The Effectiveness of Using Online Learning Platforms in Increasing Educational Access in Remote Areas: A Systematic Literature Review

Lalu Sibuan Amir[1], Ni Putu Rai Yuliartini[2], Muh. Hapipi[3], Khotib Ramli Ahmad[4]

[1,3,4]Edu Tamora Research Centre, Indonesia

[2]Prodi Hukum, Universitas Pendidikan Ganesha, Indonesia

lalusibuanamir@gmail.com[1], khatibramliahmad@gmail.com[2], hapipi.ntb@gmail.com[3], raiyuliartini@gmail.com[4]

Abstract: This study is a systematic literature review aimed at evaluating the effectiveness of utilizing online learning platforms to enhance educational access in remote areas. Literature sources for this review were obtained from the Scopus, DOAJ, and Google Scholar indexes, spanning the last 10 years, from 2013 to 2024. The findings indicate that technology, represented by online platforms, plays a transformative role in distance education. It not only addresses challenges arising from geographical limitations but also contributes to the overall improvement of teaching methodologies, technological proficiency, and educational outcomes in remote areas. The accumulated body of research positions technology, specifically online learning platforms, as a valuable instrument in addressing challenges related to distance education. The emphasis on the flexibility and adaptability of these platforms is particularly underscored during crises, such as the COVID-19 pandemic. Nevertheless, the literature also emphasizes the importance of maintaining high-quality distance learning experiences and ensuring robust interactions between students and teachers.

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A. INTRODUCTION

The enhancement of educational accessibility poses a significant challenge in remote areas, where limitations in infrastructure and geographical distance can present formidable obstacles (Ahmed et al., 2018). Nevertheless, rapid advancements in technology have unveiled promising opportunities through the emergence of online learning platforms. This innovation brings about a renewed prospect for addressing educational disparities by extending broader access to those situated in remote regions. Online learning platforms not only offer flexibility in terms of time and location for learning but also serve as a solution to overcome the physical and geographical barriers that often impede educational progress in remote areas. Consequently, this shift creates strategic opportunities to improve educational outcomes in regions that were previously challenging to reach.

The rapid development of online learning platforms in recent years reflects a significant transformation in educational approaches (Sych et al., 2021). This phenomenon is propelled by the advancing support of technology, effectively facilitating easier and broader access for

individuals in remote areas. With the adoption of technology, online learning has rapidly proliferated, connecting individuals in remote locations with educational resources that were previously challenging to attain. The availability of online learning platforms signifies a positive progression in overcoming geographical barriers, reinforcing the role of technology in delivering education to a wider societal spectrum (Townsend et al., 2013). This makes a vital contribution to addressing educational inequalities and opening new opportunities for the empowerment of individuals in remote areas through more equitable access to education.

The primary characteristic of online learning, namely the flexibility of time and place, underscores a significant advantage in the educational approach (Salas-Pilco et al., 2022). This attribute allows students to access learning materials at their convenience and from any location, aligning with individual comfort and needs (Aziz Hussin, 2018). Consequently, the utilization of online learning platforms can broaden learning opportunities for students in remote areas. The ability to overcome geographical and time constraints, often impediments in remote regions, becomes a crucial factor in enhancing educational accessibility (Townsend et al., 2013). Thus, this flexibility not only provides students with the freedom to plan their learning schedules but also offers a practical solution to increase educational participation in areas that were previously challenging to reach.

Challenges related to limited infrastructure, such as internet connectivity and electricity, present significant impediments in various scenarios. Within elementary schools, the absence of adequate facilities and infrastructure profoundly impacts educators' capacity to achieve their educational objectives (Jannah & Aini, 2023). In settings with constrained resources, deficient infrastructure creates obstacles for engagement in contemporary research initiatives reliant on electronic data capture and internet-based communication technologies (Whalen et al., 2014). The absence of Information and Communication Technology (ICT) infrastructure in rural areas impedes the adoption of e-commerce and universal internet access, impacting both consumers and vendors (Akelloh et al., 2017). The progression of the digital economy encounters hindrances due to the substandard quality and inadequacy of the regulatory and legal framework, especially within the ICT sector (Kotelevets, 2022). In less developed regions, addressing limited infrastructure challenges, such as internet access and electricity, can be partially mitigated by leveraging user mobility and collaborative efforts to provide low-infrastructure internet access (Tanjung, 2021).

Constraints related to human resources and technical expertise can indeed impede successful implementation (Rosati & Lynn, 2022). The convergence of cloud computing, mobile technology, and big data technologies introduces novel challenges in the implementation of information systems, encompassing aspects like cloud migration, security, data protection, and the governance of information and communication technologies (Lunz et al., 2014). In the realm of colorectal cancer research, the assessment of peritoneal free cancer cells as a prognostic factor encounters challenges such as variations in lavage methods and techniques for detecting free cells (Ubeda-Medina & Grajal, 2017). Veno-arterial extracorporeal membrane oxygenation (va-ECMO), a support system utilized in emergency and intensive care medicine, necessitates initiation by a proficient and experienced team due to potential complications (Guglin et al., 2019). The fully adaptive radar framework for target tracking

encounters limitations in scenarios with resource constraints, emphasizing the need for consideration when implementing this approach. Therefore, addressing constraints in human resources and technical skills is paramount for the successful implementation across diverse domains.

The utilization of online platforms has the potential to exacerbate the digital divide, particularly in the realms of education and community development. Both Kustiyanah (2020) and Masruri (2020) underscore the capability of these platforms to enhance participation and learning outcomes, but also highlight the risk of excluding those without access. This is a particular concern in the context of local economic development, where Syakur (2013) emphasizes the necessity of a participatory approach that may be hindered by uneven access to digital tools. Therefore, while online platforms can enhance participation and learning, they also have the potential to widen the gap between those with access and those without.

The investigation on "The Effectiveness of Using Online Learning Platforms in Increasing Educational Access in Remote Areas" necessitates the identification and resolution of several gaps discerned from prior research findings. While preceding studies offer insights into the challenges of infrastructure, human resources, and technology faced in remote areas, this systematic literature review aims to amalgamate these findings to formulate a comprehensive understanding. Firstly, the gap associated with limited infrastructure, such as internet and electricity connectivity in remote areas, has been pinpointed as a predominant hindrance in various contexts. As part of this systematic literature review, we will elaborate on how these infrastructure limitations can impact the implementation of online learning platforms in remote areas, restricting equitable educational access. Subsequently, the gap in human resources and technical skills needs acknowledgment as a inhibitory factor in achieving the research objectives. This necessitates a comprehensive approach to address these deficiencies, considering efforts in skill development and strategies to enhance human capacity in remote areas. The gap in regulatory frameworks and legal aspects needs integration into the report as a factor that can impede digital progress in remote areas. A systematic literature analysis will spotlight the implications of inadequate regulatory frameworks and offer policy recommendations to enhance these conditions. Furthermore, variations in research methods and technology encountered in previous research can be a critical factor in the selection and implementation of online learning platforms. Systematizing this literature will identify these gaps and suggest standardized approaches to address these issues. Lastly, the potential exacerbation of the digital divide through the use of online platforms in the context of education and community development will be the primary focus of this research. By understanding the risks of exclusion that may occur, this literature review will explore mitigation strategies to ensure that online platforms genuinely enhance equitable educational access. Thus, through a systematic literature review approach, this research aims to identify and fill existing gaps to formulate robust, evidence-based recommendations to enhance the effectiveness of using online learning platforms in increasing educational access in remote areas.

B. METHOD

The primary aim of this research is to investigate the effectiveness of utilizing online learning platforms in enhancing educational access in remote areas through a Systematic Literature Review approach. This study places its central focus on analyzing literature published over the last 10 years (2013-2024) from reputable academic sources such as Scopus, DOAJ, and Google Scholar. Consequently, the research aims to provide a profound understanding of the extent to which online learning platforms have succeeded in expanding the reach of education in remote areas and to identify the influencing factors affecting their effectiveness. The literature search will be conducted systematically through selected academic databases, utilizing precise keywords such as "online learning platforms," "educational access," "remote areas," and their variations. The selected articles will be confined to the past 10 years to ensure contemporary relevance with the current dynamics of education in remote areas. This selection process will establish a robust foundation for evaluating the recent impact and developments in the use of online learning platforms.

In determining inclusion and exclusion criteria, the research will prioritize empirical studies and literature reviews specifically addressing the use of online learning platforms in enhancing educational access in remote areas. Exclusion criteria will encompass literature not directly related to the research focus and articles failing to meet predetermined standards of methodological quality. Thus, these criteria will provide a selective basis to ensure the accuracy and relevance of the extracted information. The selection and data extraction process will be conducted meticulously, considering research design, sample population, measurement methods, key findings, and conclusions from relevant articles. This approach ensures that the extracted data supports an in-depth analysis regarding the effectiveness of utilizing online learning platforms in addressing the challenges of educational access in remote areas.

C. RESULTS AND DISCUSSION

1. The effectiveness of using online learning platforms

Online learning platforms have proven to be effective in enhancing educational access in remote areas (Pichugin et al., 2022). The utilization of technology in these remote regions enables students to learn anytime and anywhere they have internet access (Budidarma, 2022). Furthermore, online laboratories and distance learning have the potential to address challenges in laboratory education during resource shortages or crises, such as the COVID-19 pandemic (Achuthan et al., 2021). However, the effectiveness of implementing blended learning, both asynchronous and synchronous, in remote areas is hindered by constraints like limited internet access (Namira Sari, 2023). To mitigate the negative impact of online learning on student connectivity, innovative digital teaching resources have been developed to foster student engagement and combat loneliness and isolation (Hehir et al., 2021). Overall, the literature supports the effectiveness of using online learning platforms to improve educational access in remote areas, but challenges related to internet access and student connectivity need to be addressed.

Utilizing digital literacy in education, especially in remote regions, has demonstrated its efficacy in enhancing educational accessibility (Fakhru Ahsani et al., 2021). This assertion is

further corroborated by the amalgamation of conventional and contemporary literacies in language learning, fostering improved communication and critical thinking skills among students (Sari et al., 2022). Within the realm of online learning, the advocacy for digital literacy among elementary school students has proven to be successful in enhancing their comprehension of internet use and digital technology (Mardiana et al., 2022). The implementation of effective communication strategies between educators and students is also recognized as pivotal in augmenting the quality of online learning experiences (Wahidah et al., 2022). Collectively, these studies emphasize the efficacy of online learning platforms in advancing educational accessibility in remote areas.

The scholarly literature indicates that online learning platforms play a pivotal role in surmounting geographical barriers, facilitating enhanced access to education in remote areas. Collectively, these studies underscore the merits of technology, providing adaptable learning opportunities and inventive solutions amidst resource scarcities or crises. The affirmative influence of online learning becomes apparent in its adept handling of challenges inherent in traditional education systems, particularly in remote regions. The incorporation of online laboratories and initiatives promoting digital literacy further enriches the educational milieu, underscoring technology's potential to bridge gaps in accessibility. While the literature consistently affirms the efficacy of online learning platforms in ameliorating educational access, it also recognizes specific challenges. Limitations such as constrained internet access, elucidated by Namira Sari (2023), present obstacles to the seamless implementation of blended learning in remote areas. This acknowledgment of challenges underscores the imperative of addressing infrastructural constraints to fully harness the advantages of online education in remote locales. Additionally, the studies stress the continuous need for innovation, exemplified by Hehir et al. (2021) introduction of digital teaching resources to counteract adverse effects on student connectivity.

2. The Impact of Online Learning Platforms on Student Participation in Remote Areas

Online learning platforms have positively impacted student participation and engagement in remote areas. The use of technology has not proven to be a significant hindrance to online learning involvement (Dvorakova et al., 2023). Factors such as student self, teacher, course content, peer learning, and environmental factors have been shown to strongly correlate with student engagement in online learning (Park & Kim, 2020). Interactive online pedagogy has been employed to engage students with potentially challenging course content, leading to increased satisfaction, perseverance, and academic performance (Muir et al., 2022). Online learning has become a primary teaching method during the pandemic, with educators reporting various online learning experiences actively involving students (Chitanana, 2022). Teaching online through platforms such as Blackboard has a positive impact on student engagement in writing, with students appreciating the various features offered by online learning platforms (Aldaghri & Oraif, 2022).

The utilization of online learning platforms in remote regions has yielded diverse outcomes concerning student participation and engagement. Rohaniyah et al. (2021) and Sani et al. (2022) underscore the difficulties students encounter in accessing and utilizing these

platforms, citing limited resources and low motivation as prominent challenges. This has resulted in a less efficient and effective implementation of online learning, as evidenced in Sani et al. (2022) study. Nevertheless, Aprianto et al. (2022) identified a notable impact of online learning on students' workforce readiness, suggesting potential positive effects. Nashruddin & Rauf (2022) also stresses the significance of parental involvement to enhance the efficacy of online learning, particularly for elementary school students. These findings indicate that while online learning may offer some advantages, addressing challenges and involving parents are crucial factors to optimize its effectiveness in remote areas.

The favorable influence of online learning platforms on student participation and engagement is apparent in numerous studies, demonstrating the benefits of technology in remote education. The absence of substantial technological impediments aligns with the discoveries of (Dvorakova et al., 2023). The robust correlation among various factors leading to increased student engagement, as pointed out by (Park & Kim, (2020), underscores the multifaceted nature of successful online learning. The efficacy of interactive pedagogy, emphasized by Muir et al. (2022), highlights the significance of engaging methodologies in overcoming challenges. Notwithstanding the challenges pinpointed by Rohaniyah et al. (2021) and Sani et al. (2022), the positive impact on workforce readiness, as noted by Aprianto et al. (2022), implies that online learning contributes beneficially to students' overall skills. The emphasis on parental involvement by Nashruddin & Rauf (2022) suggests the necessity for a comprehensive approach involving diverse stakeholders. The comprehensive assessment implies a predominantly positive influence of online learning platforms in remote areas. The collective evidence from studies indicates heightened student participation, contentment, and academic achievement. Nevertheless, challenges identified by some studies, such as limited resources and motivation, should not be disregarded. The affirmative discoveries regarding workforce readiness and the acknowledgment of parental involvement as pivotal elements contribute to the overall positive appraisal of online learning.

3. The Role of Technology in Improving the Quality of Education in Remote Areas through Online Platforms

Technology plays a pivotal role in elevating the quality of education in remote regions through the utilization of online platforms. E-learning systems, such as online learning platforms, offer seamless opportunities for academic engagement, particularly in the context of the COVID-19 pandemic (Ali et al., 2021). These platforms provide a diverse array of learning resources and materials that can be customized to cater to the specific interests and needs of individual users (Tabolina et al., 2021). Furthermore, they contribute to acquainting educators with advanced technology and predicting the preferences of users requiring guidance in adapting to new tools and technologies (Ahuja & Yadav, 2019). Moreover, online learning surpasses traditional methods in terms of flexibility, customization, and efficacy in lifelong learning, professional development, and occupational retraining (Selim, 2020). It fosters active learning, technological proficiency, and learner autonomy, thereby enhancing pedagogical satisfaction and academic accomplishments (Cole et al., 2021). Distance learning emerges as an effective means to enhance literacy, education, and skills development in remote and secluded areas, particularly amid the challenges posed by the COVID-19 pandemic.

However, it remains imperative to organize distance learning with a high standard of quality and uphold student-teacher as well as student-student interaction to ensure seamless transitions and maximize the benefits of technology in remote education.

The utilization of diverse online learning platforms, including Whatsapp, Google Classroom, and Zoom, has proven to be essential in facilitating remote education during the Covid-19 pandemic (Amri, 2021). These platforms have demonstrated particular efficacy in areas where traditional educational access is constrained. The role of educators in elevating the quality of human resources through the integration of digital technology has been prominently acknowledged (Sutarmin, 2023). Puspitasari et al. (2023) further underscores the significance of digital literacy in augmenting the effectiveness of online learning, especially for elementary school teachers. Lastly, Puspitasari et al. (2023) emphasizes the importance of training in utilizing online learning media such as Zoom and Google Meet to enhance the educational quality in remote regions. These studies collectively emphasize the crucial role of technology in improving the standard of education in remote areas through the implementation of online platforms.

The results indicate that technology, represented by online platforms, plays a transformative role in remote education. It not only tackles challenges arising from geographical limitations but also contributes to the overall enhancement of teaching methodologies, technological proficiency, and educational outcomes in remote areas. The collective body of research positions technology, specifically online learning platforms, as a valuable instrument in addressing challenges linked to remote education. The flexibility and adaptability of these platforms are especially underscored during crises, such as the COVID-19 pandemic. Nevertheless, the literature also underscores the significance of upholding high-quality distance learning experiences and ensuring robust interactions between students and teachers.

D. CONCLUSION

Based on the evaluation of research findings, the literature generally illustrates a positive outlook on the effectiveness of online learning platforms in improving educational access in remote areas. The flexibility offered by technology, the potential of online laboratories, and the emphasis on digital literacy collectively provide a comprehensive approach to overcoming challenges. However, identified constraints related to internet access underscore the need for ongoing efforts to enhance infrastructure in remote areas. The innovative solutions proposed by Hehir et al. indicate a proactive approach to improving the overall online learning experience. In conclusion, while the literature predominantly supports the effectiveness of online learning platforms, sustained efforts are required to address challenges and optimize their impact on educational access in remote areas.

Despite challenges, the overall positive contributions, including increased skills and parental involvement, suggest that online learning can be effective with strategic interventions. A holistic approach, considering technological, pedagogical, and social aspects, is crucial to optimizing the effectiveness of online learning in remote areas. In summary, collective research supports the positive impact of online learning platforms on student engagement in

remote areas. Recognizing and addressing challenges while fostering parental involvement are key elements in optimizing the benefits of online learning. Future research should focus on developing comprehensive strategies to address challenges and enhance the overall effectiveness of online education in remote environments.

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