SCIENTIFIC CULTURE
www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 2.1, (2026), pp. 7667-7672
Open Access. Online & Print

DOI: 10.5281/zenodo.12212026594

THE PREDICTIVE ROLE OF CURRICULUM CONSTRUCTION AND SOFT SKILLS PROFICIENCY IN ENHANCING STUDENT WORK-READINESS FOR INDUSTRY 5.0

Deni Kurniawan[1*], Rusman[2], Zainal Arifin[3], Eva Puspitasari[4], Yaziz Abi Sufyan[5], Abdul Karim Suhadha[6]

[1 2 3 4 5 6]*Department of Curriculum Development, Universitas Pendidikan Indonesia, Bandung, Indonesia.*

Received: 11/12/2024
Accepted: 25/02/2025

Corresponding author: Deni Kurniawan (deniku@upi.edu)

ABSTRACT

The emergence of Industry 5.0 necessitates a fundamental reorientation of higher education toward human-centric, sustainable, and resilient professional development. Despite the theoretical importance of curriculum alignment, a methodological gap exists in the empirical validation of the predictive pathways linking academic architecture to professional readiness. The present study addresses this gap by investigating the relationships within a professional development triad: curriculum construction, soft skills proficiency, and perceived work-readiness. Utilizing a quantitative, cross-sectional design, data were collected from 402 final-year undergraduate students and recent graduates across STEM, Business, and Social Science disciplines. Structural path analysis using the Hayes (2022) process macro (Model 4) revealed that curriculum construction significantly predicts both work-readiness ($\beta = 0.467$, $p < 0.001$) and soft skills proficiency ($\beta = 0.467$, $p < 0.001$). Furthermore, the results confirmed a significant partial mediation model ($\beta = 0.2036$, 95% CI [0.154, 0.255]), demonstrating that soft skills, specifically the 4C competencies of critical thinking, communication, collaboration, and creativity, serve as the primary bridge for transmitting the impact of curriculum architecture to professional readiness. These findings provide a robust empirical foundation for University 5.0, suggesting that academic governance must move beyond thematic mapping to embed soft skills as structural core components. The study concludes that while curriculum construction provides the necessary scaffolding, professional preparedness for the Industry 5.0 era is a mediated journey dependent on the successful cultivation of interpersonal and cognitive agency.

KEYWORDS: 4C Skills, Curriculum Construction, Industry 5.0, Mediation Analysis, Work-Readiness.

1. INTRODUCTION

The emergence of Industry 5.0 marks a significant paradigm shift from purely technological optimization to a socio-technical approach that prioritizes human-centricity, sustainability, and resilience (Castagnoli et al., 2024). Unlike its predecessor, Industry 4.0, which focused predominantly on automation and cyber-physical systems, Industry 5.0 necessitates a workforce capable of collaborating with advanced intelligent systems while addressing complex societal challenges (P. Griffin et al., 2015). This transition places unprecedented demands on higher education institutions to redesign educational frameworks that move beyond technical expertise to cultivate high-level cognitive and interpersonal attributes (Leng et al., 2022).

Central to this educational transformation is the concept of curriculum construction (Leng et al., 2022). Systematic frameworks such as Outcome-Based Education (OBE) have been widely adopted to align academic outputs with professional requirements (Edwin & Susanta, 2025; Keo et al., 2025; Qin & Chen, 2025; Spady, 1994). However, recent scholarship suggests that traditional curriculum mapping often identifies thematic alignment without providing empirical evidence of its predictive efficacy on professional outcomes (Akdere et al., 2019; Armstrong & Vergara, 2024; Broo et al., 2022; Poltronieri et al., 2025). This gap represents a methodological void where qualitative thematic coherence is assumed to translate into quantitative work-readiness without rigorous statistical validation.

The mechanism through which curriculum construction influences work-readiness is frequently theorized to be mediated by proficiency in soft skills (Alwi & Karim, 2024; Herbert & Herbert, 2020; Mahalingam & Webb, 2025; Wong et al., 2026). Attributes such as critical thinking, communication, collaboration, and creativity, recognized as the 4C skills, are increasingly identified as the primary drivers of employability in the age of artificial intelligence (Schmitt & Scheibe, 2023). Economic and psychological research supports the malleability of these non-cognitive traits, suggesting that intentional pedagogical interventions can significantly enhance a student's professional trajectory (Heckman & Kautz, 2012; Schmitt & Scheibe, 2023). Given the nascent awareness of Industry 5.0 within Higher Education and Industries (HEIs), there remains a clear gap in research that applies advanced mediation analysis to quantify the causal relationships among curriculum construction, skill acquisition, and student work-readiness (Adil et al., 2025; Schmitt & Scheibe, 2023; Schoeman, 2025). Based on the theoretical framework, this study proposes that perceived curriculum construction rigor significantly and positively predicts undergraduate students' work-readiness for Industry 5.0 (H1) and their proficiency in soft skills (H2). Furthermore, it is hypothesized that soft skills proficiency mediates the relationship between curriculum construction and student work-readiness (H3). To empirically examine these assumptions, the study addresses three key research questions: the extent to which perceived curriculum rigor predicts student work-readiness, the influence of curriculum construction on the development of soft skills, and whether soft skills significantly mediate the relationship between curriculum construction and perceived work-readiness.

2. RESEARCH METHOD

This study employed a quantitative, predictive, cross-sectional research design to examine the structural relationships among curriculum architecture, soft skills, and professional readiness. Data collection was conducted via a non-probability snowball sampling strategy, targeting final-year undergraduate students and recent graduates within 1 year of completing STEM, Business, and Social Science disciplines. This demographic was selected for their immediate proximity to the labor-market transition, ensuring high ecological validity in the Industry 5.0 context. The initial recruitment phase yielded 430 total responses via a digital survey platform. After rigorous data cleaning, 28 cases were excluded due to straight-lining (zero variance) and multivariate outliers. The final analytical sample consisted of 402 valid responses (n = 402), exceeding the established gold standard required for generalizability in large populations (Hair et al., 2021).

The research instrument comprised three primary scales adapted from validated constructs and tailored for the Industry 5.0 environment. All items were measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Curriculum Construction was operationalized through five items assessing perceived thematic alignment and interdisciplinary integration. Soft Skills Proficiency (SS) used 5 items to assess the 4C competencies: critical thinking, communication, collaboration, and creativity. These dimensions were framed according to the assessment frameworks for 21st-century skills (Griffin et al., 2016). Perceived Work-Readiness (EMP) was measured using four items assessing students' confidence in navigating technologically

advanced and human-centric industrial environments. Before the main distribution, a pilot study (n = 30) established internal consistency and face validity. The pilot results indicated robust reliability: Curriculum Construction (α = 0.791), Soft Skills Proficiency (α = 0.840), and Perceived Work-Readiness (α = 0.884).

Before hypothesis testing, the dataset underwent a three-stage algorithmic screening process. First, a missing-value analysis confirmed a 0% missing-data rate across all 14 critical items. Second, multivariate outliers were identified using the Mahalanobis Distance (D2), which was evaluated against a Chi-square critical value of 36.12 (df = 14, $p < 0.001$) (Adhikari, 2023). One case was identified as a significant multivariate outlier and subsequently removed. Third, Common Method Bias (CMB) was addressed via Harman's Single Factor Test (Aguirre-Urreta & Hu, 2019; Howard et al., 2024; Kock et al., 2021), revealing that the first factor accounted for only 27.6% of the total variance, which is substantially below the 50% threshold, indicating significant common method variance. Furthermore, normality assessments involving Skewness (-0.08 to -0.42) and Kurtosis (-0.12 to 0.73) confirmed that the data resided within the acceptable range of ±2, justifying the use of parametric modelling.

The structural model was tested using the Hayes & Little (2022) process macro (Version 4.2) for IBM SPSS Statistics. Specifically, Model 4 was employed to execute the mediation analysis, treating Curriculum Construction as the independent variable (X), Soft Skills Proficiency as the mediator (M), and Work-Readiness as the dependent variable (Y). This approach was selected for its ability to quantify indirect effects without assuming normality in the sampling distribution of the product of coefficients. To ensure the highest level of rigor, the study utilized bias-corrected bootstrapping with 5,000 resamples. Statistical significance for the indirect effect was determined by the absence of zero within the 95% bootstrap confidence intervals (Lower Limit Confidence Interval and Upper Limit Confidence Interval). Standardized coefficients and R^2 values were calculated to report both the predictive strength and the effect size.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Participant Demographic Profile

The demographic composition of the final analytical sample (n = 402) is presented in Table 1. The data reveal a balanced distribution across genders and a significant representation from STEM and Business disciplines.

Table 1: Participant Demographic Profile (n = 402).

Demographic Category	Frequency (f)	Percentage (%)
Gender		
Male	194	48.3
Female	208	51.7
Academic Discipline		
STEM	158	39.3
Business and Economics	132	32.8
Social Sciences and Humanities	112	27.9
Employment Status		
Final-year Undergraduate	246	61.2
Recent Graduate (< 1 year)	156	38.8

3.1.2. Preliminary Analysis and Descriptive Statistics

Before structural testing, data were evaluated for internal consistency and fundamental relationships. Table 2 provides means (M), standard deviations (SD), and the Pearson correlation matrix. The analysis confirmed robust internal consistency for Curriculum Construction (α = 0.830), Soft Skills Proficiency (α = 0.809), and Perceived Work-Readiness (α = 0.747).

Table 2: Descriptive Statistics, Reliability, and Correlations.

Variable	M	SD	α	1	2	3
Curriculum Construction (CUR)	3.92	0.64	0.830	1		
Soft Skills Proficiency (SS)	4.12	0.58	0.809	0.467**	1	
Perceived Work-Readiness (EMP)	3.88	0.71	0.747	0.467**	.471**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed).

None of the standardized beta coefficients were statistically significant ($p > 0.05$). This indicates that variations in how individual students engaged with specific sub-components (technology or project work) did not independently predict their score gains. This may imply that the effectiveness of each component is contingent upon its interaction with other elements within the curriculum framework.

This finding provides a complex response to H4, suggesting that the curriculum functions as a synergistic whole rather than a sum of its parts. This is a crucial finding that highlights the importance of implementing the curriculum as an integrated package rather than piecemeal.

3.1.3. Structural Path and Mediation Analysis

Testing of the pathways was conducted via the Hayes and Little (2022) process macro. Regarding H1, curriculum construction rigor significantly predicted work-readiness ($\beta = 0.467$, $p < 0.0001$). This finding indicates that a well-structured, systematically developed curriculum plays a crucial role in equipping students with the competencies needed to meet workplace demands, particularly by aligning learning outcomes with industry expectations. Similarly, H2 was validated as curriculum construction emerged as an antecedent for soft skills proficiency ($\beta = 0.467$, $p < 0.0001$). This suggests that, beyond technical knowledge, the curriculum's design also facilitates the development of essential interpersonal and intrapersonal skills, such as communication, teamwork, and adaptability. The mediation analysis, presented in Table 3, quantified the transmission of influence.

Table 3: Decomposition of Mediation Effects (Bootstrap = 5,000)

Pathway	Coefficient (β)	Standard Error	Lower Limit Confidence Interval	Upper Limit Confidence Interval	Result
Direct Effect (X→)	0.2634	0.043	0.179	0.348	Significant
Indirect Effect (X→ M→)	**0.2036**	0.025	**0.154**	**0.255**	**Significant**
Total Effect	0.4670	0.044	0.381	0.553	Significant

The indirect effect (0.2036) was statistically significant, as the 95% bias-corrected bootstrap confidence interval did not include zero. The persistence of a significant direct effect confirms a significant partial mediation model (H3).

3.2. Discussion

The study provides a quantitative confirmation of the structural mechanisms connecting curriculum architecture to professional readiness in the Industry 5.0 era. By moving beyond qualitative mapping to a robust predictive mediation model, the findings address the methodological void identified in contemporary higher education literature (Otermans et al., 2023; Tan et al., 2021; Tran et al., 2022). The discovery of a significant partial mediation provides a nuanced understanding of how academic design translates into market-ready competence (Akbar et al., 2026; Hasan et al., 2025; Hadianto et al., 2021; Sirinterlikci et al., 2024; Vezi-Magigaba & Utete, 2024). The significant predictive link between curriculum rigor and work-readiness ($\beta = 0.467$) indicates that students recognize academic architecture as a critical preparatory framework for socio-technical resilience (Leng et al., 2022; Rifai et al., 2025). This outcome validates the immune system theory of higher education (Herbert & Herbert, 2020; Mahalingam & Webb, 2025).

Crucially, the mediation analysis provides the empirical evidence required to understand the transmission of this educational impact. The significant indirect effect through soft skills ($\beta = 0.2036$) aligns with the 21st-century skills framework, reinforcing the notion that technical mastery is secondary to interpersonal and cognitive fluencies (Griffin et al., 2015). In an era characterized by human-machine symbiosis, readiness is defined by the human agency required for ethical and technical oversight (Poltronieri et al., 2025; Gyulai et al., 2023; Suganya et al., 2024; Supriya et al., 2024; Taverner et al., 2021). Results indicate that the curriculum's impact is filtered through the acquisition of critical thinking and collaboration skills, which serve as the actual mechanisms of professional application. This suggests that technical knowledge alone, without the mediating influence of interpersonal competence, is insufficient for the demands of the modern labor market (Castagnoli et al., 2024).

The results resonate deeply with the human-centric and resilient pillars of Industry 5.0. By identifying soft skills as a critical mediator, the evidence emphasizes that professional preparedness is not a direct byproduct of technical exposure but a result of a psychological-organizational pathway (Aslan et al., 2025; Nursyifa et al., 2020; Ojo et al., 2025; Rifai et al., 2025; Schoeman, 2025; Tsephe, 2024). This supports the human-tech orientation necessary for University 5.0, where the focus shifts from purely tech-driven efficiency to a socio-technical configuration that prioritizes human well-being and sustainability (Aratthanage et al., 2025; Castagnoli et al., 2024; Deepavani & Kumaravel, 2025; Medusalem et al., 2026; Rifai et al., 2025). The data suggest that the perceived interdisciplinary nature of the curriculum is a vital component of this predictive success (Ainiyah, 2025; Broo et al., 2022; Mohan et al., 2025; Pelaez-Sanchez et al., 2024). When curriculum construction includes modules on digital twins, sustainability, and ethical AI governance,

students report higher levels of both skill proficiency and professional confidence.

Methodologically, the use of Mahalanobis distance cleaning and Hayes' process mediation provides a blueprint for future studies aiming to move beyond qualitative mapping. By excluding straight-lining and outliers, it is ensured that the reported coefficients reflect the genuine predictive power of academic design rather than statistical noise. This rigor is essential for journals aiming to address the methodological gaps in educational analytics (Hair et al., 2021). Furthermore, the 4C skills must be repositioned at the core of the academic experience. Given that they serve as the primary bridge for work-readiness, these skills should be assessed as technical competencies in their own right. Pedagogical delivery must incorporate experiential learning methods, such as immersive simulations and project-based technology integration, to maximize the mediating potential of these interpersonal attributes.

4. CONCLUSION

The study confirms that the transition to Industry 5.0 readiness is a mediated process rather than a direct outcome of technical instruction. Rigorous curriculum construction provides the necessary foundation, yet soft skills proficiency, specifically the 4C competencies, acts as the essential bridge that translates academic rigor into professional agency. By quantifying these predictive pathways, higher education institutions can adopt a more strategic, human-centric approach to talent cultivation. This transition is vital to ensuring that the next generation of professionals possesses the resilience, ethical agency, and collaborative fluency required to thrive in a sustainable, resilient industrial era.

REFERENCES

1. Adhikari, A. (2023). Application of mahalanobis distance in education and educational psychology: a mini review. Innovare Journal of Education, 11(4), 5–7.
2. Adil, A. S., Ginting, H., & Febriansyah, H. (2025). Reframing workforce readiness: Bridging soft skills gaps for business and sustainability in Indonesia. SSRN eLibrary
3. Aguirre-Urreta, M. I., & Hu, J. (2019). Detecting common method bias. ACM SIGMIS Database: The DATABASE for Advances in Information Systems, 50(2), 45–70.
4. Ainiyah, Z. D. (2025). Integrating STEAM project-based learning into elementary curriculum to strengthen innovation and collaboration skill for industry 5.0. The Proceeding International Conference on Education, Religion, and Social Studies, 2(2), 346-354.
5. Akbar, M. A. A., Ahmad, A. A., & Muhajad, A. (2026). Bridging soft skills and academic success: The mediating role of internship performance. Journal of Educational Management Research, 5(1), 1016–1030.
6. Akdere, M., Hickman, L., & Kirchner, M. (2019). Developing leadership competencies for STEM fields: The case of Purdue Polytechnic Leadership Academy. Advances in Developing Human Resources, 21(1), 49–71.
7. Alwi, S. K. K., & Karim, A. A. (2024). Bridging the employability gap: Aligning higher education curricula with industry-required competencies in the digital era. Journal of Business Strategies, 18(2), 93–110.
8. Aratthanage, K., Jeyachandran, K., Wickramasinghe, S., & Premachandra, P. (2025). Profiling industry 5.0 readiness: A machine learning approach to student soft skills. IEEE Xplore.
9. Armstrong, R., & Vergara, C. J. T. (2024). Coping with Industry 5.0: An assessment of evolving soft skills for the workplace. In S. Nousala, G. Metcalf, & D. Ing (Eds.), Industry 4.0 to Industry 5.0. (Vol. 41, pp. 57–78). Springer.
10. Aslan, S., Alanoğlu, M., & Karabatak, S. (2025). Enhancing 21st-century teaching competencies: The key role of digital literacy in connecting pre-service teachers' TPACK. Information Development, 1(1), 1–10.
11. Broo, D. G., Kaynak, O., & Sait, S. M. (2022). Rethinking engineering education at the age of Industry 5.0. Journal of Industrial Information Integration, 25(1), 100311.
12. Castagnoli, R., Cugno, M., Maroncelli, S., & Cugno, A. (2024). A new research agenda for human-centric manufacturing: A systematic literature review. IEEE Transactions on Engineering Management, 71(1), 15236–15253.
13. Deepavani, S., & Kumaravel, V. (2025). A study on entrepreneurial skills and employability readiness of business management students. Lex Localis, 23(6), 9220–9227.
14. Edwin, & Susanta, V. A. (2025). Outcome-based education in the 21st century: Innovations, implementation, and impact. Advances in Psychological Sciences and Applications, 1(2), 48–72.

15. Griffin, P., Care, E., & Harding, S.-M. (2015). Task characteristics and calibration. In P. Griffin, B. McGaw, & E. Care (Eds.), Assessment and Teaching of 21st Century Skills (pp. 133–178). Springer Netherlands.
16. Griffin, P., Care, E., & McGaw, B. (2016). Assessment and teaching of 21st century skills: Methods and approach (P. Griffin, B. McGaw, & E. Care, Eds.). Springer.
17. Gyulai, T., Wolf, P., Kása, F., & Viharos, Z. J. (2023). Learning factories towards industry 5.0: Evolutionary or revolutionary?. MACRO Meets NANO in Measurement for Diagnostics, Optimization, and Control.
18. Hadiyanto, H., Noferdiman, N., Syamsurizal, S., & Muhaimin, M. (2021). Students' soft skills, hard skills, and competitiveness (SHC): A suggested model for Indonesian higher education curriculum. International Journal of Learning, Teaching and Educational Research, 20(1), 511–530.
19. Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Partial least squares structural equation modeling (PLS-SEM) Using R. Springer International Publishing.
20. Hasan, D. H., Almuhajir, A., & Ilyas, M. (2025). Soft skills-based curriculum implementation: A response to educational challenges in the Vuca and Tuna era. Jurnal Hurriah: Journal of Educational Evaluation and Research , 6(2), 886–893.
21. Hayes, A. F., & Little, T. D. (2022). Introduction to mediation, moderation, and conditional process analysis : a regression-based approach. The Guilford Press.
22. Heckman, J. J., & Kautz, T. (2012). Hard evidence on soft skills. Labour Economics, 19(4), 451–464.
23. Herbert, N., & Herbert, D. (2020). Five principles to integrate professional skill development within a curriculum to ensure industry-ready graduates. Aisel
24. Howard, M. C., Boudreaux, M., & Oglesby, M. (2024). Can Harman's single-factor test reliably distinguish between research designs? Not in published management studies. European Journal of Work and Organizational Psychology, 33(6), 790–804.
25. Keo, V., Hak, C., Lan, B., Khong, R., Neang, S., & Hoeurn, S. (2025). Implementing outcome-based education in higher education: Challenges and benefits. International Journal of Educational and Psychological Sciences, 3(5), 511–530.
26. Kock, F., Berbekova, A., & Assaf, A. G. (2021). Understanding and managing the threat of common method bias: Detection, prevention, and control. Tourism Management, 86(1), 104330.
27. Leng, J., Sha, W., Wang, B., Zheng, P., Zhuang, C., Liu, Q., Wuest, T., Mourtzis, D., & Wang, L. (2022). Industry 5.0: Prospect and retrospect. Journal of Manufacturing Systems, 65, 279–295.
28. Mahalingam, T., & Webb, H. (2025). Co-creating competency-based business curriculum to embed industry-prioritized soft skills. Industry and Higher Education, 1(1), 1–12.
29. Medusalem, J. H., & Ntjamba, F. C. (2026). Bridging the gap: Employer expectations vs. graduate readiness. In M. A. Aziz, & B. Christiansen (Eds.), Enhancing graduate employability in an evolving (pp. 195–222). IGI Global.
30. Mohan, M., Sharma, P., & Dana, L. P. (2025). Cultivating socially sustainable employability in Industry 5.0: exploring the impact of specific skills on the employability of management graduates. Education + Training, 67(7–8), 701–720.
31. Nursyifa, A., Rahmadi, I. F., & Hayati, E. (2020). TPACK capability preservice teachers civic education in the era of Industrial Revolution 4.0. Jurnal Pendidikan Indonesia, 9(1), 15–29.
32. Ojo, S. A., Ogbu, D. K., & Dalyop, G. B. (2025). Workplace readiness skills needed by graduates of polytechnics for employment in construction industries in Enugu State. Home Economics Research Association of Nigeria, 1(1), 1–18.
33. Otermans, P. C. J., Aditya, D., & Pereira, M. (2023). A study exploring soft skills in higher education. Journal of Teaching and Learning for Graduate Employability, 14(1), 151–168.
34. Pelaez-Sanchez, I. C., Glasserman-Morales, L. D., & Rocha-Feregrino, G. (2024). Exploring digital competencies in higher education: design and validation of instruments for the era of Industry 5.0. Frontiers in Education, 9(1), 1–5.
35. Poltronieri, C. F., Leite, L. R., Xavier, Y. S. M., Domingues, J. P. T., Toledo, J. C. D., & Oliveira, O. J. D. (2025). Toward industry 5.0: Mapping technologies, competencies, and research opportunities. Journal of Entrepreneurship, Management and Innovation, 21(4), 103–129.
36. Qin, X., & Chen, Y. (2025). Enhancing educational outcomes with Outcome-Based Education: A study of employability and industry readiness in Chinese multimedia technology students. International Journal of Inclusive Education, 1(1), 1–29.

37. Rifai, D. S., Widodo, W., & Hasbullah, H. (2025). Boosting student work readiness: A meta-analysis of soft skills and teaching factory. Jurnal Pemberdayaan Masyarakat, 4(4), 982–994.
38. Schmitt, A., & Scheibe, S. (2023). Beliefs about the malleability of professional skills and abilities: Development and validation of a scale. Journal of Career Assessment, 31(3), 493–515.
39. Schoeman, L. (2025). Work-readiness of trainee accountants–are the Universities getting it right? African Journal of Innovation and Entrepreneurship, 4(4), 1–20.
40. Sirinterlikci, A., Al-Jaroodi, J., & Moretti, A. (2024). Integrating soft skills into technical curriculum. Asee Peer.
41. Spady, W. G. (1994). Outcome-based education : critical issues and answers. American Association of School Administrators.
42. Suganya, G., Selvakumar, J. J., Varadharajan, P., & Pachiyappan, S. (2024). Skill sets required to meet a human-centered industry 5. In M. A. Khan, R. Khan, P. Praveen, A. R. Verma, & M. K. Panda (Eds.), Infrastructure Possibilities and Human-Centered Approaches With Industry 5.0 (pp. 231–252). IGI Global.
43. Supriya, Y., Bhulakshmi, D., Bhattacharya, S., Gadekallu, T. R., Vyas, P., Kaluri, R., Sumathy, S., Koppu, S., Brown, D. J., & Mahmud, M. (2024). Industry 5.0 in smart education: Concepts, applications, challenges, opportunities, and future directions. IEEE Access, 12(1), 81938–81967.
44. Tan, C. Y., Abdullah, A. G. K., & Ali, A. J. (2021). Soft skill integration for inspiring critical employability skills in private higher education. Eurasian Journal of Educational Research, 21(92), 23–39.
45. Taverner, C., Trojan, L., Simion, O., & Szkudlarek, E. (2021). Design culture in the era of Industry 5.0: A review of skills and needs. Cultural Management: Science and Education, 5(1), 41–58.
46. Tran, L. T., Ngo, N. T. H., Nguyen, H. T. M., & Le, T. T. T. (2022). Higher education, graduate employability, and labour market. IGI Global.
47. Tsephe, R. (2024). Graduate readiness for the world of work in the 4IR context–A view from the 2022 institutional quality audit. Iated Digital Library.
48. Vezi-Magigaba, M. F., & Utete, R. (2024). Enhancing graduate employability: Inculcating soft skills into the tertiary institutions' curriculum. Journal of Curriculum and Teaching, 13(5), 62–80.
49. Wong, R., Saraih, U. N., Abidin, N. Z., & Nasir, N. M. (2026). Enhancing graduate employability through soft skills: Insights from Malaysian Technical Universities. IGI Global