ALGEBRA : JURNAL PENDIDIKAN, SOSIAL DAN SAINS

ISSN : 2807-663X e-ISSN : 2807-629X
Journal Homepage : https://ejournal.yana.or.id/index.php/algebra
Volume 5 Nomor 2 (2025)

THE INFLUENCE OF DIGITAL TECHNOLOGY INTEGRATION ON STUDENT LEARNING MOTIVATION TOWARDS THE ERA OF INDONESIA EMAS 2045

Salim[1], Muhammad Arif Fadhillah Lubis[2]
[1]Universitas Islam Negeri Sumatera Utara Medan, Indonesia
[2]Politeknik Negeri Medan, Indonesia
Correspondence Email : salim@uinsu.ac.id

ABSTRACT

Digital technology integration is applied by universities as a process of utilising technology which is a challenge for educational institutions in the industrial revolution 4.0 towards 5.0 and also a challenge for graduates to improve their individual abilities. Student learning motivation in the use of technology integration is an important reference that needs to be considered. The analysis method used in determining what affects student learning motivation is PLS-SEM. Sampling in this study through the Random Sampling method. This study aims to see the effect of digital technology integration on learning motivation. The subjects in the study were 142 students of STIKes Indah Medan. The results show that digital technology integration has a significant effect on learning motivation (30.9%), digital literacy has a significant effect on learning motivation (63.8%). With these findings, student learning motivation can be increased by increasing digital literacy in gathering information.

Keywords: Digital Technology Integration; Digital Literacy; Learning Motivation; Students.

INTRODUCTION

The rapid development of digital technology has brought significant changes in various aspects of life, including in the realm of education (Iivari et al., 2020). Entering the era of the Industrial Revolution 4.0 and the transition to society 5.0, digital technology is no longer positioned merely as a supporting instrument but has become an essential component that is integrated into the learning process (Monferdini et al., 2025). In Indonesia, the integration of digital technology in the education system, especially at the higher education level, is one of the key strategies in preparing resilient, adaptive, and competitive human resources to face global challenges in the future. This strategy is an integral part of the grand agenda of Indonesia Emas 2045, namely a national vision that aims to make Indonesia a developed and competitive country exactly one century after its independence (Sahrul et al., 2024). However, the success of this strategy is not only determined by the availability of infrastructure and technology adoption alone but is also greatly influenced by the extent to which this integration is able to encourage increased learning motivation among students. High learning motivation is a key factor in shaping the character of lifelong learners who are innovative, critical, and collaborative, which ultimately becomes the main foundation for realizing national education goals in the era of digital transformation for Indonesia Emas 2045.

The Indonesia Emas 2045 program is a long-term development vision that aims to make Indonesia a developed and highly competitive country. In the National Long-Term Development Plan (RPJPN) 2025-2045, improving the quality of higher education and mastery of technology is one of the main pillars of superior human resource development. Therefore, technology integration in higher education is not only an adaptive necessity but also a key strategy in preparing students as agents of future transformation. Indonesia is preparing to enter the Indonesia Emas 2045 era, in which it is projected to become a developed country with superior human resources, global competitiveness, and the ability to adapt to changing times. In this context, higher education plays an important role as a key pillar in producing a quality young generation.

As the future leaders of the nation, students play a strategic role in realizing this vision. Therefore, improving the quality of education, particularly in terms of learning motivation, is crucial. The integration of digital technology into the learning process is expected to increase student motivation, independence, and creativity (Sasongko et al., 2025). Technologies such as e-learning platforms, interactive learning videos, artificial intelligence, and educational social media have provided a more engaging and relevant learning experience tailored to the characteristics of the digital generation. With the advancement of information technology, higher education has undergone significant changes. Digital technology is no longer merely a tool but has become the primary driver of educational transformation. Students now learn not only through textbooks and face-to-face lectures but also through online platforms, interactive simulations, educational videos, and globally available digital learning resources.

However, not all technology integration is effective in increasing motivation to learn. Various factors influence the success of the integration, ranging from infrastructure readiness and the digital skills of lecturers and students to the pedagogical approach used. Therefore, it is important to examine the extent to which digital technology integration affects the learning motivation of students in Indonesia today. Not all students respond positively to this change. Learning motivation, which is the foundation of academic success, is one of the most affected aspects. Therefore, the purpose of technology integration is implemented as a cognitive aid to help teachers engage students in an authentic technology-supported learning environment (Singun, 2025).

The integration of digital technologies in education includes the use of digital devices and systems such as Learning Management Systems (LMS), mobile applications, Artificial Intelligence (AI), Virtual Reality (VR), and other online resources in the learning process. These technologies enable more flexible, adaptive and personalized learning. Another supporting factor is the need for continuous professional development measures for students as well as attention to the integration of technology in accordance with the needs and considerations of the success of the expected academic achievements (Sato et al., 2023).

In Indonesia, technology integration in education has grown rapidly since the COVID-19 pandemic forced educational institutions to adapt to online systems. In its actualization, the implementation of technology integration also has several obstacles, including lecturers experiencing obstacles in terms of attendance and providing descriptions of student participation activities and delays in submitting assignments due to technical obstacles, such as obstacles to communication devices and limited communication network connections (Szopiński & Bachnik, 2022). Therefore, it

is important to develop a comprehensive policy to address the various obstacles that arise due to the implementation of technology integration. However, the orientation of the impact of technology integration in online learning is not only in the negative aspect, but at the university level online learning is claimed to have a high flexibility aspect and can save learning time (Viner et al., 2020). In addition, other fundamental things also include simplifying the complexity of learning methods compared to traditional approaches. Meanwhile, in terms of effectiveness, online learning provides an opportunity for students to review and repeat recordings of learning materials with the aim of deepening knowledge or can even be used to prepare for learning evaluations (Khan et al., 2022). Other characteristics of online learning can be seen in the simplification of the distance aspect with a wide reach, as long as the student's area has access to communication network connectivity (Fonseca et al., 2021).

Digital literacy generally refers to different forms of technology implementation. The implementation of this technology will have a positive impact on human life, particularly in the areas of governance, health, business, and education, according to (Tinmaz et al., 2022). Broadly speaking, the definition of digital literacy is oriented toward two branches of understanding, including some who argue that digital literacy is related to technical skills and others who focus on the concept of understanding ideas (Peng & Yu, 2022). So in terms of technical skills, digital literacy is also considered capable of honing and providing students with skills including social skills, learning skills and attitudes, critical thinking, creativity and inspiration, and the ability to utilize technology, information, and communication devices (Dhewi & Ningrum, 2022). Meanwhile, digital literacy can also be interpreted as the ability to survive in the digital era. Moreover, digital literacy encompasses a range of media literacy initiatives aimed at enhancing personal control over the mediums individuals utilize for communication. The spread of information in today's world is very fast and can come from various directions. Media literacy is important because we can filter or control media to obtain information and entertainment.

Learning motivation is an internal and external drive that encourages individuals to be actively involved in the learning process and strive to achieve academic goals. So that the purpose of its application will provide influence and encouragement to students to determine the behavior that will be carried out during the learning process. In addition, motivation also plays an active role in increasing student learning efforts, thus having an impact on improving the learning outcomes carried out. Learning motivation provides an indication of the drive to meet learning needs, the existence of interest and attention to completing tasks, and the desire to achieve learning goals (Rachmavita, 2020).

The theory of self-determination motivation (SDT) offers a comprehensive framework for comprehending diverse factors that either enhance or diminish intrinsic motivation, autonomous extrinsic motivation, psychological well-being, and issues directly related to the educational setting. Intrinsic motivation and forms of extrinsic motivation that are well internalized can predict a series of positive outcomes at various levels of education in the context of culture, support for students' basic psychological needs, competence, and student interest. Technology can support the fulfillment of these needs through an interactive and collaborative learning approach (Ryan & Deci, 2020).

The following description applies to several relevant studies that serve as fundamental foundations:

Research findings (Bui, 2022) explain recommendations for practices and policy making in technology integration. The classification of findings is divided into two parts, namely the implementation of digital technology used with a focus on the learning system for teachers. Teachers adopt digital technology during the learning process to meet the needs of learning information content that is tailored to students' learning needs. Furthermore, several factors that influence the adoption of digital technology are: teacher pedagogy, competence, self-confidence in digital technology integration, availability of resources, professional development, and socioculture.

Research conducted by (Gulzar et al., 2024) considers case studies from nursing higher education institutions. The adopted technology is used fully to accommodate the needs and desires of students, educational institutions, and stakeholders and adjust to learning trends. Regardless of the type of technology used, efforts to maximize the role of students in the learning process are still a challenge. This is because intrinsic motivation is closely related to achievement in the academic context, active participation, and student learning motivation. The results of the study explain the implementation of digital technology that has the most influence on the learning motivation of undergraduate

nursing students oriented towards virtual reality and gamification. Clinical and non-clinical theoretical modules incorporate the implemented digital technology. The aim is to provide a description of simulations and scenarios in a learning environment that has minimal risk and increases student learning motivation. The results of the study also represent positive results in terms of increasing student learning participation and learning motivation.

Research conducted by (Soto et al., 2024), the integration of artificial intelligence technology in the context of network education. This study reviews the impact of digital technology integration on student understanding, participation, and learning outcomes related to learning motivation. The findings stated that there was a significant increase in student understanding and performance when using digital technology in the learning process. However, some shortcomings require further evaluation, including the ease of the interface, responsibility, and the need to reformulate the content of learning information.

Meanwhile, the research applied by (Dong, 2025) is oriented towards exploring the relationship between digital media involvement as a technology category with learning motivation that emphasizes the mediation function of digital self-efficacy. The research was conducted by implementing Self-Determination Theory (SDT) and applying Structural Equation Modeling (SEM) to review the reciprocal relationship between constructs. The distribution of data used reached 286 students through a validated survey distribution to find digital media involvement, digital self-efficacy and learning motivation. The results of the study showed a positive relationship between digital media involvement and learning motivation. This study shows that students who actively use digital devices have motivation during the learning process.

Based on the correlation of relevant research relationships, the contribution of the research conducted is oriented towards understanding the dynamics of learning by integrating two important variables, namely the integration of digital technology and digital literacy on student learning motivation in the context of efforts to build education towards the vision of a Indonesia Emas 2045. Meanwhile, the novelty of the research lies in the comprehensive approach in combining the role of technology integration as a learning facilitator and digital literacy as a form of internal student capability. Tests were conducted simultaneously on the psychological construction of learning motivation. In the research conducted, the two variables are paired integratively to influence learning motivation, which has a role as the main driver in creating adaptive, competitive students in the era of digital transformation.

This study aims to analyse the influence of digital technology integration and digital literacy on student learning motivation in the context of developing high-quality human resources towards Indonesia Emas 2045. By understanding this relationship, it is hoped that appropriate technology-based educational strategies can be formulated to support this ambitious national vision. A theoretical model is used to identify the constructs that influence student learning motivation using PLS SEM. The proposed theoretical model can be seen in the illustration in Figure 1.

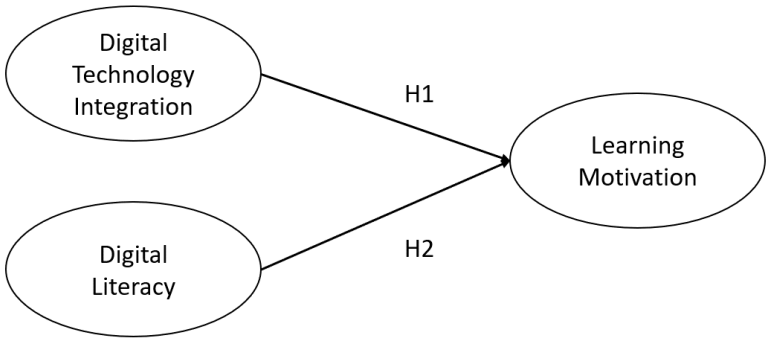

Figure 1. Proposed theoretical model

Figure 1 above illustrates the conceptual model of the influence of two independent variables, namely digital technology integration and digital literacy, on learning motivation as the dependent variable. This scheme organizes the theoretical framework that forms the basis for developing research hypotheses that aim to test the causal relationship between variables in the context of educational transformation in the digital era.

The study presents the following description of the variable relationships:

1. Digital Technology Integration
   Refers to the extent to which digital technology is actively and structurally implemented in the learning process. This includes the use of a Learning Management System (LMS), online-based applications, and other digital tools. It is connected to learning motivation through hypothesis H_1, which states that digital technology integration has a positive effect on student learning motivation.
2. Digital Literacy
   Digital literacy refers to the capacity of students to effectively and responsibly access, evaluate, and utilize digital information. Digital literacy in this context includes technical, cognitive, and social aspects of using information technology. It is connected to learning motivation through hypothesis H_2, which assumes that the higher the students' digital literacy, the higher the level of learning motivation.
3. Learning Motivation
   Learning motivation is a psychological construct that reflects a student's internal drive to actively engage in learning activities. Learning motivation is considered a key variable in ensuring educational success, particularly in the context of technology-based learning.

Based on the conceptual framework developed, this study aims to examine the influence of two main variables, namely digital technology integration and digital literacy, on students' learning motivation. The relationship between variables is based on theory and previous findings that emphasize the importance of the role of technology and digital competence in increasing learner engagement and motivation in the digital learning era. The hypothesis formulation proposed in this study is as follows:

1. H_1: There is a positive and significant influence of digital technology integration on students' motivation to learn.
   This hypothesis is based on the assumption that the higher the level of digital technology utilization in the learning process, such as the use of online platforms, interactive media, and learning management systems, the greater the encouragement for students to be actively involved in learning. Well-integrated technology has the potential to increase the convenience, efficiency and relevance of learning, which in turn encourages an increase in students' intrinsic and extrinsic motivations.
2. H_2: There is a positive and significant influence between digital literacy and students' learning motivation.
   This hypothesis is based on the assumption that digital literacy, as an individual's ability to access, analyze and evaluate technology-based information, is an important prerequisite for successful learning in the digital era. Students who have high digital literacy will be more confident and efficient in facing technology-based learning challenges, thus increasing overall learning motivation.

This hypothesis is based on the assumption that the higher the level of digital technology utilization in the learning process, such as the use of online platforms, interactive media, and learning management systems, the greater the encouragement for students to be actively involved in learning. Well-integrated technology has the potential to increase the convenience, efficiency and relevance of learning, which in turn encourages an increase in students' intrinsic and extrinsic motivations.

RESEARCH METHODS

Student motivation in online learning was measured through a questionnaire survey designed in February 2025. There were 15 items distributed using a 5-category Likert scale. These items produced 3 constructs or dimensions: digital technology integration, digital literacy, and learning motivation (Table 1).

Table 1. Questionnaire indicators

Construct	Item
Digital Technology Integration	ID1 = Availability of Technology Infrastructure ID2 = Utilisation of Learning Management System (LMS) ID3 = Student Engagement in Digital Learning ID4 = Digital Capabilities of Lecturers and Students

Construct	Item
	ID5 = Integration of Technology in Learning Plans and Evaluations ID6 = Effectiveness and Impact on the Learning Process
Digital Literacy	LD1 = Internet Searching LD2 = Hyper textual Navigation LD3 = Content Evaluation LD4 = Knowledge Assembly
Learning Motivation	MB1 = Instrinsik MB2 = Ekstrinsik

The sample in this study consisted of 142 students from STIKes Indah Medan. There were two estimation processes carried out in PLS-SEM (Husin, 2022):

1. Measurement Model
   a. Reliability: Cronbach's Alpha (α) and CR ≥0.7
   b. Convergent Validity: Outerloading ≥ 0.7 and AVE ≥ 0.5
   c. Discriminant Validity < 0.9
2. Structural Model
   a. R^2; weak (0.25), medium (0.5), and strong (0.75)
   b. Path analysis: p-value < 0.05 hypothesis accepted and significant
   c. Q^2: weak (0), medium (0.25), and strong (0.5)
   d. f^2: small (0.02), medium (0.15), and large (0.35)

RESULTS AND DISCUSSION

Measurement Model

All model constructs developed meet the criteria for reliability and convergent validity (Table 3) as well as discriminant validity (Table 4). The results of convergent validity are evident in the outer loading values and Average Extracted Variance (AVE) values for each variable, which meet the established criteria. for digital technology integration ranging from 0.719 to 0.923; digital literacy ranging from 0.779 to 0.911; and learning motivation having the same value of 0.993, as well as the AVE values for all variables also meeting the established criteria ≥ 0.5 (digital technology integration = 0.697; digital literacy = 0.771; and learning motivation = 0.987) (Table 2). The reliability values, as measured by Cronbach's alpha, are as follows: digital technology integration = 0.914; digital literacy = 0.900; and learning motivation = 0.986. and composite reliability (digital technology integration = 0.932; digital literacy = 0.931; and learning motivation = 0.993), all variables met the criterion of ≥ 0.70 (Table 2).

Then, for discriminant validity, as seen from the standardised values (Table 3), all related variables showed discriminant results < 0.9, which means that the constructs are truly different from one another.

Table 2. Measurement model results

Construct	Item	Consistency Reliability		Convergent Validity	
		Cronbach's alpha (α) ≥ 0,70	**Composite Realibility (CR) ≥ 0,70**	**Outer Loading ≥ 0,70**	**AVE > 0,50**
Digital Technology Integration	ID1	0,914	0,932	0,719	0,697
	ID2			0,856	
	ID3			0,923	
	ID4			0,923	
	ID5			0,746	
	ID6			0,821	
Digital Literacy	LD1	0,900	0,931	0,911	0,771
	LD2			0,779	
	LD3			0,907	

Construct	Item	Consistency Reliability		Convergent Validity	
		Cronbach's alpha (α) ≥ 0,70	Composite Realibility (CR) ≥ 0,70	Outer Loading ≥ 0,70	AVE > 0,50
	LD4			0,908	
Learning Motivation	MB1	0,986	0,993	0,993	0,987
	MB2			0,993	

Table 3. Heterotrait-Monotrait Ratio (HTMT)

	Standarized
Learning Motivation -> Digital Technology Integration	0,841
Learning Motivation -> Digital Literacy	0,721

Measurement Model

The predictive power of the model for exogenous to endogenous variables can be seen in Table 4. Learning motivation is influenced by digital technology integration and digital literacy, by 0.835 (83.5%) with a medium prediction.

Table 4. R square and Q square

Construct	R2	Category
Learning Motivation	0,835	High

Table 5. f square.

Construct	*f*	Category
ID -> MB	0,164	Low
LD -> MB	0,699	High

Table 5 shows that the effect of digital technology integration on learning motivation is small, at 0.164. Digital literacy also has a significant effect on learning motivation, at 0.699.

Table 6. Model fit test

	Saturated Mode	*Estimated Model*
SRMR	0,141	0,141
Chi-square	171,956	171,956
NFI	0,637	0,637

Model fit (Goodness of Fit) indicates an SRMR (Standardised Root Mean Residual) value of less than 0.1, meaning the model has good fit (Table 6). The Chi-Square value is > 0.9 and the NFI ranges from 0 to 1 (the closer to 1, the better the model fit).

Thus, the model is considered good because it meets all criteria and the applied model is suitable and acceptable. The path coefficient results are shown in Table 7 through the bootstrapping process in Figure 2. It can be seen in Figure 2 that all T-statistic values, both between exogenous and endogenous variables and between manifest and exogenous variables, obtain values ≥1.96, thus indicating a significant effect.

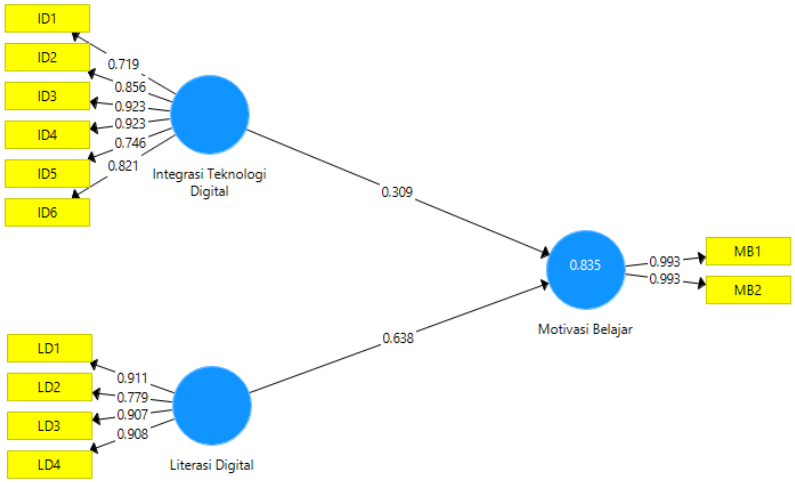

Figure 2. Bootstrapped results.

Table 7. Hypothesis

Path Analysis	*Standarized ß*	*T Statistic*	*P-Value*	*Description*
Digital Technology Integration	0,309	2,564	0,011	H_1 Accepted
Digital Literacy	0,638	5,478	0,000	H_2 Accepted

In Table 7, the path analysis results show that digital literacy has the most significant effect on student learning motivation (0.638). Overall, all hypotheses proposed were accepted.

The Influence of Digital Technology Integration on Learning Motivation

Path analysis shows that the influence of digital technology integration on learning motivation has a path coefficient of 0.309 at a significance level of less than 5% (β = 0.309, p<0.05). Therefore, H1 is accepted, stating that digital technology integration has a positive influence on learning motivation. With online learning, students can express their opinions more freely (Coman, 2020) without feeling embarrassed to ask questions directly to the lecturer, as they can send short messages via the platform used during learning. This proves that the integration of digital technology increases student learning motivation (Baber, 2020). The integration of digital technology also provides new insights into the use of online learning platforms.

The Influence of Digital Literacy on Learning Motivation

Path analysis shows that the influence of digital literacy on learning motivation has a path coefficient of 0.638 with a significance value of less than 5% (β = 0.638, p<0.05). Therefore, H_2 is accepted, stating that digital literacy has a positive influence on learning motivation. Good digital literacy can enhance the ability to summarise information that has been obtained (Churchill, 2020), thereby increasing learning motivation. Additionally, good digital literacy can search for information from various sources (Widana, 2020), so learning motivation will improve when information about learning can be easily obtained (Çetin, 2021). Digital literacy is the ability to understand and use information in various forms (Park et al., 2021) and from a wide range of sources accessible through computer devices (Tsai, 2017). Furthermore, digital literacy is a key component in learning and academic environments (Tomczyk, 2020), especially in online learning.

CONCLUSIONS

The effect of integration on learning motivation can be seen from the score obtained, which is 30.9%. This demonstrates that with the integration of digital technology, students are more motivated to participate in learning. In online learning, students also tend to feel more at ease when expressing their opinions to lecturers or peers, whether through video or short messages. There is a significant influence of digital literacy on learning motivation, as evidenced by the score obtained of 63.8%. This means that the better the digital literacy possessed by electronics department students, the higher their learning motivation will be. Because with good digital literacy skills, students' learning motivation will also improve.

BIBLIOGRAPHY

Bui, T. H. (2022). English teachers' integration of digital technologies in the classroom. *International Journal of Educational Research Open*, *3*, 100204. https://doi.org/https://doi.org/10.1016/j.ijedro.2022.100204

Çetin, E. (2021). Digital storytelling in teacher education and its effect on the digital literacy of pre-service teachers. *Thinking Skills and Creativity*, *39*, 100760.

Churchill, N. (2020). Development of students' digital literacy skills through digital storytelling with mobile devices. *Educational Media International*, *57*(3), 271–284.

Dhewi, A. S., & Ningrum, W. W. (2022). Strategi Literasi Digital Sebagai Sarana Penguatan Berpikir Kritis Mahasiswa Peminatan Jurnalistik. *Seminar Nasional Pendidikan Sultan Agung IV*, *3*(1).

Dong, D. (2025). Self-determination theory perspectives on the influence of digital learning engagement on motivation in extracurricular learning activities: Considering the mediating role of digital self-efficacy. *Learning and Motivation*, *90*, 102135. https://doi.org/https://doi.org/10.1016/j.lmot.2025.102135

Fonseca, D., García-Peñalvo, F. J., & Camba, J. D. (2021). New methods and technologies for enhancing usability and accessibility of educational data. *Universal Access in the Information Society*, *20*(3), 421–427. https://doi.org/10.1007/s10209-020-00765-0

Gulzar, M., Smolander, K., Ali, A., & Naqvi, B. (2024). Motivational factors and Challenges in the adoption of latest digital technology in educational institutes: A thematic analysis. *Procedia Computer Science*, *239*, 1670–1677. https://doi.org/https://doi.org/10.1016/j.procs.2024.06.344

Husin, M. (2022). Learning styles towards entrepreneurship learning outcomes and career development: a structural equation model analysis. *Jurnal Iqra': Kajian Ilmu Pendidikan*, *7*(2), 29–45.

Iivari, N., Sharma, S., & Ventä-Olkkonen, L. (2020). Digital transformation of everyday life – How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? *International Journal of Information Management*, *55*(June), 102183. https://doi.org/10.1016/j.ijinfomgt.2020.102183

Khan, S., Kambris, M. E. K., & Alfalahi, H. (2022). Perspectives of University Students and Faculty on remote education experiences during COVID-19- a qualitative study. *Education and Information Technologies*, *27*(3), 4141–4169. https://doi.org/10.1007/s10639-021-10784-w

Monferdini, L., Tebaldi, L., & Bottani, E. (2025). From Industry 4.0 to Industry 5.0: Opportunities, Challenges, and Future Perspectives in Logistics. *Procedia Computer Science*, *253*, 2941–2950. https://doi.org/https://doi.org/10.1016/j.procs.2025.02.018

Park, H., Kim, H. S., & Park, H. W. (2021). A scientometric study of digital literacy, ICT literacy, information literacy, and media literacy. *J. Data Inf. Sci.*, *6*(2), 116–138. https://doi.org/https://doi. org/10.2478/jdis-20210001

Peng, D., & Yu, Z. (2022). A literature review of digital literacy over two decades. *Education Research International*, *2022*(1), 2533413.

Rachmavita, F. P. (2020). Interactive media-based video animation and student learning motivation in mathematics. *Journal of Physics: Conference Series*, *1663*(1), 12040.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/https://doi.org/10.1016/j.cedpsych.2020.101860

Sahrul, S., Wiranto, S., Yusnaldi, Y., Suwarno, P., & Widodo, P. (2024). Strategi Diplomasi Keamanan Maritim Untuk Menghadapi Ancaman Krisis Pangan Dalam Mewujudkan Visi Indonesia Emas 2045. *Innovative: Journal Of Social Science Research*, *4*(4), 5757–5771. https://doi.org/https://doi.org/10.31004/innovative.v4i4.13452

Sasongko, A. T., Ekhsan, M., & Fatchan, M. (2025). Dataset on technology acceptance in E-learning: A PLS-SEM analysis using extended TAM among undergraduate students in Indonesia. *Telematics and Informatics Reports*, *18*, 100192. https://doi.org/https://doi.org/10.1016/j.teler.2025.100192

Sato, S. N., Condes Moreno, E., Rubio-Zarapuz, A., Dalamitros, A. A., Yañez-Sepulveda, R., Tornero-Aguilera, J. F., & Clemente-Suárez, V. J. (2023). Navigating the new normal: Adapting online and distance learning in the post-pandemic era. *Education Sciences*, *14*(1), 19. https://doi.org/https://doi.org/10.3390/educsci14010019

Singun, A. J. (2025). Unveiling the barriers to digital transformation in higher education institutions: a systematic literature review. *Discover Education*, *4*(1), 37. https://doi.org/10.1007/s44217-025-00430-9

Soto, D., Higashida, M., Shirai, S., Ueda, M., & Uranishi, Y. (2024). Enhancing Learning Dynamics: Integrating Interactive Learning Environments and ChatGPT for Computer Networking Lessons. *Procedia Computer Science*, *246*, 3595–3604. https://doi.org/https://doi.org/10.1016/j.procs.2024.09.198

Szopiński, T., & Bachnik, K. (2022). Student evaluation of online learning during the COVID-19 pandemic. *Technological Forecasting and Social Change*, *174*(September 2021). https://doi.org/10.1016/j.techfore.2021.121203

Tinmaz, H., Lee, Y.-T., Fanea-Ivanovici, M., & Baber, H. (2022). A systematic review on digital literacy. *Smart Learning Environments*, *9*(1), 21. https://doi.org/10.1186/s40561-022-00204-y

Tomczyk, Ł. (2020). Skills in the area of digital safety as a key component of digital literacy among teachers. *Education and Information Technologies*, *25*(1), 471–486.

Viner, R. M., Russell, S. J., Croker, H., Packer, J., Ward, J., Stansfield, C., Mytton, O., Bonell, C., & Booy, R. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *The Lancet Child & Adolescent Health*, *4*(5), 397–404. https://doi.org/https://doi.org/10.1016/S2352-4642(20)30095-X

Widana, I. W. (2020). The effect of digital literacy on the ability of teachers to develop HOTS-based assessment. *Journal of Physics: Conference Series*, *1503*(1), 12045.