diverse educational environments (Martínez-Bravo et al., 2022).

The integration of educational technology (EdTech) in primary school management offers transformative opportunities to improve literacy outcomes. By incorporating digital tools, schools can provide interactive learning experiences, promote inclusivity, and adapt teaching methods to meet individual student needs (Asmayawati et al., 2024). A comparative analysis of Indonesia and Finland highlights the significance of EdTech in addressing literacy challenges, particularly in developing innovative approaches to engage students. While Finland excels in leveraging technology for personalized learning, Indonesia has the potential to bridge literacy gaps by adopting best practices tailored to its unique cultural and infrastructural contexts. This approach underscores the critical role of technology in redefining literacy education for the 21st century (Marmoah & Poerwanti, 2022).

### **The role of literacy in children's cognitive and social development**

Literacy plays a fundamental role in shaping children's cognitive abilities by serving as a gateway to acquiring knowledge and developing critical thinking skills. As children learn to read and write, they enhance their language comprehension, memory retention, and problem-solving capabilities (Reyes-Torres & Bird, 2015). These foundational skills are integral to higher-order thinking, enabling children to analyze, synthesize, and evaluate information effectively. Literacy also fosters creativity by exposing children to diverse perspectives and ideas, encouraging them to form their own interpretations (d'Apice & von Stumm, 2020). Moreover, literacy supports academic success across all subjects, as reading comprehension and writing proficiency are essential for mastering complex concepts and tasks in science, mathematics, and social studies. Table 1 highlights the crucial role literacy plays in both cognitive and social development in children. Under cognitive development, literacy enhances key skills such as language comprehension, which helps children process and understand information, and memory retention, enabling them to remember and recall what they read. It also strengthens problem-solving skills by encouraging logical thinking and helps develop critical thinking, allowing children to analyze, synthesize, and evaluate information. Additionally, literacy fosters creativity by exposing children to a variety of ideas and perspectives, encouraging independent thought and imagination. These cognitive benefits lay the foundation for academic success in subjects like science, mathematics, and social studies, where reading comprehension and writing proficiency are essential for mastering complex concepts and solving academic challenges.

**Table 1. the information about the impact of literacy on children's cognitive and social development**

Category	Impact	Description
Cognitive Development	Language Comprehension	Enhances the ability to understand and process language.
	Memory Retention	Helps children remember and retain information.
	Problem-Solving Skills	Improves the ability to solve problems effectively.
	Critical Thinking (Higher-Order Thinking)	Enables children to analyze, synthesize, and evaluate information.
	Creativity	Exposes children to diverse perspectives and ideas, encouraging independent thinking.
Academic Success	Science	Supports mastery of complex concepts in science.
	Mathematics	Supports mastery of complex concepts in mathematics.
	Social Studies	Supports mastery of complex concepts in social studies.
Social Development	Communication Skills	Enhances children's ability to express and understand others.
	Empathy	Reading diverse stories introduces children to different cultures and values, fostering understanding.
	Self-Expression (Writing)	Allows children to express thoughts, emotions, and ideas effectively.
	Social Participation	Enables children to navigate social norms and engage in meaningful community discussions.
	Confidence & Advocacy	Helps children build confidence and advocate for themselves and others.

**The concept of EdTech and its applications in primary education**

Educational Technology (EdTech) refers to the integration of technology into teaching and learning processes to enhance educational outcomes. It encompasses a wide range of tools, including digital platforms, software applications, and interactive learning devices that support instructional delivery, student engagement, and personalized learning (El Hajj & Harb, 2023). The core aim of EdTech is to create an adaptive and efficient learning environment where students can access resources beyond the traditional classroom setting. By leveraging technologies such as artificial intelligence, virtual reality, and online collaboration platforms, EdTech transforms traditional education into an interactive and student-centered experience (Hernández et al., 2024). This approach aligns with modern pedagogical trends that emphasize active learning and critical thinking.

Furthermore, in primary education, EdTech plays a vital role in fostering foundational skills such as literacy, numeracy, and problem-solving. Interactive applications and games make learning engaging and enjoyable for young learners, promoting better retention and understanding of concepts. Tools like digital storytelling platforms, e-books, and literacy apps

enhance reading and writing skills, catering to different learning styles and needs (Kovačević et al., 2017). Additionally, EdTech supports teachers by offering data-driven insights into students' progress, enabling them to customize lesson plans and address learning gaps effectively. In regions with limited educational resources, such as rural areas, EdTech also democratizes access to quality education, bridging the digital divide and ensuring equitable opportunities for all students (Lynch et al., 2024).

### **Relevant Technologies For Management And Learning**

In the realm of education management, relevant technologies include tools and platforms that streamline administrative tasks, improve communication, and optimize resource allocation. Learning Management Systems (LMS) such as Google Classroom, Moodle, and Edmodo enable schools to organize curricula, track student progress, and manage schedules efficiently. These platforms offer centralized access to lesson plans, grades, and communication channels, facilitating seamless interaction among teachers, students, and parents (Visvizi et al., 2019). Additionally, technologies like cloud-based data systems and student information systems (SIS) enhance the organization of student records, attendance, and performance metrics, reducing manual workload and allowing school administrators to focus on strategic planning. Emerging technologies such as artificial intelligence (AI) are also being used for predictive analytics, enabling data-driven decisions in resource allocation and intervention strategies (Manhiça et al., 2022).

In the context of learning, relevant technologies focus on enhancing student engagement, accessibility, and personalized instruction. Digital tools such as educational apps, e-books, and multimedia resources cater to diverse learning styles and provide interactive experiences. Technologies like augmented reality (AR) and virtual reality (VR) make abstract concepts tangible, offering immersive learning environments for subjects like science and history (Ravindar et al., 2023). AI-powered tutoring systems such as chatbots and adaptive learning platforms tailor educational content to individual needs, ensuring students receive support at their own pace. Additionally, collaborative tools like Microsoft Teams and Zoom enable group learning and peer interaction, even in remote settings. With the integration of gamification and simulation-based learning, these technologies also foster motivation and critical thinking, preparing students for real-world problem-solving scenarios (Nagani, 2024).

### **Comparative Study of the Educational Systems in Indonesia and Finland**

The significant differences between the educational systems in Indonesia and Finland, as presented in Table 2, reflecting distinct approaches to structure, curriculum, and challenges. Indonesia's education system is large-scale and centralized, aiming to serve a diverse population across thousands of islands, with a focus on universal access and aligning with national development goals. In contrast, Finland operates a decentralized system, granting autonomy to local municipalities and schools, which allows for flexibility in addressing local needs (Pupala et al., 2022). Both countries face challenges; Indonesia struggles with disparities between urban and rural education, insufficient teacher training, and limited access to technology, while Finland focuses on maintaining equity and student well-being, though it still faces challenges related to adapting to evolving educational demands (Corral-Granados et al., 2023).

In addition, Finland's teachers are highly qualified, holding master's degrees, while Indonesia is working to improve teacher training and professional development. Finland also emphasizes EdTech and innovative, student-centered teaching methods, offering personalized learning experiences, whereas Indonesia is in the process of integrating technology into classrooms (Al-Thani, 2024). Despite these differences, both systems aim to address educational equity, though Finland's approach is more focused on ensuring equal access to quality education across the entire country.

**Table 2. The differences between the educational systems in Indonesia and Finland** (Al-Thani, 2024; Corral-Granados et al., 2023; Pupala et al., 2022)

Aspect	Indonesia	Finland
<b>Educational Structure</b>	Large-scale system serving a diverse population across thousands of islands, managed by the Ministry of Education.	Decentralized system with autonomy granted to local municipalities and schools.
<b>Compulsory Education</b>	Nine years (primary and junior secondary education).	Begins at age 7, continues through comprehensive schooling (primary and secondary).
<b>Focus of Curriculum</b>	Government emphasizes universal access and alignment with national development goals.	Prioritizes critical thinking, creativity, problem-solving, and minimal standardized testing.
<b>Challenges</b>	Disparities between urban and rural education, insufficient teacher training, limited tech access.	Focus on maintaining equity and student well-being, though some challenges around adaptation to evolving needs.
<b>Teacher Qualifications</b>	Teacher training programs need improvement; limited professional development opportunities.	Teachers are highly qualified, with all educators required to hold a master's degree.
<b>Technology Integration</b>	Efforts underway to integrate technology into classrooms and improve digital resources.	Strong focus on EdTech integration, with a student-centered approach and personalized learning experiences.
<b>Innovative Teaching Practices</b>	Government reforms aim to improve curricula and teaching quality.	Focus on innovation through creative teaching methods and fostering student-centered pedagogy.
<b>Educational Equity</b>	Disparities in educational quality between urban and rural areas.	Strong emphasis on equity and student well-being, ensuring all students have equal access to quality education.

### **Focus on literacy policies and the use of technology in primary schools**

Indonesia and Finland have distinct approaches to literacy policies in primary schools, shaped by their unique educational contexts. Indonesia focuses on addressing disparities in access to education across its archipelago, with initiatives like the "Gerakan Literasi Sekolah" aiming to foster a reading culture, though implementation is uneven due to challenges like



limited resources and inadequate teacher training, especially in rural areas. In contrast, Finland prioritizes equity and student well-being, integrating literacy into a broader, play-based curriculum that emphasizes individualized learning, teacher autonomy, and minimal standardized testing. Finland also excels in using technology to enhance literacy, with advanced tools and teacher training supporting personalized learning, while Indonesia faces challenges in implementing digital literacy programs due to unequal access to technology and infrastructure, particularly in remote areas.

## **RESEARCH METHODS**

This study employs a literature review method to explore the integration of educational technology (EdTech) in primary school management and its impact on improving literacy in Indonesia and Finland. The literature review approach is chosen to provide a comprehensive understanding of existing research, policies, and practices regarding EdTech in the context of primary education in both countries. The review examines scholarly articles, government reports, educational policy documents, and case studies from various academic databases, including JSTOR, ERIC, Google Scholar, and other relevant sources published within the past two decades.

The literature review is structured around key themes such as the role of EdTech in literacy development, the policies and initiatives implemented in both Indonesia and Finland, challenges and barriers to successful integration, and the outcomes of EdTech initiatives in primary education. Special attention is given to the differences in infrastructure, teacher training, and access to technology in rural versus urban areas, particularly in Indonesia, as well as the strategies employed by Finland to ensure equitable access to high-quality education.

In order to ensure a robust analysis, the review also includes comparative studies that analyze the effectiveness of EdTech tools such as digital libraries, adaptive learning software, and e-books in enhancing literacy skills. Additionally, the review investigates the role of teacher professional development in the successful integration of EdTech in the classroom, with a focus on Finland's teacher training model and Indonesia's evolving approach to educator capacity-building.

By synthesizing findings from a range of sources, this literature review aims to highlight the best practices, lessons learned, and key challenges that both Indonesia and Finland face in integrating EdTech to improve literacy outcomes in primary schools. The goal is to provide actionable insights for policymakers, educators, and researchers interested in leveraging technology to foster literacy in diverse educational contexts.

## **RESULTS AND DISCUSSION**

### **Result**

#### **Literacy Conditions in Primary Schools**

The literacy conditions in primary schools vary significantly between countries like Indonesia and Finland, reflecting disparities in resources, teacher training, and policy implementation. In Indonesia, primary schools often face challenges such as limited access to reading materials, inconsistent teacher training, and a lack of infrastructure to support literacy programs. Rural and underserved schools are particularly affected, with students having limited

exposure to books and digital tools essential for modern literacy development (Kartikasari & Nuryasana, 2022). Additionally, the reliance on rote learning in many Indonesian classrooms undermines efforts to develop critical thinking and comprehension skills. Despite these challenges, initiatives like the "Gerakan Literasi Sekolah" (School Literacy Movement) aim to improve these conditions by promoting reading habits and fostering a culture of literacy (Meri et al., 2023; Rahma Rahma et al., 2024).

In contrast, Finland exhibits exemplary literacy conditions in its primary schools due to a strong emphasis on equity, teacher autonomy, and well-designed literacy policies. Finnish students benefit from a curriculum that integrates reading and writing with creativity and problem-solving. Teachers are highly trained to identify and address individual student needs, ensuring that all children, regardless of their background, develop strong literacy skills (Purnama et al., 2022). Moreover, the use of digital tools and interactive learning methods in Finnish classrooms enhances student engagement and comprehension. These favorable conditions demonstrate the importance of a supportive ecosystem, where effective policies, teacher training, and technology come together to promote literacy from an early age (Purnama et al., 2022). This comparison underscores the need for tailored interventions in Indonesia to bridge the gap and improve literacy outcomes.

### **Analysis of Literacy Conditions in Indonesia and Finland**

The literacy conditions in **Indonesia** and **Finland** present stark contrasts, reflecting differences in their educational structures and resources. A complete analysis of the comparison is presented in Table 3. Indonesia's literacy development is hindered by significant disparities, particularly in rural areas, where there is limited access to reading materials, libraries, and digital tools (Ning et al., 2016). Traditional teaching methods based on rote memorization restrict critical thinking and comprehension skills, and many teachers lack sufficient training to implement effective literacy curricula. These challenges are compounded by underfunded policies and inadequate infrastructure, which affect literacy outcomes (Mayuni et al., 2020). In contrast, Finland's education system places a strong early emphasis on fostering a love for reading through play-based and student-centered learning. Finnish schools offer universal access to resources like libraries and digital tools, and teachers are highly trained, ensuring the effective delivery of literacy programs. Finland's focus on developing critical thinking, creativity, and problem-solving, combined with personalized teaching methods, contributes to its global leadership in literacy standards, providing comprehensive literacy development from early education.

**Table 3. Analysis of Literacy Conditions in Indonesia and Finland** (Ning et al.,

2016; Purnama et al., 2022; Rahma Rahma et al., 2024)

Aspect	Indonesia	Finland
<b>Literacy Development Approach</b>	Initiatives like the "Gerakan Literasi Sekolah" aim to enhance literacy, but significant disparities exist.	Strong early emphasis on fostering a love for reading through play-based and student-centered learning.
<b>Access to Resources</b>	Rural areas lack reading materials, libraries, and digital tools.	Universal access to libraries, digital tools, and other resources to support literacy activities.
<b>Teaching Methods</b>	Traditional rote memorization limits critical thinking and comprehension skills.	Personalized, innovative teaching methods that cater to individual student needs.
<b>Teacher Competency</b>	Many teachers lack sufficient training to implement literacy-focused curricula effectively.	Teachers are highly trained and qualified, ensuring effective implementation of literacy programs.
<b>Focus on Cognitive Skills</b>	Limited focus on developing critical thinking and problem-solving skills due to reliance on rote memorization.	Emphasis on critical thinking, creativity, and problem-solving embedded in literacy programs.
<b>Challenges</b>	Structural issues such as underfunded policies and inadequate infrastructure hinder literacy improvement.	Focus on maintaining equity and ensuring that all students receive high-quality literacy education.
<b>Literacy Outcomes</b>	Literacy outcomes are affected by systemic issues, such as underfunded education policies and resource gaps.	Finland leads in global literacy standards, with comprehensive literacy development from early education.

### Use of EdTech in Primary School Management: Case Study in Indonesia and Finland

The use of EdTech in Indonesia and Finland reveals substantial differences in their integration and infrastructure as clearly presented in Table 4. In Indonesia, EdTech is still in a developmental phase, with notable initiatives like the "Rumah Belajar" platform aimed at providing free access to resources, but its implementation is often limited to urban areas due to disparities in infrastructure and internet access (Muhaimin et al., 2020). Teacher training is insufficient, making it challenging for educators to effectively integrate technology into the classroom. As a result, the impact on student learning remains mixed, with some pilot programs, such as tablet-based learning, showing improvements in engagement and outcomes (Soekamto et al., 2022). However, challenges such as resistance to technology adoption and the need for capacity building in rural areas persist, limiting the widespread effectiveness of EdTech.

In contrast, Finland has successfully integrated EdTech into its education system, with digital tools seamlessly embedded into the curriculum to enhance both administrative efficiency and student learning. Finnish schools benefit from universal access to advanced EdTech tools, supported by robust infrastructure and comprehensive teacher training programs,

which ensure that educators are well-equipped to use these tools effectively (Mertala, 2020). Initiatives like personalized learning apps, data-driven platforms for student monitoring, and adaptive learning software contribute to significant improvements in both student outcomes and school management practices. Although some adaptation is necessary to ensure equity across all student groups, Finland faces minimal challenges compared to Indonesia, positioning it as a global leader in EdTech integration (Saari & Sääntti, 2018).

**Table 4 Comparative Use of EdTech in Primary School Management: Indonesia vs. Finland** (Al-Thani, 2024; Ning et al., 2016; Rahma Rahma et al., 2024)

Aspect	Indonesia	Finland
EdTech Integration	Still in developmental phase, with initiatives like "Rumah Belajar" offering free access to resources.	Highly advanced, with digital tools integrated seamlessly into the curriculum for administrative and learning purposes.
Access to Technology	Uneven distribution due to infrastructure and resource disparities, especially in rural areas.	Universal access to advanced EdTech tools and platforms, supported by strong infrastructure.
Key Initiatives	"Rumah Belajar" platform for learning materials, teacher training, and digital resources.	Personalized learning apps, data-driven platforms for monitoring student progress, adaptive learning software.
Teacher Training	Inadequate teacher training for EdTech use, leading to challenges in adoption.	Comprehensive teacher training programs ensuring effective use of EdTech tools.
Challenges	Uneven internet access, resistance to technology, and need for capacity building in rural areas.	Minimal challenges, though some adaptation is needed to ensure all students benefit equally.
Impact on Student Learning	Pilots like tablet-based learning programs have shown improvements in student engagement and outcomes.	Significant positive impact, with EdTech improving both student learning outcomes and administrative efficiency.
Infrastructure	Limited technological infrastructure in rural schools hampers widespread implementation.	Robust infrastructure supports the seamless integration of EdTech across all schools.

### Supporting and Inhibiting Factors of EdTech Integration

The successful integration of EdTech into primary education is heavily reliant on robust infrastructure, effective teacher training, and comprehensive policy support. Adequate infrastructure, such as access to reliable internet, computers, and digital tools, creates a foundation for EdTech adoption. In countries like Finland, a well-established digital infrastructure ensures that schools have the necessary resources to integrate technology

seamlessly. Teacher training is another critical factor, as it equips educators with the technical skills and pedagogical knowledge required to effectively use EdTech tools. In Finland, extensive teacher training programs ensure that educators are confident in incorporating digital tools into their lessons. Policy support, including funding and strategic frameworks, also plays a crucial role. Governments that prioritize technology in education by allocating resources and creating supportive policies, like Finland's education model, foster an environment where EdTech can thrive.

Despite its potential to revolutionize education, the integration of educational technology (EdTech) in developing countries like Indonesia is hindered by multiple factors. One of the most significant barriers is the lack of infrastructure, particularly in rural areas where internet connectivity is unreliable or non-existent. The limited availability of digital devices further exacerbates the problem, making it difficult for students and teachers to access EdTech resources. This digital divide disproportionately affects underprivileged communities, creating an unequal distribution of learning opportunities. Programs like Indonesia's "Rumah Belajar" aim to address these issues, but their effectiveness remains constrained by logistical challenges and inadequate financial support.

Another critical challenge lies in teacher training and professional development. Many educators in Indonesia lack the skills, knowledge, or confidence needed to effectively incorporate technology into their teaching practices. Teacher training programs are often inconsistent, and the absence of ongoing professional development opportunities leaves educators without the tools to adapt to new technologies. As a result, even when digital resources are available, their potential remains untapped due to low technological literacy among teachers. This issue highlights the need for a comprehensive, systematic approach to teacher training, including both initial preparation and continuous professional learning opportunities.

Policy and financial support further compound the challenges of EdTech integration. While the Indonesian government has introduced various initiatives, the lack of substantial funding and a clear implementation framework limits their success. Programs designed to bridge the technological gap often lack scalability and sustainability, especially in remote regions where resources are scarce. Overcoming these obstacles requires **targeted investments** in building robust infrastructure, such as expanding internet access and providing affordable digital devices. Additionally, policies must prioritize equitable access to technology and promote collaboration between the public and private sectors to ensure long-term sustainability. By addressing these barriers, developing nations like Indonesia can unlock the full potential of EdTech and create more inclusive and effective learning environments.

## CLOSING

The review of educational technology (EdTech) and its role in improving literacy outcomes highlights several key findings. Firstly, EdTech has proven to be an effective tool in addressing literacy challenges, especially in areas with limited access to traditional educational resources, such as rural or underserved regions. By leveraging digital tools like e-books, learning management systems, and gamified applications, EdTech provides equal opportunities for students to access quality learning materials, regardless of their geographical location. In

multilingual societies such as Indonesia, language translation tools and localized content further ensure that literacy resources are culturally and linguistically appropriate, making them more accessible and effective. The integration of EdTech in Finland's education system further demonstrates its potential, with tools such as AI-powered platforms offering personalized learning and fostering collaboration through digital tools, which enhances literacy development and critical thinking skills. Overall, EdTech offers transformative potential, not only in improving literacy but also in democratizing access to education.

The benefits of EdTech in improving literacy are evident. It allows for greater accessibility to educational content, bridging the resource gap between urban and rural schools. Moreover, it promotes more engaging and interactive learning experiences, particularly through gamification and adaptive learning platforms, which can motivate students to develop their literacy skills in a more enjoyable and personalized manner. EdTech also facilitates ongoing learning, offering real-time feedback that helps students progress at their own pace, which is particularly beneficial in diverse educational settings. The flexibility of digital tools further supports inclusive education by addressing the varied learning needs of students, thus contributing to more equitable literacy outcomes.

Based on the findings of this review, several recommendations can be made for various stakeholders in the education system. For governments, it is crucial to implement policies that support the integration of educational technology in schools, particularly in underserved and rural areas. These policies should focus on funding for infrastructure development, such as reliable internet access and electricity, as well as subsidies or incentives to make EdTech tools more affordable and accessible to all schools, regardless of their location or funding status. Additionally, governments should prioritize digital literacy from an early age, incorporating technology-driven education into national curricula to ensure that students are well-equipped for the digital world.

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