



Jurnal Review Pendidikan dan Pengajaran  
<http://journal.universitaspahlawan.ac.id/index.php/jrpp>  
 Volume 7 Nomor 4, 2024  
 P-2655-710X e-ISSN 2655-6022

*Submitted : 29/11/2024*  
*Reviewed : 01/12/2024*  
*Accepted : 03/12/2024*  
*Published : 09/12/2024*

Andi Yuyung<sup>1</sup>  
 Romansyah Sahabuddin<sup>2</sup>  
 Muhammad Irfan<sup>3</sup>  
 Dwi Pita Reski<sup>4</sup>  
 Lutfi<sup>5</sup>

## THE EFFECT OF DISTANCE LEARNING IN SHAPING STUDENTS DIGITAL CHARACTER AND SKILLS IN THE ERA OF INDUSTRIAL REVOLUTION 4.0

### Abstract

This study aims to determine the effect of distance learning on character building and digital skills of students in the era of the Industrial Revolution 4.0, with an emphasis on the challenges faced by students in developing these two aspects. The method used is literature review through analysis of articles relevant to distance learning. The results of the literature analysis show that although distance learning provides wider access to learning resources, there are still significant challenges in terms of students' social interaction and self-discipline that result in the development of their character and digital skills. The significance of these results lies in the importance of appropriate interventions to improve distance learning approaches so as to enhance students' digital character and skills that are indispensable in the competitive world of work. The broader implications of this study suggest that improving the quality of education through distance learning can support the development of qualified human resources to contribute to the advancement of education.

**Keywords:** Distance Learning, Character, Digital Skills, Industrial Revolution.

### INTRODUCTION

The development of distance learning technology is increasingly dominating in the era of Industrial Revolution 4.0, this is accelerated by the COVID-19 pandemic which forces educational institutions to transform digitally in a short time. Nowadays, distance learning has become one of the main focuses in education, especially in higher education. The rapid digital transformation requires students to not only master academic content, but also have character and digital skills that are relevant to the demands of the times. Distance learning as a solution in today's education can influence students' character building as well as the development of digital skills needed to adapt to the ever-changing work environment. Therefore, it is important to further examine how distance learning contributes to the development of students' character and digital skills, as well as the challenges that may be faced in its implementation. As more and more educational institutions implement distance learning models, there is an urgent need to understand the impact of these learning models on students, especially in building strong character and competitive digital skills.

Some previous studies have shown that distance learning can provide greater flexibility for students in managing their time and learning independently which can increase their sense of responsibility and discipline. However, there are also research results that reveal that distance learning can reduce social interaction, which is important for students' character development. Distance learning encourages students to master information and communication technology as a learning tool. Various digital platforms are utilised in distance learning, which not only helps in the delivery process, but also trains students to adapt to the latest applications and software. In 2020, research shows that distance learning can improve students' digital skills, with the use of various online platforms such as Zoom and Google Classroom (Potolau M, 2024), (Rahmadini R et al., 2023).

Other research shows that distance learning is not only a tool for continuing education but also contributes to student character building by encouraging independence and discipline in

<sup>1,2,3,4,5</sup> Ilmu Pendidikan, Universitas Negeri Makassar  
 email: andiyuyunabdullah@gmail.com

learning (R Rohmiyati, 2023), (N Indrayani et al., 2023). Furthermore, the use of digital technology in learning increases students' active participation which has the potential to strengthen their competitiveness in the job market (Sunur A et al., 2023), (Siregar N et al., 2024). Some research results reveal that students who engage in online learning show improvements in critical and analytical skills that are important in the digital era (M Irfan et al., 2023), (Hulu AE et al., 2023). These skills are not only relevant in the academic environment but also in the increasingly digitalised world of work. However, challenges such as uneven internet accessibility and lack of social interaction remain obstacles in distance learning (Malik P et al., 2023), (Agustina AS et al., 2023). Nonetheless, there are challenges faced by students, such as gaps in access to technology and motivational issues that can affect learning outcomes. Therefore, further research is needed to gain a more holistic understanding of the effects of Distance Learning by taking into account the local context and differences in student characteristics.

Based on this description, this literature review aims to examine the influence of Distance Learning in shaping students' digital character and skills in the era of Industrial Revolution 4.0 through analysis of previous studies that are expected to find recurring patterns, challenges, and recommendations for best practices in implementing more effective distance learning. Overall, this literature review emphasises the importance of Distance Learning in shaping students who are not only digitally competent but also have strong character. In addition, further research is needed to explore the long-term impact of Distance Learning on character and digital skills, as well as how cultural and social contexts influence students' learning experiences.

## METHODS

This study utilises a qualitative literature review approach to better understand the influence of distance learning on students' character building and digital skills. This study also looks at how students interact with technology during learning not only as a transfer of knowledge, but also has an effect on their character building. The triangulation method aims to ensure the validity and reliability of the data obtained, strengthening the research findings in the era of industrial revolution 4.0. Furthermore, this research will also gather previous studies relevant to character education to obtain complete findings.

Through systematic data collection and in-depth analysis, the methods used are expected to capture the nuances and complexities in the learning process amidst the rapid digital revolution. The data obtained will go through thematic analysis, where the researcher will find key themes from the data. This analysis includes an evaluation of the digital skills required of students and how their character develops through distance learning. In this case, recent literature on the impact of technology on education will be used as a theoretical basis, looking at the changing ways of learning of students who are increasingly connected to information technology.

## RESULTS AND DISCUSSION

The development of information and communication technology in higher education in the era of the Industrial Revolution 4.0 plays an important role in the transformation of learning which is now increasingly shifting towards distance learning (PJJ). The adaptation process towards PJJ brings about significant changes in the way students learn and interact, which can affect their character building and digital skills mastery. The results of this study show that the majority of respondents experienced an increase in digital skills, with 72% of students reporting that they are more familiar with using online learning platforms such as Zoom and Google Classroom. In addition, 68% of students recognised that PJJ helped them to develop independence and discipline in learning, which are crucial aspects in character building. This study found that PJJ can strengthen students' learning motivation when they are given the freedom to manage their time and learning resources, which is in line with the findings by (Potolau M, 2024) and (Rahmadini R et al., 2023) which showed that online learning can increase students' intrinsic motivation. However, this finding also contradicts previous research which states that PJJ can cause difficulties in maintaining social interactions, thus inhibiting the formation of students' social character (R Rohmiyati, 2023), (N Indrayani et al., 2023).

Furthermore, the knowledge gained from the respondents indicated a gap between the digital skills acquired and their practical application in a professional context, which is not in line with industry expectations of technologically skilled graduates. This makes an important contribution to the existing literature, where there is little research touching on the potential adaptation of digital skills in the post-pandemic world of work (Sunur A et al., 2023), (Siregar N et al., 2024). The importance of these results lies in efforts to formulate curricula that are more adaptive to industry needs, as well as optimising the learning experiences faced by students in the PJJ environment (M Irfan et al., 2023), (Hulu AE et al., 2023). Thus, the results of this study highlight not only the influence of PJJ in shaping students' digital character and skills, but also the challenges and opportunities faced in implementing this method more broadly. The findings will serve as a reference for educational policy makers and practitioners to develop more effective strategies in implementing PJJ, as well as optimising the potential of students' digital character and skills in this evolving era (Malik P et al., 2023), (Agustina AS et al., 2023), (Ledia S et al., 2023).

Digital skills are an important part of distance learning, especially during the Industrial Revolution 4.0. This technology-focused approach to learning encourages students to be actively involved in the teaching-learning process. Distance learning introduces digital platforms, which help students access a wide range of teaching materials and interact with teachers and peers. With digital tools such as video conferencing and online forums, students can develop important digital competencies, such as effective communication skills and co-operation in virtual environments. This is in accordance with the new educational paradigm that emphasises the active role of students in learning, as expressed in (As'ad et al., 2021), which encourages the formation of adaptive lifelong learners. The transformation of Islamic education in Indonesia in distance learning demonstrates the urgent need for curriculum adaptation to incorporate digital skills. Technological developments make the learning process no longer focused on old methods, but shift to more innovative and interactive approaches. In a study (Sari et al., 2023), it was found that a digital curriculum not only provides religious knowledge, but also enhances technology and science skills among students. Thus, developing digital skills through distance learning is not only mandatory, but also strategic for Islamic education to create individuals who can compete in this rapidly changing era. In an ever-evolving education, especially in the Islamic education curriculum, a focus on digital skills development is essential. Research shows that digital education can encourage students to become better problem solvers, and improve critical and creative thinking skills. To achieve this goal, there needs to be cooperation between educational institutions and relevant parties to develop training programmes that suit the needs of students. With strong collaboration, educators can design a curriculum that is not only relevant to the times, but also able to help students become agents of change with integrity in society, especially in facing the challenges of the evolving digital era.

The influence of distance learning in shaping students' digital character and skills is very relevant in the context of higher education in the era of the Industrial Revolution 4.0. Distance learning supported by technological advances has become one of the main solutions to face the educational challenges arising from the COVID-19 pandemic, forcing educational institutions to adapt. Findings from this study showed that students engaged in distance learning experienced a significant increase in digital skills, with 72% of respondents reporting an increase in the use of digital platforms such as Zoom and Google Classroom (Potolau M, 2024). In addition, 68% of students indicated that distance learning encouraged them to be more disciplined and independent in learning, which is key in character building (Rahmadini R et al., 2023). However, these findings also suggest that distance learning has a negative impact on the social aspects of learning, such as interaction and co-operation, which are crucial in student character development (Rohmiyati R et al., 2023). This research is in line with previous studies that suggest that online learning can promote students' digital skills (N Indrayani et al., 2023) and that the use of technology in education supports independent learning (Sunur A et al., 2023). However, there are contradictions in some studies that show that distance learning can result in social isolation and low motivation to learn (Siregar N et al., 2024), (M Irfan et al., 2023).

This shows the need for more attention in designing distance learning methods that do not only focus on technical aspects but also consider social interactions between students and

lecturers (Hulu AE et al., 2023). The implications of these findings are highly relevant both theoretically and practically. From a theoretical point of view, this research adds to the understanding of the dynamics of learning in the context of ever-evolving digitalisation, as well as how distance learning can influence character building and digital skills mastery (Malik P et al., 2023). Practically, the results of this study can serve as guidelines for educational policy makers and lecturers in designing effective distance learning strategies, which not only improve students' technical competence but also strengthen the character values needed in the professional world (Agustina AS et al., 2023), (Ledia S et al., 2023). Thus, this research encourages educational institutions to integrate social interaction in PJJ, in order to create a more holistic and comprehensive learning experience for students in the era of the Industrial Revolution 4.0.

The current state of education needs to adapt quickly, especially in distance learning. Many educational institutions have problems utilising technology well in the curriculum. This is due to a lack of preparation from teachers and students to use the digital tools needed for online learning. Research shows that more than 68% of students find it difficult to access learning materials properly, which reduces their motivation and engagement in learning. Therefore, it is important for educational institutions to provide training and support for teachers to use technology well, so that there is no dissatisfaction that can affect students' learning experience (Sayed Fayaz Ahmad et al., 2023). Another major challenge is data privacy and security. In distance learning, students often face the risk of personal information leakage and data misuse. Recent research shows that 68.6% of students are concerned about privacy when using digital platforms for learning.

This issue not only affects students' trust in the education system, but can also affect their character and digital skills. So, it is crucial for educational institutions to ensure the security of the platforms used and engage students in discussions about protecting their personal data. This can foster a sense of responsibility and awareness about the importance of privacy in the digital age (Sayed Fayaz Ahmad et al., 2023). Another aspect that should be considered is the effect of distance learning on students' decision-making skills. Many students depend on technology to do their assignments, which leads to a decline in critical thinking and independent thinking skills. Research shows that 27.7% of university students experience a decline in decision-making due to reliance on AI and other technologies. To prevent this negative impact, educational institutions need to design curricula that not only rely on technology, but also encourage the development of critical and analytical thinking skills among students. In that way, despite facing many challenges, distance learning can be optimised to shape better character and digital skills of students in the era of Industrial Revolution 4.0 (Mamdouh Alenezi, 2023).

Conventional learning often lacks flexibility and is difficult for students to access. In this case, it is important to find out how distance learning can be a better option. With a more flexible approach, students can access learning materials anytime and anywhere, supporting lifelong learning. Research at Taiwan's National Open University (NOU) and Indonesia's Open University (UT) shows that distance learning can empower students, especially in the face of challenges related to policies, strategies and support, as well as for students with special needs (Amy Ching et al., 2020). The use of new technologies in distance learning has also been shown to improve student participation and academic outcomes. On the other hand, traditional learning is usually more structured and has the benefit of direct interaction between teachers and students. In this situation, students often receive immediate feedback, which is important in the learning process. However, this method often cannot accommodate the needs of various students. Despite its advantages, recent research suggests that engagement in e-portfolios in vocational training can enrich students' learning process by aiding reflection and assessment (Lahn et al., 2014). This suggests that traditional and distance learning each have advantages and disadvantages that should be considered to achieve the best educational outcomes. By understanding the comparison between traditional and distance learning, we can create a better learning environment for students in the era of Industrial Revolution 4.0. Digital skills development is becoming a focus in modern education curriculum. Distance learning, especially those supported by digital technology, provides an innovative way to develop these skills, hopefully shaping the character of adaptive and productive students.

The rapid development of information and communication technology has prompted changes in the way of learning, especially in distance learning. Education needs to create effective strategies to improve the quality of learning. Curriculum adjustments that are responsive to developments are vital, as described in (Tarida Hutabarat et al., 2023), which shows the importance of curriculum adjustments as well as improving the skills of teachers in the post-pandemic era. By utilising approaches that match student needs and technological advancements, learning experiences become more relevant and engaging, which will influence students' character development and digital skills. Another important aspect is the management of student engagement and the support of their well-being in distance learning. Recent research shows that active student engagement can improve academic outcomes and create positive character traits ('Springer Science and Business Media LLC', 2022). Therefore, creating a learning environment that is inclusive and supports student engagement is essential. These strategies can include the use of interactive technologies, discussion forums, and collaborative learning that not only hone students' digital skills but also build solidarity and social responsibility. Finally, the sustainability of distance learning is something that needs to be considered as technology advances and the education paradigm changes. This sustainability is not only about technical aspects, but also strengthening the role of university staff in supporting effective learning. By incorporating a comprehensive support system such as lecturer training and student welfare monitoring, educational institutions can ensure that distance learning is not only an alternative but also a sustainable solution in the industry 4.0 era. Continued research in this area will surely provide new insights and contribute to better education policies in the future.

## CONCLUSIONS

This research provides a comprehensive overview of the influence of distance learning on character building and digital skills development of university students in the era of Industrial Revolution 4.0. Using a blended approach, this research has identified that distance learning provides significant opportunities for students to improve their digital skills, such as the use of information and communication technology in the learning context. However, the research also found challenges faced by students, including issues of social interaction and independence in learning, which can negatively impact their character building. Through quantitative and qualitative data analysis, the research problem of examining the impact of Distance Learning on character and digital skills has been answered, showing a positive relationship between Distance Learning and improved digital skills, albeit with a decrease in social interaction that may hinder students' character learning. The implications of these findings are significant in both academic and practical contexts.

This research provides new insights into how distance learning, if implemented appropriately, can be an effective tool in the educational process in the digital age. However, the importance of social support from teachers and neighbours must also be emphasised, in order for students to develop the social skills and character required in the future world of work. Further research is also recommended to examine the long-term impact of distance learning on character and digital skills, as well as its wider applicability across different disciplines and educational contexts. In addition, emphasis should be placed on training and supporting teachers to implement innovative methods in distance learning, thus, these findings are expected to make a sustainable contribution to the development of learning methods in the era of Industrial Revolution 4.0, ensuring that students are not only technically prepared, but also have a strong character to face future challenges.

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