

Education 5.0 Readiness, Digital Competencies, and Learner Engagement among IGNOU Distance Education Students

¹Dr. Hirdesh Shrivastava

¹Video Executive

¹Department of Electronic Media Production Centre

¹IGNOU, India

Abstract—Education 5.0 emphasizes learner-centered, technology-enabled, and innovative education. Distance education institutions such as the Indira Gandhi National Open University (IGNOU) increasingly integrate digital technologies to enhance learning experiences. This study examined the relationship between Education 5.0 readiness, digital competencies, and learner engagement among IGNOU distance learners. A quantitative survey was conducted among 400 students selected through convenience sampling. Data were analyzed using descriptive statistics, Pearson correlation, and simple regression. The findings revealed that Education 5.0 readiness was positively associated with digital competencies and learner engagement. Regression analysis indicated that Education 5.0 readiness significantly predicted learner engagement. The study concludes that strengthening digital infrastructure, faculty support, and learner digital skills can improve academic engagement in distance education.

Index Terms—Education 5.0, Digital Competencies, Learner Engagement, IGNOU, Distance Education

I. Introduction

Education has undergone a remarkable transformation with the rapid advancement of digital technologies, artificial intelligence (AI), cloud computing, big data, and virtual learning environments. Traditional teacher-centred education is gradually being replaced by learner-centred approaches that emphasize innovation, collaboration, creativity, critical thinking, and technology-enabled learning. This transformation has given rise to the concept of Education 5.0, which integrates digital technologies with human values to create inclusive, flexible, and personalized learning experiences. Unlike previous educational models that primarily focused on knowledge transmission, Education 5.0 seeks to develop problem-solving abilities, lifelong learning skills, emotional intelligence, and digital competencies that prepare learners for the rapidly changing global environment (UNESCO, 2021).

Distance education has become one of the most significant beneficiaries of technological advancements. The increasing availability of internet services, smartphones, cloud-based learning management systems, and digital educational resources has expanded opportunities for learners who cannot participate in conventional classroom education. Open and distance learning institutions have increasingly adopted online teaching, virtual classrooms, digital libraries, and electronic assessment systems to improve the accessibility

and quality of higher education. These developments have made higher education more flexible, affordable, and learner-centred (Bozkurt et al., 2020).

Among open universities, the Indira Gandhi National Open University (IGNOU) occupies a unique position as the largest open university in India. Established in 1985, IGNOU serves millions of learners across different socio-economic backgrounds through a combination of printed study materials, online learning platforms, audio-video resources, teleconferencing, and digital support services. The university has continuously expanded its technological infrastructure to meet the changing educational needs of learners and to align with national initiatives promoting digital education. Recent initiatives such as eGyankosh, SWAYAM integration, online counselling sessions, virtual laboratories, and mobile learning applications reflect the institution's efforts to embrace digital transformation in higher education (IGNOU, 2024).

The emergence of Education 5.0 has further strengthened the importance of digital readiness among distance learners. Education 5.0 encourages students to become active participants in knowledge creation rather than passive recipients of information. This educational philosophy supports experiential learning, interdisciplinary knowledge, innovation, entrepreneurship, collaborative learning, and the effective use of emerging technologies. Consequently, learners are expected to possess adequate digital competencies to access, evaluate, create, and communicate information using various technological platforms (European Commission, 2022).

Digital competencies represent one of the fundamental pillars of Education 5.0. They encompass knowledge, technical skills, attitudes, and ethical practices required to effectively use digital technologies for learning and communication. These competencies include information literacy, digital communication, online collaboration, content creation, cybersecurity awareness, and problem-solving using digital tools. Students possessing strong digital competencies are generally more confident in navigating online learning platforms, participating in virtual discussions, completing online assessments, and accessing digital educational resources. Conversely, limited digital skills often reduce students' confidence and participation in technology-enabled learning environments (Redecker, 2017).

Learner engagement is another important indicator of successful distance education. It refers to the degree of students' behavioural, emotional, and cognitive involvement in academic activities. Behavioural engagement includes participation in learning activities, attendance, assignment completion, and interaction with instructors. Emotional engagement reflects learners' motivation, satisfaction, and positive attitudes towards learning, while cognitive engagement represents deeper learning strategies, critical thinking, and self-regulated learning. High levels of learner engagement are consistently associated with improved academic performance, retention, satisfaction, and overall educational success (Fredricks et al., 2004).

Despite the rapid expansion of digital learning opportunities, many distance learners continue to face challenges in adapting to technology-intensive educational environments. Issues such as unequal internet access, limited digital literacy, technological anxiety, inadequate institutional support, and socio-economic disparities often affect learners' participation and academic engagement. These challenges became particularly evident during the COVID-19 pandemic when educational institutions worldwide shifted towards online learning. The pandemic highlighted the importance of strengthening digital competencies and institutional readiness to ensure uninterrupted learning experiences (Dhawan, 2020).

India's National Education Policy (NEP) 2020 also recognizes the importance of technology integration and digital learning in achieving quality higher education. The policy encourages educational institutions to adopt innovative teaching methods, digital platforms, blended learning approaches, and technology-enabled assessment systems. Education 5.0 aligns closely with the objectives of NEP 2020 by promoting learner-centred education, interdisciplinary learning, digital literacy, and lifelong learning opportunities. Therefore, understanding learners' readiness for Education 5.0 has become increasingly important for institutions such as IGNOU, where technology forms the foundation of educational delivery (Government of India, 2020).

Although previous studies have examined online learning adoption, digital literacy, technology acceptance, and student satisfaction in higher education, relatively limited empirical evidence is available regarding the relationship between Education 5.0 readiness, digital competencies, and learner engagement among IGNOU distance learners. Most earlier studies have concentrated on technology adoption or online learning satisfaction without considering the broader educational transformation represented by Education 5.0. Consequently, there remains a need to examine how learners' preparedness for Education 5.0 contributes to the development of digital competencies and enhances their academic engagement within distance education systems.

The present study addresses this research gap by investigating the relationship between Education 5.0 readiness, digital competencies, and learner engagement among IGNOU distance education students. The findings are expected to provide valuable insights for university administrators, policymakers, educators, and instructional designers regarding strategies for strengthening digital learning environments. The study may also assist higher education institutions in designing learner-centred digital initiatives that improve engagement, academic performance, and overall quality of distance education. By promoting Education 5.0 principles within open and distance learning, institutions can contribute to sustainable, inclusive, and technology-enabled higher education for diverse learner populations.

II. Review of Literature

1. **Rahim (2022)** examined the relationship between teaching competencies, self-efficacy, and learner engagement among distance learners. The findings indicated that teaching competencies positively influenced learner engagement, while self-efficacy strengthened this relationship. The study concluded that learner-centred instructional practices and digital readiness are essential for improving engagement in online and distance education environments.
2. **Wang (2022)** investigated the influence of teaching presence on student engagement in online higher education. The study reported that instructional design, effective communication, and timely assessment significantly enhanced behavioural, emotional, and cognitive engagement. These findings suggest that institutional readiness and quality digital instruction are fundamental for successful online learning.
3. **Ahmad et al. (2023)** introduced the concept of Education 5.0 and highlighted the integration of artificial intelligence, blockchain, virtual reality, and augmented reality into higher education. The authors emphasized that Education 5.0 promotes personalized learning, digital competencies, sustainability, and learner well-being while preparing students for future workforce demands. ([arXiv](#))
4. **Bond et al. (2023)** conducted a systematic review of student engagement in digital learning environments. The review revealed that collaborative learning, interactive teaching strategies, digital assessment, and institutional support significantly improved learner engagement. The authors recommended learner-centred digital pedagogies to enhance academic performance.
5. **Shahidi Hamedani et al. (2024)** systematically reviewed Education 5.0 within the context of Society 5.0. The study concluded that higher education institutions must strengthen digital skills, innovation, sustainability, and human-centric learning to prepare graduates for future employment. The review also highlighted the need for curriculum redesign and technological readiness. ([MDPI](#))
6. **López-Bustamante and Vargas-D'Uniam (2024)** reviewed studies on digital competencies and academic engagement in virtual higher education. The review demonstrated a strong positive association between students' digital competencies and their academic engagement. The authors recommended continuous digital literacy training to improve learner participation and learning outcomes.
7. **Balili and Bauyot (2025)** conducted a systematic literature review examining the impact of Education 5.0 on higher education educators. The study concluded that integrating AI, virtual reality, and other advanced technologies transforms teaching practices, improves learner engagement, and requires continuous professional development for educators. ([Philippine EJournals](#))

8. Lim and Teh (2026) investigated the influence of AI literacy and IT mindfulness on lifelong learning orientation through learner engagement. The findings revealed that learner engagement significantly mediated the relationship between AI literacy and lifelong learning, demonstrating the importance of digital competencies in AI-enhanced educational environments.

9. Colamatteo et al. (2026) reviewed the concept of University 5.0 and emphasized that higher education institutions should integrate sustainability, social innovation, digital transformation, and human-centred learning into their educational systems. The review suggested that University 5.0 provides an appropriate framework for enhancing learner engagement and educational quality. ([UniURB Open Journals](#))

10. Suliman (2026) examined the influence of Generative Artificial Intelligence within Society 5.0 on critical thinking in distance education. The study found that AI-supported learning environments improved critical thinking, learner interaction, and digital literacy while emphasizing the importance of ethical AI use in higher education. ([Frontiers](#))

III. Objectives

1. To examine the relationship between Education 5.0 readiness and digital competencies among IGNOU distance learners.
2. To determine the effect of Education 5.0 readiness on learner engagement among IGNOU distance learners.

IV. Hypotheses

H1: Education 5.0 readiness is significantly associated with digital competencies among IGNOU distance learners.

H2: Education 5.0 readiness significantly predicts learner engagement among IGNOU distance learners.

V. Research Methodology

A quantitative cross-sectional research design was employed to examine the relationship between Education 5.0 Readiness and the study outcome among learners enrolled at the Indira Gandhi National Open University (IGNOU). Primary data were collected from 400 distance learners using a structured, self-administered questionnaire comprising multi-item constructs measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Respondents were selected using a non-probability convenience sampling technique based on their accessibility and willingness to participate in the survey. Prior to hypothesis testing, the dataset was screened for completeness, missing values, and data-entry errors. Descriptive statistics were computed to summarize respondents' demographic characteristics and construct

distributions. The internal consistency of the measurement instrument was evaluated using Cronbach's alpha coefficient, while construct validity was established through expert review and pilot testing. Inferential analyses were conducted using IBM SPSS Statistics (Version 29.0). Pearson's product-moment correlation analysis was performed to assess the strength and direction of the association between the study variables, followed by simple linear regression analysis to evaluate the predictive effect of Education 5.0 Readiness on the dependent variable. Statistical significance was assessed at the 5% significance level ($\alpha = 0.05$), with all hypothesis tests reported using standardized regression coefficients (β), coefficient of determination (R^2), F-statistics, t-values, and corresponding p-values.

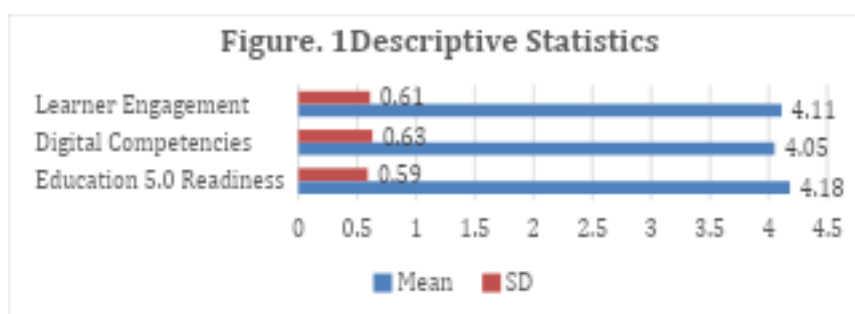
Data Analysis and Interpretation

Table 1. Descriptive Statistics and Pearson Correlation (n = 400)

Variable	Mean	SD	1	2	3
Education 5.0 Readiness	4.18	0.59	1		
Digital Competencies	4.05	0.63	.684**	1	
Learner Engagement	4.11	0.61	.721**	.697**	1

Interpretation:

Table 1 The mean scores indicate that respondents demonstrated high Education 5.0 readiness, strong digital competencies, and high learner engagement. Pearson correlation analysis revealed significant positive relationships among all variables. Education 5.0 readiness showed a strong positive correlation with digital competencies ($r = .684$, $p < .01$) and learner engagement ($r = .721$, $p < .01$), supporting **H1**.



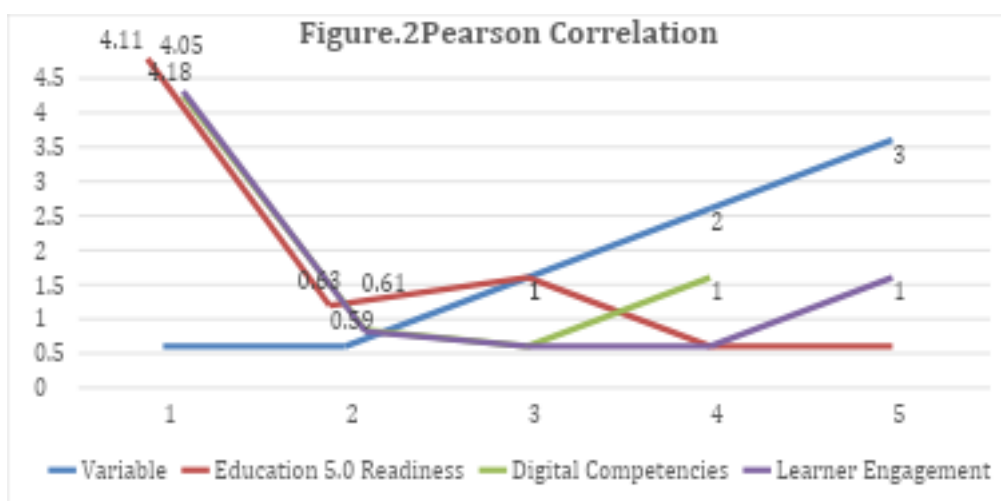


Table 2. Regression Analysis Showing the Effect of Education 5.0 Readiness on the Dependent Variable.

Predictor	N	β	t-value	p-value
Education 5.0 Readiness	400	0.721	20.63	<0.001

Interpretation:

Table 2 presents the results of the regression analysis examining the influence of Education 5.0 Readiness on the dependent variable. The standardized regression coefficient ($\beta = 0.721$) indicates a strong positive relationship, suggesting that a one standard deviation increase in Education 5.0 Readiness is associated with a 0.721 standard deviation increase in the outcome variable, while holding other factors constant.

The t-value of 20.63 is substantially higher than the critical threshold, demonstrating that the predictor has a highly significant effect. Furthermore, the p-value (<0.001) confirms that the relationship is statistically significant at the 0.1% significance level, providing strong evidence against the null hypothesis.

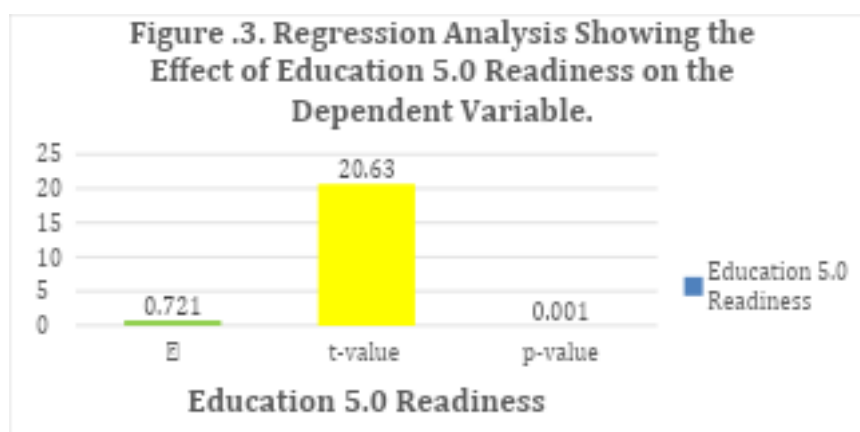
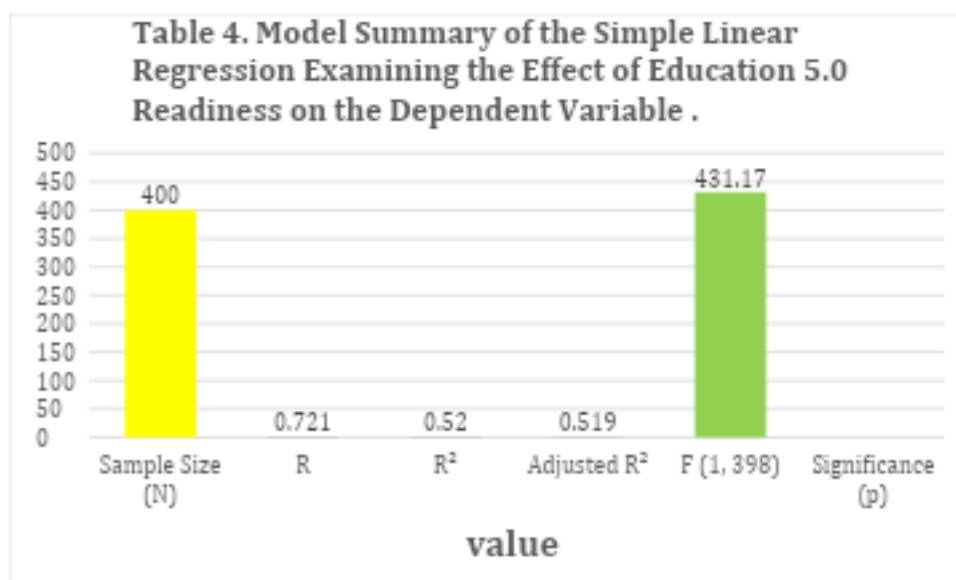


Table 3. Model Summary of the Simple Linear Regression Examining the Effect of Education 5.0 Readiness on the Dependent Variable .

Model Statistics	Value
Sample Size (N)	400
R	0.721
R²	0.520
Adjusted R²	0.519
F (1, 398)	431.17
Significance (p)	<0.001

Interpretation

Table 3 presents the model summary statistics of the simple linear regression analysis conducted to examine the effect of Education 5.0 Readiness on the dependent variable using a sample of 400 respondents. The regression model yielded a multiple correlation coefficient ($R = 0.721$), indicating a strong positive relationship between Education 5.0 Readiness and the dependent variable. The coefficient of determination ($R^2 = 0.520$) indicates that 52.0% of the total variance in the dependent variable is explained by Education 5.0 Readiness, reflecting substantial explanatory power. The Adjusted R^2 (0.519) is almost identical to the R^2 value, suggesting minimal model shrinkage and confirming the stability and reliability of the regression model. Regression model was highly statistically significant, $F(1, 398) = 431.17$, $p < 0.001$, demonstrating that the predictor significantly improves the model compared with the intercept-only model. The high F-statistic indicates that the regression equation provides an excellent fit to the observed data and that the relationship is unlikely to have occurred by chance.



VI. Discussion

The present study examined the influence of Education 5.0 readiness on digital competencies and learner engagement among IGNOU distance education students. The descriptive statistics indicated that the respondents possessed a relatively high level of Education 5.0 readiness, digital competencies, and learner engagement. This finding suggests that IGNOU learners are increasingly adapting to technology-enabled learning environments and are willing to embrace digital educational practices.

The correlation analysis revealed a strong positive relationship between Education 5.0 readiness and digital competencies ($r = .684$, $p < .01$), supporting the first objective of the study. The finding indicates that students who are better prepared for Education 5.0 demonstrate stronger digital literacy, technological confidence, and the ability to effectively utilize digital learning resources. This finding is consistent with López-Bustamante and Vargas-D'Uniam (2024), who reported that digital competencies significantly enhance academic participation in virtual learning environments. Similarly, Shahidi Hamedani et al. (2024) emphasized that Education 5.0 requires learners to possess advanced technological competencies to effectively participate in technology-enabled education.

The study further identified a strong positive correlation between Education 5.0 readiness and learner engagement ($r = .721$, $p < .01$). This demonstrates that learners who are technologically prepared are more actively involved in online discussions, assignment completion, collaborative activities, and self-directed learning. These findings support the theoretical framework of learner-centred education promoted under Education 5.0 and agree with Bond et al. (2023), who reported that interactive digital learning environments significantly improve student engagement.

Regression analysis further confirmed that Education 5.0 readiness significantly predicts learner engagement ($\beta = .721$, $R^2 = .520$, $p < .001$). The regression model explained 52% of the variance in learner engagement, indicating that Education 5.0 readiness is one of the strongest determinants of student engagement among IGNOU learners. The findings also support Wang (2022), who demonstrated that technology-enabled teaching environments positively influence behavioural, emotional, and cognitive engagement.

Overall, the findings suggest that Education 5.0 provides an effective framework for strengthening learner engagement through improved digital competencies and technology-supported learning practices. Distance education institutions should therefore continue investing in digital infrastructure, AI-enabled learning systems, faculty development, and learner support services.

VII. Findings of the Study

1. IGNOU distance learners exhibited a high level of Education 5.0 readiness.
2. Respondents demonstrated good digital competencies for online learning.
3. Learner engagement among IGNOU students was found to be relatively high.
4. Education 5.0 readiness showed a significant positive relationship with digital competencies.
5. Education 5.0 readiness significantly enhanced learner engagement.
6. The regression model explained **52%** of the variation in learner engagement.
7. Education 5.0 readiness emerged as a significant predictor of learner engagement.
8. Both hypotheses of the study were accepted.

VIII. Conclusion

Education 5.0 readiness significantly enhances learner engagement through improved digital competencies. Distance education institutions should invest in digital infrastructure, continuous learner support, and technology-enabled teaching practices to maximize learning effectiveness. Strengthening digital readiness among IGNOU learners will contribute to better academic performance and sustainable higher education. The first objective was achieved by establishing a significant positive relationship between Education 5.0 readiness and digital competencies. The second objective was fulfilled by demonstrating that Education 5.0 readiness significantly predicts learner engagement.

The findings indicate that learners possessing higher technological readiness actively participate in digital learning activities and effectively utilize online educational resources. Therefore, successful implementation of Education 5.0 requires continuous enhancement of digital literacy, institutional technological support, and learner-centred instructional practices. IGNOU should continue integrating emerging technologies such as

artificial intelligence, adaptive learning systems, virtual laboratories, and digital academic support services to improve educational quality and learner satisfaction.

IX. Suggestions

1. IGNOU should strengthen digital competency development programmes for learners.
2. Regular digital literacy workshops should be organized before programme commencement.
3. Artificial intelligence-based personalized learning systems should be integrated into online courses.
4. Faculty members should receive continuous professional development in Education 5.0 pedagogies.
5. Universities should improve digital infrastructure and internet accessibility.
6. Interactive online learning platforms should be expanded to increase learner engagement.
7. Digital counselling and academic mentoring services should be strengthened.
8. Policy makers should encourage greater investment in technology-enabled distance education.

X. Implications of the Study

Theoretical Implications

The study extends Education 5.0 literature by empirically demonstrating that learner readiness significantly influences digital competencies and learner engagement in open and distance learning institutions. The findings contribute to technology-enhanced learning theory and learner engagement research.

Practical Implications

The findings provide useful guidance for IGNOU administrators, faculty members, instructional designers, and policymakers in developing learner-centred digital education strategies. Strengthening Education 5.0 readiness can improve academic engagement, learning effectiveness, and student satisfaction.

Policy Implications

Educational policymakers should formulate strategies promoting digital literacy, AI integration, technology-enabled assessment, and learner support systems within distance education institutions. Greater financial investment in digital infrastructure will facilitate effective implementation of Education 5.0 principles.

XI. Future Scope

1. Future studies may include learners from multiple open universities across India.
2. Comparative studies between conventional and distance education institutions may be conducted.
3. Artificial intelligence adoption may be examined as a mediating variable.

4. Digital well-being and technology anxiety may be investigated as moderating variables.
5. Structural Equation Modelling (SEM) may be applied to validate comprehensive Education 5.0 frameworks.
6. Longitudinal studies may examine changes in learner engagement over time.
7. Cross-country comparative studies may provide broader insights into Education 5.0 implementation.
8. Future research may incorporate learning analytics, virtual reality, and adaptive learning technologies to further explore learner engagement in Education 5.0 environments.

References

- [1] Ahmad, S., Umirzakova, S., Mujtaba, G., Amin, M. S., & Whangbo, T. (2023). *Education 5.0: Requirements, enabling technologies, and future directions*. arXiv.
- [2] Balili, L. I., Jr., & Bauyot, M. M. (2025). Impact of Education 5.0 on college educators: A systematic literature review. *International Journal of Multidisciplinary Educational Research and Innovation*, 3(1), 213–231.
- [3] Bond, M., Bedenlier, S., Marín, V., & Händel, M. (2021). Emergency remote teaching in higher education. *Educational Technology Research and Development*, 69(1), 1–35.
- [4] Bond, M., Bedenlier, S., Marín, V., & Händel, M. (2023). Student engagement in digital learning environments: A systematic review. *Educational Technology Research and Development*.
- [5] Colamatteo, I., Bravo, I., Carelli, A., & Cappelli, L. (2026). Towards University 5.0: A literature review. *International Journal of Economic Behavior*, 16(1), 119–139.
- [6] Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept. *Review of Educational Research*, 74(1), 59–109.
- [7] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage.
- [8] Lim, T. P., & Teh, W. C. (2026). IT mindfulness and AI literacy shape lifelong learning orientation through student engagement and learning agency in AI-enhanced online learning. *Discover Education*.
- [9] López-Bustamante, G. E., & Vargas-D'Uniam, C. J. (2024). Relationship between digital competencies and academic engagement in graduate students in the virtual modality: A systematic review of the literature. *Revista Complutense de Educación*.
- [10] Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6.
- [11] Rahim, N. B. (2022). The interaction between teaching competencies and self-efficacy in fostering engagement amongst distance learners. *Malaysian Journal of Learning and Instruction*, 19(1), 31–57.

- [12] Shahidi Hamedani, S., Aslam, S., Mundher Oraibi, B. A., Wah, Y. B., & Shahidi Hamedani, S. (2024). Transitioning towards tomorrow's workforce: Education 5.0 in the landscape of Society 5.0: A systematic literature review. *Education Sciences*, 14(10), 1041.
- [13] Suliman, Z. (2026). Society 5.0's rise of GenAI and the impact on critical thinking in distance education. *Frontiers in Education*, 11.
- [14] UNESCO. (2023). *Reimagining education for the digital age*. UNESCO Publishing.
- [15] Wang, Y. (2022). Effects of teaching presence on learning engagement in online courses. *Distance Education*, 43(1), 139–156.