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Original Article

Transformation of Language, Literature and Technology in Learning

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Abstract

This study aims to implement the transformation of language, literature and technology views in learning (transportation). The research method uses the Systematic Literature Review (SLR) Prism Method. The results of the study produced 8,675 similar articles, then a screening was carried out so that 3 articles were left ready to use. The first article discusses building height estimation using deep learning-based street view imagery, the second article proposes the design of an Internet of Things (IoT)-based intelligent transportation system to support smart cities, and the third article explores the role of e-learning in enhancing green innovation and technology for sustainable management practices. This research highlights the importance of integrating advanced technologies such as AI, IoT, and deep learning in supporting sustainability, innovation, and smart city management. The results show that green technologies and innovations have great potential in creating more efficient and sustainable solutions in various sectors, whether in education, transportation, or urban management. This paper demonstrates that implementing advanced technologies in transportation systems yields significant positive outcomes across multiple domains: enhancing urban mobility efficiency, promoting sustainable development practices, and providing valuable frameworks for future smart city initiatives.

Keywords: Language, Literature, Transformation, SLR Prisma Method.

1. Introduction

The term 'learning' is an extension of 'teaching,' and both terms, along with 'teaching and learning,' can be subjects of debate or simply acknowledged for their important meanings (Ruhimat, 2011). Learning is a process carried out by a person or teacher in order to teach a student. In the context of education, learning is seen as a means of changing the environment in such a way that individuals can develop in a particular environment (Miarso, 2004).

Transformation in language and literature education in the digital era is now essential to enhance students' learning experiences (Jufri, 2013; Rusman, 2012; Trianto, 2010; Yamin, 2009). This project involves integrating technology that not only enhances learning materials but also increases student engagement in the learning process. Teachers act as facilitators and motivators for students in using technology in schools (Fadillah et al., 2022; Gebremariam & Mulugeta, 2025). They need to be trained to integrate technology effectively into learning, to ensure that students not only understand the material but are also able to use technology effectively (Prastowo, 2019; Rachmawati, 2015). Despite the rapid development of technology, the role of teachers in language and science education remains important (Kurniawan, 2011; Lestari, 2013). Technology plays a vital role in helping teachers provide feedback to students in a more effective and efficient manner.

The use of technology in education is an unavoidable reality. Technology is described as a tool that can enhance collaboration and motivate students to return to school and enable them to improve their multimodal performance (Flavin, 2017; Siemens & Schreibman, 2013).

The use of technology has shifted from a local perspective to a global perspective as a means to meet the ever-increasing needs and demands. The exploration of digital technology is focused on learning methods to achieve practical knowledge goals. In practice, digital technology has the potential to enhance students' ability to learn in a more efficient way and expand their multimodal capabilities (Heriawan & Darmajari & Sanjaya, 2012; Huda, 2013).

The exploration of digital libraries and hermeneutics accelerated through digital technology is an attempt at a new approach and experimentation (Steggle, 2013). In the era of globalization, this will be needed by almost every citizen and student (Albaburrahim et al., 2023). Especially the general public and students who are educated and technology literate. Continuing on the transformation of language and literature towards education.

Transformation in Indonesian language and literature learning has undergone significant developments, especially along with technological advances and social changes. The digital era has brought many innovations that have changed the way of teaching and learning, making it more interactive and relevant to the needs of today's students.

Digital literacy has become one of the most important aspects in the transformation of language and science education. It is hoped that by utilizing digital literacy, students will be able to develop creative and interactive language skills. Including the ability to access information online, participate in virtual discussions, and use various digital tools to explore literary works.

The challenges and opportunities in this transformation include several aspects (1) Teacher Skills: To realize this transformation, teachers must have adequate technological skills. They must be able to use various digital devices and innovative teaching methods to improve learning effectiveness (2) Student Engagement: The main goal is to improve student welfare. With a more interactive and creative approach, it is hoped that students will be more motivated to learn the language and its rules. (3) Adaptation to Change: In order to face the era of society 5.0, language and science education must continue to adapt to changes in society. Including updating the curriculum and teaching methods to remain relevant to changes in the world.

The transformation of Indonesian language and culture into the digital era has provided many opportunities to improve the quality of education. With the integration of technology, the development of digital literacy, and the development of relevant curriculum, it is hoped that the learning process will be more effective and enjoyable for students. However, challenges in terms of teacher performance and student satisfaction must be overcome for this transformation to be successful.

Based on the explanation above, the problem formulation can be taken, namely how to implement the transformation of language, literature and technology in the learning perspective. The study highlights the importance of integrating advanced technologies like Artificial Intelligence (AI), Internet of Things (IoT), and deep learning into education. This integration is crucial for modernizing learning methods and making them more efficient, interactive, and engaging. As technology evolves, traditional teaching methods become less effective. By incorporating technology, educators can create a more dynamic learning environment that prepares students for the demands of the digital age.

2. Literature Review

2.1. The Role of Technology in Language and Literature Learning

2.1.1. Technology Integration

The use of technology in Indonesian language learning allows students to create memorable learning experiences. Digital platforms provide access to a variety of resources, such as learning apps, videos, and virtual schools, which increase student engagement. Technology also allows for immediate feedback on student progress, making the learning process more efficient.

2.1.2. Interactive Learning

Technology-based learning can increase students' motivation and interest. Students can engage with the material actively, which helps them understand language and literature concepts better. For example, the use of video and multimedia in teaching can make the material more interesting and easier to understand.

2.1.3. Relevant Curriculum

The transformation of language and literature education also achieves the development of a curriculum that is integrated with the context of students' lives. The aim of this activity is to connect theory and practice, so that students not only learn grammar or structural analysis, but also how to apply it in real-life situations.

2.2. Technology Development Index on Indonesian Learning

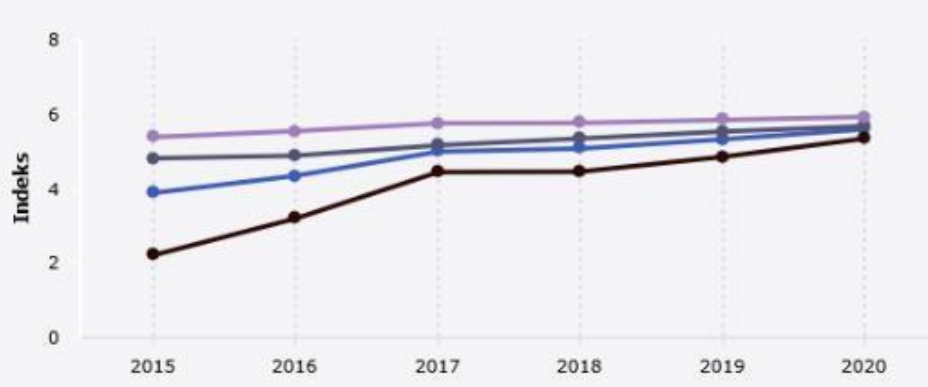

Figure 1. Indonesian technology development index
Source: Katadata (2021)

Based on the graph above, it shows that there is an annual increase in the technology development index in Indonesia from 2015 to 2020. This is in line with the opinion expressed by Miarso (2004) which states that technology is the process of increasing the value of a product. Technology is different from other products and functions as an integral part of a system.

According to Niaisbitt et al. (2002), in Random House Dictionary. Technology is a thing, object, material, and form that is ddifferent from humans. According to Wikipedia, the most popular wiki site in the world, technology is the provision of goods and services necessary for human survival and well-being

2.3. Trends in the Transformation of Language, Literature and Technology Research towards Learning

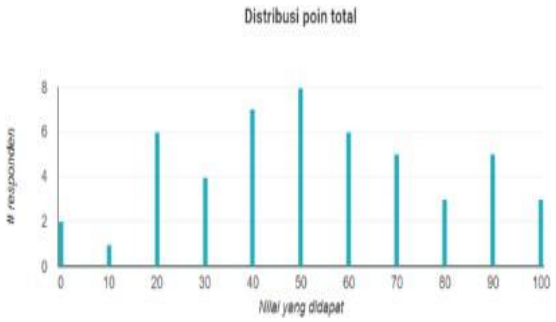

Figure 2. Research trends

This data comes from an online survey conducted through social media platforms, with around 50 respondents. Based on the data provided, it can be concluded that 52.6% of the 50 respondents have a score. In addition, there are only 11 respondents with a score above 70. The data visualization below, which illustrates the survey results, can be used to calculate the average and median values.

Furthermore, the data shows that the ratio of 52.6% and the median of 50 indicate that focusing on language, science, and technology research results in better learning outcomes for millennials and young people. This is also supported by data on languages that are often used and studied by millennials and young people.

2.4. Literature Learning in Schools Supports the Industrial Revolution 4.0

Nurgiyantoro (2010) argues that literature, as an advanced discipline, is not only about language but also involves other higher-level skills. Literature is composed of language meaning. However, literature is also influenced by life phenomena that require renewal. Factors that influence literature learning in schools include learning objectives, learning materials, and feedback on learning outcomes. Literature as a subject in schools also requires a pair of subjects and clear explanations.

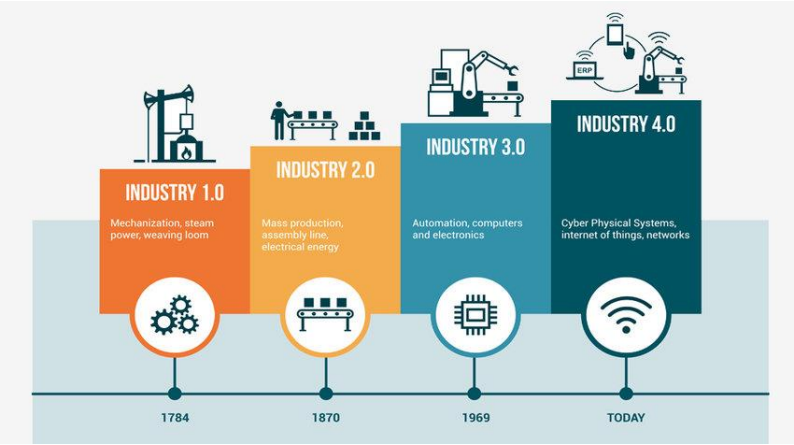

Figure 3. The industrial revolution of language and literature

Source: https://www.seekmomentum.com/blog/manufacturing/the-evolutionof-industry-from-1-to-4

3. Methods

This study uses the Systematic Literature Review (SLR) methodology of the prism method. The study was conducted through identification, analysis, synthesis, and replication of previously published research. Through this SLR method, researchers can identify, examine, analyze, and summarize published research. Through the use of SLR, researchers can systematically identify and evaluate journal articles, considering the length and methods that have been determined (Triandini et al., 2019).

This research is qualitative and descriptive, with a focus on collecting qualitative information from relevant articles, such as content analysis of abstracts, titles, and article language. The data sources came from scientific articles retrieved from the Springer database, with an initial number of 8,671 articles, as well as an additional 4 articles from other relevant database. The focus of the data was then narrowed down based on the keywords "language, literature, and technology."

Data collection techniques included searching for articles in the database, followed by a filtering process based on certain criteria, such as removal of duplicate articles and relevance analysis of abstracts, titles, and language (English). Articles that did not match the keywords were also excluded. This process resulted in filtering down to the final 10 relevant articles for review. The data analysis technique used was qualitative, where the researcher analyzed the titles, abstracts, and content of the articles to ensure relevance. In addition, the articles were grouped based on the themes of language, literature, and technology transformation, and then organized for in-depth review.

4. Results and Discussion

4.1. Search Results using the SLR Prisma method

Based on the search results using Springer, a total of 8,671 articles were identified on the transformation of language, literature, and technology in learning. Additionally, four related research articles were integrated, bringing the total to 8,675 articles.

The researcher then focused on the abstracts, leading to the exclusion of 8,000 articles, leaving 675 articles for further review. Subsequently, a more refined search using the keywords language, literature, and technology reduced the selection to 50 articles.

Following this, five articles were excluded, while five were categorized as reports sought, five as reports not retrieved, and 25 as reports assessed. Among these 25 articles, 15 were found to be irrelevant based on their abstract, title, and discussion, resulting in a final selection of 10 articles. The results are illustrated in Figure 4 below.

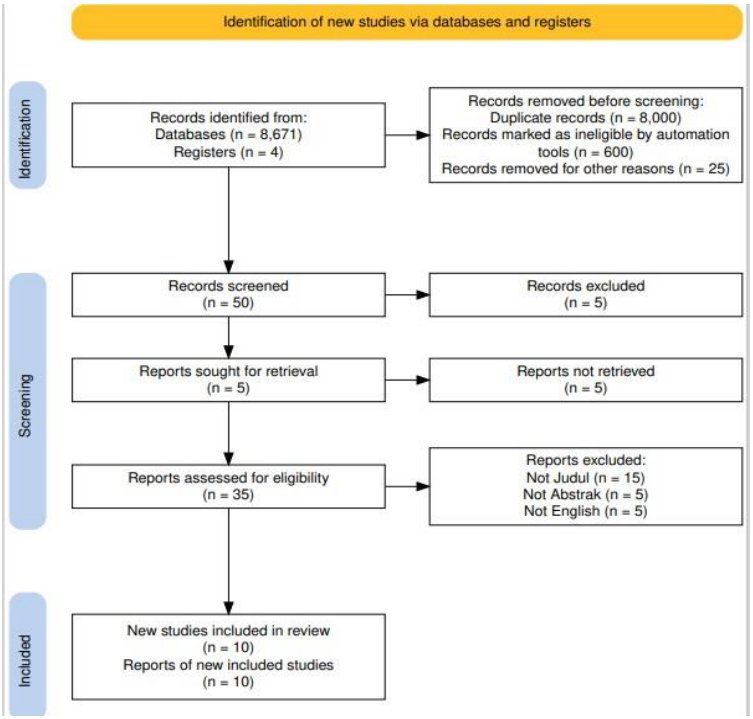

Figure 4. PRISMA Flow Diagram of the Systematic Literature Review Process

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram outlines the systematic article selection process. An initial database search on Springer identified 8,671 articles, with four additional sources bringing the total to 8,675. The screening phase removed 8,000 articles based on abstract relevance, leaving 675 articles. Further filtering by keywords (language, literature, and technology) reduced this to 50 articles.

In the eligibility phase, five articles were excluded due to inaccessibility, five were sought for full-text review, five were not retrieved due to access restrictions, and 25 were assessed for eligibility. Of these, 15 were excluded for misalignment with the research focus, leaving 10 articles that met all inclusion criteria. After further refinement using Scispace analysis, three articles remained.

Selection criteria included relevance to language, literature, and technology transformation in learning, English-language publications, full-text availability, alignment with research objectives, peer-reviewed status, and consistency with the keywords in the abstract, title, and discussion.

4.2. Selected articles

Of the 10 articles selected, only 5 were accessible through Open Access as shown in Table 1. Based on Table 1, five journal articles highlight the role of technology and innovation in various contexts, such as sustainability, education, and smart city management, which are increasingly relevant in the modern era. The first article was written by Nusraningrum et al. (2024) focuses on how e-learning can be an important mediator in driving green innovation and green technologies for sustainable management practices. With the increasing need for environment-based management, this article contributes to linking digital technology with sustainability efforts in the management sector.

Second article by Guo et al. (2024) discusses the design of an Internet of Things (IoT)-based intelligent road transportation system in the context of a smart city. With IoT integration, this transportation system not only has the potential to reduce congestion and

improve efficiency, but also supports sustainability through real-time data management and carbon emission reduction.

Liang et al. (2024) discusses how artificial intelligence (AI) technology can accelerate green transformation in enterprises. This perspective is important because AI not only helps companies optimize operations but also drives sustainability-focused green innovation. This research is relevant for businesses that are increasingly faced with demands to adopt environmentally friendly practices.

Fourth article by Doyle (2024) focuses on digital learning tools in supporting technology education, especially in the context of STEM (Science, Technology, Engineering, and Mathematics). This article highlights the importance of integrating technology in the learning process to equip students with 21st century skills, despite being in Q4, its contribution is significant in driving educational innovation.

Lastly, Al-Habashna & Murdoch (2024) using deep learning and automated geospatial analysis for building height estimation from street images. This research is not only relevant to the development of geospatial technology, but also supports sustainability in urban planning and management. By integrating cutting-edge technologies, this article provides practical solutions to challenges in urban planning and construction.

Table 1. Selected articles

No	Author	Year	Title	Journal	Citation	Q
1	Dewi Nusraningrum, Winda Widyanty, Sonny Indrajaya, Nimit Soonsan, Suphattra Sangthong & Kanyapat Pattanapokinsakul	2024	Improving E-learning mediating green innovation and green technology for green management practice	Discover Sustainability	1	Q3
2	Huichao Guo, Runhua Huang & Zhiming Xu	2024	The design of intelligent highway transportation system in smart city based on the internet of things	Scientific Reports	1	Q1
3	Peng Liang, Xinhui Sun & Luzhuang Qi	2023	Does artificial intelligence technology enhance green transformation of enterprises: based on green innovation perspective	Environment, Development and Sustainability	1	Q2
4	Andrew Doyle	2024	Technology and Digital Learning Tools: Technology Education and Educational Technology	Technology Education in STEM Teaching and Learning	1	Q4
5	Ala'a Al-Habashna & Ryan Murdoch	2024	Building height estimation from street-view imagery using deep learning, image processing and automated geospatial analysis	Multimedia Tools and Applications	1	Q4

Overall, these five articles demonstrate the central role of advanced technologies such as AI, IoT, and deep learning in supporting sustainable development, technology education, and

smart city management. Articles published in Q1 and Q2 journals such as Scientific Reports and Environment, Development and Sustainability have a greater academic influence due to the level of quality and scope of their discussions. However, articles in Q3 and Q4 also make important contributions in their respective fields, demonstrating that digital technology can be a catalyst for innovation in various sectors. The studies highlighted how digital transformation can serve as a strategic tool to achieve global sustainability, whether through education, innovation or urban management.

However, after analysis using Scispace, it was found that two articles could not be downloaded because they were part of another chapter. Thus, only three articles remained usable. Here is the description:

Table 2. Three Selected Articles

No	Article Title	Research Results
1	Building height estimation from street-view imagery using deep learning, image processing and automated geospatial analysis	This paper focuses on building height estimation from street view images. Street view images and building footprints are becoming increasingly available data sources. Results show the scalability and effectiveness of the proposed method.
2	The design of intelligent highway transportation system in smart city based on the internet of things	This paper designs an intelligent road transportation system. It utilizes the Internet of Things and cloud computing technology. This research addresses gaps in existing intelligent transportation systems.
3	Improving E-learning mediating green innovation and green technology for green management practice	E-learning enhances green and technological innovation in management practices. Green innovation and technology mediate e-learning and management practices.

The analysis results in Table 2 show that the study of Al-Habashna & Murdoch (2024) makes an important contribution to the development of green technologies integrated with sustainable management. Research by Al-Habashna & Murdoch (2024) specifically focused on building height estimation using street view images, reflecting an innovative approach in utilizing visual-based technologies to support green practices. Data obtained from street view images and building footprints are becoming increasingly available resources thanks to the development of remote sensing and image processing technologies. The results of this study show that the proposed method has high scalability, so it can be widely implemented. Moreover, its effectiveness in providing relevant data for green management purposes confirms that this approach can be a practical solution to reduce environmental impacts.

Study of Guo et al. (2024) proposes the design of an intelligent road transportation system that is part of the smart city infrastructure. This research shows how the Internet of Things (IoT) and cloud computing technologies can be integrated to create a more efficient, safe, and environmentally friendly transportation system. IoT enables real-time data collection from various sensors installed on roads, such as traffic data, weather, and road conditions. Meanwhile, cloud computing enables complex data analysis and rapid solution provision for transportation management. However, Guo et al. (2024) also identifies gaps in the implementation of existing intelligent transportation systems, including technical challenges such as IoT device interoperability, costly infrastructure requirements, as well as

data security issues. This research provides an important basis for addressing these gaps, while pointing to new directions in the design of innovative transportation systems.

Research of Nusraningrum et al. (2024) emphasizes the role of e-learning in mediating green innovation and technology in management practices. In this context, e-learning serves as a platform that enables the transfer of knowledge related to green practices widely and effectively. Nusraningrum et al. (2024) found that e-learning not only increases awareness of the importance of green innovation, but also helps organizations to adopt green technologies in their operations. Furthermore, green innovation and technology act as mediators that strengthen the impact of e-learning on the successful implementation of sustainable management practices. In other words, this research suggests a synergistic relationship between educational technology, green innovation and management efficiency.

These three studies, while having different focuses, complement each other in highlighting the importance of technology and innovation in achieving sustainability. The first and third studies show how green technology and e-learning can support sustainable management, both through efficient data collection and technology-facilitated learning. On the other hand, the second study provides insights into how smart technologies can be applied in the context of transportation to support the smart city concept. Overall, these three studies emphasize the need for the integration of technology, green innovation and management to create solutions that are not only innovative, but also sustainable and relevant to future needs.

5. Conclusion

The implementation of language, literature, and technology transformation in the learning perspective has a positive impact on the development of learning. This is evidenced by the increasing numbers in the graph for technological improvements in learning. The theoretical implication of this research is the development of an understanding of the role of advanced technologies such as artificial intelligence (AI), Internet of Things (IoT), and deep learning in promoting sustainable development and innovation. This research enriches theories related to digital transformation, sustainable management, and technology integration in education and smart city management. For example, the application of e-learning as a mediator in facilitating green innovation strengthens the theory of the role of educational technology in supporting environmental awareness and green practices in organizations.

Practically, the implications of this research provide guidance for policy makers, practitioners and industries to focus on the application of advanced technologies in sustainable and efficient solutions. In education, the results of this study encourage the integration of e-learning to support the adoption of green technologies in the managerial sector, as well as increase public knowledge about sustainability. Practitioners in the transportation and smart city sectors can use the findings on IoT and cloud computing to design efficient and environmentally friendly transportation systems, while overcoming technical challenges such as device interoperability and data security. In addition, geospatial technologies such as deep learning for building height estimation open up opportunities for better urban planning and environmental management, and provide recommendations for developers and urban planners to explore the application of geospatial technologies in resource management and more sustainable planning.

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