Curriculum Innovation For Ai Integration in Fashion Technology Engineering Courses: A Comparative Study of Global Best Practices

Arul Kumaravelu[1*]

[1] Associate Professor, Department of Knitwear Design, National Institute of Fashion Technology (NIFT), Chennai, Tamil Nadu, India.
Email: karul500@gmail.com
ORCID: 0000-0001-8886-8215

Corresponding Author:

Arul Kumaravelu[1*]

Associate Professor, Department of Knitwear Design, National Institute of Fashion Technology (NIFT), Chennai, Tamil Nadu, India.
Email: karul500@gmail.com
ORCID: 0000-0001-8886-8215

Abstract: The rapid advancement of Artificial Intelligence (AI) is reshaping education systems and demanding urgent reform across disciplines, particularly within fashion technology engineering. As AI tools are introduced into the process of design, production and retail, the academic curriculum needs to be up-to-date to educate graduates in the context of new hybrid professions at the intersection of creativity and computation. More often though, the implementation of AI in a structured way does not seem to exist in the current programmes, which generates a high skill gap. This paper set out to identify and compare international curriculum frameworks of AI in fashion engineering of technology. The research points out transferrable best practices that can be used to conduct educational reforms in line with Industry 5.0. The implications of the findings can be viewed as a guide to institutions wanting to modernise their curriculum and future proof their graduates within the AI enabled areas of creative engineering.;

Keywords: AI in education; curriculum innovation; fashion technology; engineering education; global case studies; digital skills development.

Introduction

Artificial Intelligence (AI) has significantly influenced both creative and engineering domains, transforming how industries design, produce, and deliver value. In sectors such as architecture, product design, media, and engineering, AI applications—ranging from generative design to predictive analytics—are rapidly expanding. The global AI market in education is expected to grow from 4.1 billion USD in 2023 to 20.5 billion USD by 2028, reflecting the increasing pace of adoption across institutions worldwide (Padovano & Cardamone, 2024). As a result, graduates must now combine creative fluency with advanced digital competencies, including machine learning, data science, and computational design.

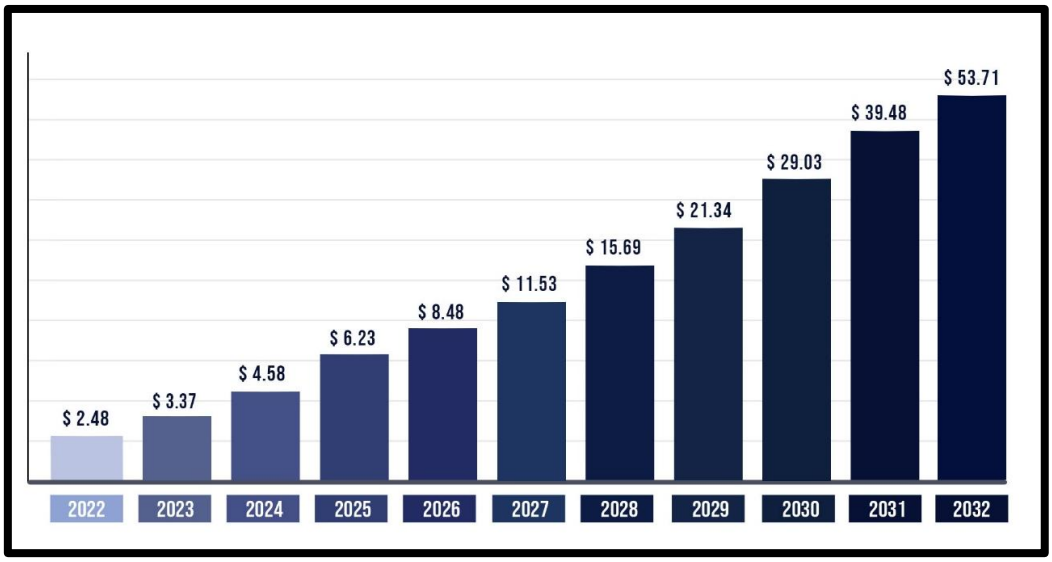

Figure 1: AI In Education Market

(Source: Vision Research Report, 2025)

Fashion technology engineering, as an interdisciplinary field, is particularly impacted by these developments. AI-driven applications such as 3D garment prototyping, intelligent textile systems, and automated fashion forecasting are becoming standard across the industry. More than 70% of the major fashion players intend to spend on an AI solution in 2025, which is evidence of a trend towards design, production, and retail digital transformation (Paulauskaite-Taraseviciene et al., 2022).

Even though the innovation has been stepped up, the systematic implementation of AI teaching into fashion technology engineering courses is scarce. There are still a lot of programmes that stick to the classical paradigm, and even then, the course content does not always meet all the requirements (the range of modules usually captures data-driven design, sustainability analytics, and AI-driven personalisation). The comparative analysis shows that not all the countries, in fact, such countries as the United States, South Korea, and Finland have already implemented the AI-related modules by the creative engineering programmes, whereas others are still hesitating to revise the curricular materials due to this global transition (Merryman & Lu, 2021).

The purpose of this research is to scan and examine the best practices in incorporating AI into the engineering curricula of fashion technologies in the global comparative way. It takes on a secondary qualitative approach, as thematic data across peer-reviewed journal articles, institution syllabus, and global policy guidelines are investigated to expose the concept of innovation in pedagogy and curriculum design.

Objectives:

To critically examine how global higher education institutions are integrating artificial intelligence into fashion technology engineering curricula.

To identify and analyse recurring themes, pedagogical models, and curriculum design strategies used in leading international programmes.

To develop a set of evidence-based, transferable best practices that can inform future curriculum innovation in AI-driven fashion technology education.

LITERATURE REVIEW

a. AI in Higher Education Globally

Artificial intelligence (AI) is fast becoming a game changer in the global higher education's sector and requires a radical pedagogical, structural, and strategic change. Jin et al. (2025) provide an international overview of institutional adoption policies in relation to generative AI, describing how universities are searching the balance between innovation and a manageable risk of ethical issues. The review contains wide gaps in the preparation of AI integration, particularly among the developed and developing countries. They analyse well the patterns and policy focus of policies and strategic planning, but there is no consideration of the practical pedagogical or curriculum deployment at ground level and especially in interdisciplinary areas like that of fashion technology engineering.

Southworth et al. (2023) present a conceptual model of integrating AI in higher education curriculum in an effort to cultivate AI literacy and interdisciplinary interaction. What is particularly distinguished in their work is that they put much focus on the long-term academic innovation, particularly in enabling institutional AI readiness. The generic nature of the model does not provide answers regarding discipline-specific adaptation, especially in hybrid areas, which include a combination of both, technical and creative skills.

Abisoye & Akerele (2023) has offered a more practical perspective to consider more as they are related directly to national policy frameworks that aim the AI literacy in STEM learning. According to them, it is necessary to start discussing the use of AI by future workforces starting with the policy setup and reinforce it with specific changes in the curriculum. Their analysis, however, despite its success in pointing out how important national efforts are to solve the digital knowledge gap, focuses on STEM disciplines.

A combination of these works provides a picture of the movement towards integration based on artificial intelligence on the global level and promotes awareness of strategy versus practice differences and especially in creative-technological spheres. They explicate the necessity of discipline-specific frameworks that extend beyond AI literacy in the general sense and contribute to solving sector-specific curriculum issues.

b. Fashion Technology Engineering and AI

Fashion technology engineering may be regarded to be experiencing considerable growth in industry-related protocols, but the enhancement is not well represented in the formulation of academic curriculums. Mohiuddin Babu et al. (2024) discuss how AI is being used to enhance agility in fashion supply chains through predictive analytics, automated production, and customer-centred data models. While their analysis effectively captures the strategic transformation of fashion operations, the study remains firmly grounded in industrial application.

An & Park (2023) provide one of the few empirical examples of AI use within a university-level fashion design course. Through an industry-university collaboration in South Korea, their study demonstrates how AI-enabled design tools improved students' engagement and outcomes in garment personalisation. Additionally, the study does not fully explore the pedagogical scaffolding required to support sustained AI literacy across semesters or degree levels.

Donmezer et al. (2023) focus on advanced manufacturing and design practices such as digital twins, E-libraries, and closed-loop production. These innovations represent future directions for the fashion sector, particularly in achieving sustainability goals. However, the study's orientation towards operational innovation provides little insight into how fashion education should evolve to reflect these industry shifts. There is minimal discussion of faculty readiness, curriculum redesign, or student skill

development strategies related to AI competencies.

These studies confirm the transformative potential of AI in fashion tech, but also expose a critical weakness: a lack of comprehensive, comparative curriculum models that bridge design thinking, AI technologies, and engineering competencies in academic settings.

c. Curriculum Innovation and Pedagogy

Contemporary pedagogical approaches are increasingly aligned with the digital demands of AI-enhanced education. Epp et al. (2021) propose a radical shift in curriculum design through the adoption of constructivist learning theories, suggesting that traditional content delivery must be restructured to accommodate dynamic learner engagement. Their work, rooted in nursing education, illustrates how faculties can evolve through collaborative, reflective, and technology-rich teaching models.

Sasson et al. (2022) advance this discourse by advocating for flexible, student-centred environments that foster interdisciplinary thinking. Their emphasis on collaborative and problem-based learning correlates with best practices in emerging creative-tech education. However, their study's focus remains on general education contexts, without examining how these pedagogical strategies perform in hybrid domains that blend engineering, art, and digital systems.

Malik & Zhu (2023) provide stronger alignment with the current research topic by investigating flipped classrooms and hands-on project-based learning within computing education. Their findings demonstrate that students in AI-related modules exhibit higher engagement and comprehension when teaching is structured around real-world problems and experiential learning. This is particularly relevant to fashion tech curricula, where creativity, iteration, and technical application must coexist.

While these sources support the move toward digital pedagogy, none provide a curriculum template specific to fashion technology engineering. The evidence reinforces a need for more discipline-anchored pedagogical studies that bridge technical and creative learning outcomes, particularly in AI-focused modules.

d. Global Best Practices in AI-Integrated Fashion Tech Curricula

The comparative review of international best practices provides valuable insight into how AI is being integrated across fashion-related academic programmes. Singh et al. (2024) discuss the incorporation of AI in India's textile sector, emphasising institutional collaborations with firms such as IBM and Google. These partnerships facilitate real-time exposure to AI systems and suggest a practical model for industry-academia synergy.

Khan et al. (2024), while focused on microgrid energy management, contribute by presenting a robust technological framework that can inform curriculum development in technical domains. Directly applicable to fashion may not be an aspect of the focus on problem solving approaches using AI, but the conceptual similarities exist, and can even be applied to fashion engineering, first in the field of creating innovative materials, and second in wearables.

Inamdar et al. (2024) thoroughly describe the digital twin technologies as applied in engineering. These models may be incorporated in line with developing curriculums of prototyping and predictive design education. Their study explains the applicability of simulation technologies and real-time analytics in developing products that can be applied directly in teaching fashion technology.

Ahn et al. (2021) present the most curriculum-relevant case through their study of KAIST's interdisciplinary AI initiatives in South Korea. Their model proves the success of the convergence of engineering, design, and data science by labs, maker spaces, and industry-connected studios. The example of the case presents an alterable model of intertwinement of pedagogy, infrastructure, and

strategic planning, which suggests a complete blueprint of integrating AI into the discipline of creative-engineering.

Combined, these examples of case studies suggest that best practices are dependent upon five elements, namely modular curricula, project-based pedagogy, AI laboratories, industry-academia partnerships, and competency-based assessment. Nevertheless, the most serious deficiency is an absence of comparative research that examines these models within a standardized, transferable framework that can be used across nations.

Theoretical Framework

Technological Pedagogical Content Knowledge (TPACK) Model

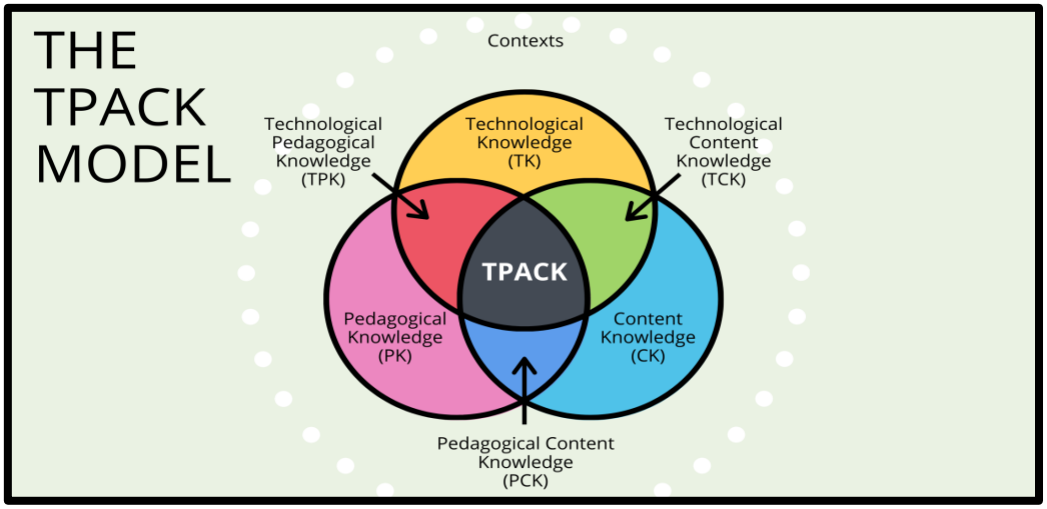

Figure 2: Technological Pedagogical Content Knowledge (TPACK) Model

(Source: Influenced by Bueno *et al.*, 2023)

Technological Pedagogical Content Knowledge (TPACK) model provides a good frame to assess the use of AI in curriculum integration. Handayani et al. (2023) designates a bibliometric study of the global significance of TPACK in technology-enhanced teaching. Their studies single out fundamental conflicts between integrating digital tools and content and pedagogy. Bueno et al. (2023) go further to discuss how TPACK is adapting to new forms of disruption such as AI and why the re-skilling of educators remains a necessity. TPACK is especially appropriate to deal with the convergence of design content, digital pedagogy, and AI tools in the setting of fashion technology engineering.

Diffusion of Innovation Theory (Rogers)

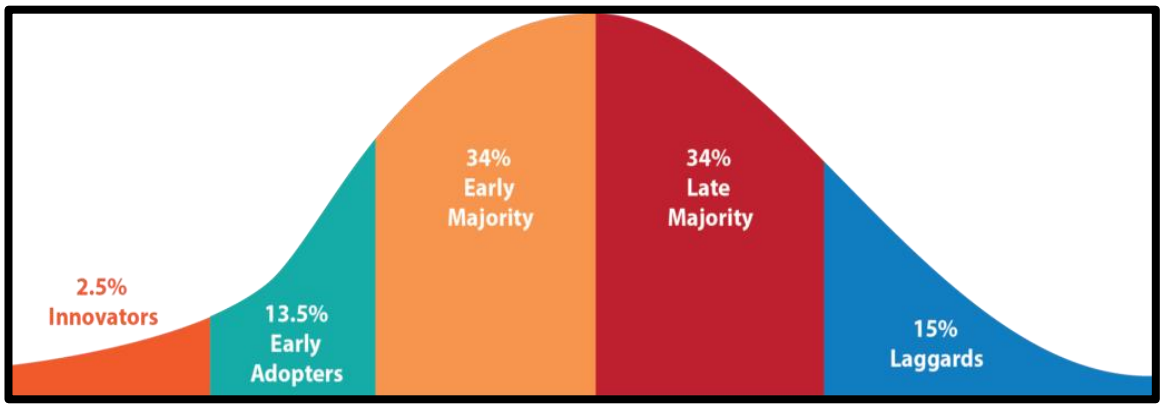

Figure 3: Diffusion of Innovation Theory (Rogers)

(Source: Influenced by Van Houtven *et al*., 2023)

Rogers' Diffusion of Innovation Theory by Rogers also offers an adjunctive scope through answering the question of institutional adoption and implementation of AI education. Frei-Landau et al. (2022) use the model to cover mobile learning in the era of COVID and reveal value drivers of the adoption that include institutional culture and the attitude to faculty. Van Houtven et al. (2023) regarding organisational readiness, which demonstrates the influence of the top-down support on the process of innovation adoption.

Gap Identified

Even though the research exposure on AI in education and fashion technology is increasing, there is a significant dearth of comparative research on curriculum-based integration of AI in fusion technology engineering in fashion technology. The current research is largely industry based or generic in its pedagogical thrust. Comparisons of international practices leave also little use of theory-based analysis. Such gaps indicate that thematic synthesis based on educational theory is necessary in the context of constructing viable curriculum reform in fashion tech engineering AI towards delivering quality scalable curriculum.

MATERIALS AND METHODS

This study adopted a ***secondary qualitative research design***, in which it applied the elements of thematic analysis to explore the level at which artificial intelligence (AI) is being incorporated into the engineering of fashion technologies within various higher education institutions around the world. The study involved secondary sources of content such as peer-review magazines indexed in Scopus and other official sources at university curriculums and even state education policies, and institution reports within the time range of 2020 to 2025. These sources allowed constructing a rather large amount of data, which made it possible to find regularities in the organization of the curriculum, teaching methodology, and cooperation between the industry and academia (Chong & Plonsky, 2021).

Performance in international indexes of innovation, maturity of an AI adoption strategy in education and relevance of fashion technology as an accepted academic field were used to select countries. The countries selected were United States, India, South Korea, Germany, Netherlands and the United Kingdom and each of these countries had different variants of incorporating AI into design-engineering education (Dupuy, Teuber & Van Ingelgom, 2022). In each context, institutional-based examples which are the Fashion institute of technology (FIT), National Institute of Fashion Technology (NIFT), and KAIST were examined in terms of curricular innovation and structural correspondence with the emerging digital competencies.

Thematic analysis was used to interpret the data, focusing on four key dimensions: curriculum structure, pedagogical strategy, industry integration, and skills mapping. Themes had been assigned through a systematic coding process of identified patterns and differences in the way AI was integrated into the design of the programme (Grimalt-Alvaro & Ametller, 2021). A particular focus was made on whether AI modules were mandatory or optional, the extent of practical learning methods used, and the availability of the instructive AI-based equipment, including laboratories and simulation devices.

These were some of the limitations of the methodology, that is, limited access to full syllabi as a result of institutional confidentiality and bottlenecks in documentation on study areas beyond English. Also, the global application of certain curricular models was restricted due to regional specificity, especially in scenarios in which local culture or regulations had a robust impact on the education policy of higher education (Chang, Bruess & Chong, 2024).

RESULTS AND DISCUSSION

Curriculum Repositioning through AI Literacy and Transversal Integration

Another significant development noticed among international institutions was the repositioning of AI as a transversal literacy that would be integrated in the various disciplines. Rebelo (2025), she suggested introducing AI during her cross-disciplinary curricular units that would not isolate any technical materials, claiming that this would allow every graduate (particularly in creative careers such as fashion technology) to develop a basic fluency in AI. Walter (2024) the rapid engineering and critical thinking, also underlined their significance as crucial AI skills in the contemporary classrooms.

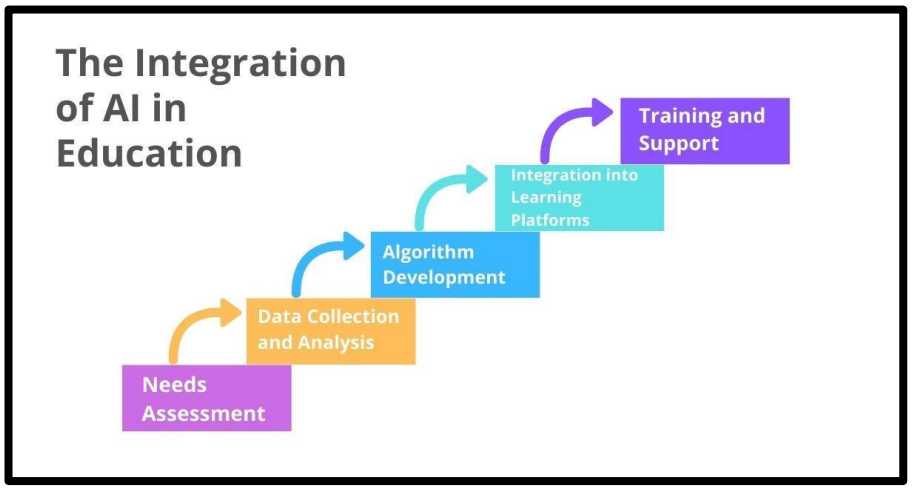

Figure 4: The Integration of AI in Education

(Source: Influenced by Jung & Suh, 2024)

Jung & Suh (2024) offered practical insights specific to fashion design education, who demonstrated the use of AI-based projects in textile courses to foster not only technical but also soft skills, including teamwork and ethical decision-making. But their research was limited to a certain Korean scenario and the study did not refer to more general international relevance.

Its results indicate that fashion technology engineering education needs to change in order to think of AI not as an additional technical component but as a fundamental graduate skill. More interdisciplinary approaches to sustainable design and manufacturing should be introduced into the fashion industry, beginning with digital literacy and progressing to the creation of AI-based application, a point that would be served with the help of a scaffolded model of learning.

Instructional Design Strategies for Scalable AI Integration

The analysis revealed a second theme focused on instructional design models that support scalable, high-quality AI curriculum delivery. Spatoti et al. (2022) tested the suitability of the ADDIE model to the context of digital learning and found its advantages linked to using it in the context of a structured development of content. They however warned that their implementation should never be strictly followed but should be learner-centred. This was a replication of other models in the studies (Sasson et al., 2022) which cautioned against application of static models on rapidly changing items such as AI.

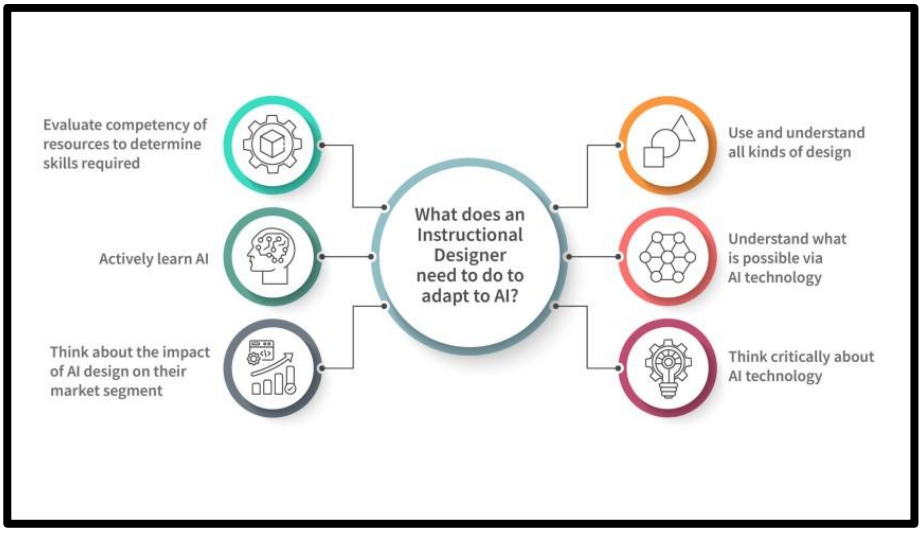

Figure 5: Artificial Intelligence in Instructional Designing

(Source: Influenced by Molenda, 2023)

Molenda (2023) pinpointed the history of changes to the instructions design methodology in which they supported constructivist instructions design as a method that encourages direct interaction with AI tools. In the same way, Julia and Marco (2021) discussed the frameworks of instruction in the context of MOOCs and identified the efficiency of modular systems, real-time feedback, and adaptive AI-enabled courses. Although initial studies of MOOCs were promising, they had lower completion rates indicating problems in learner motivation and course difficulty that is particularly important in the case of channels with creative courses that require hands-on practice such as fashion tech (Julia & Marco, 2021).

The fashion technology programmes are to shift to flexible models of instructional design that incorporate the traditional studio practice with modular, digitally augmented AI guidance. Digital simulation, industry tools, and iterative design support constructivist and experiential-based pedagogies, which provide expanding frameworks to incorporate AI into fashion education.

Ethics, Policy, and Institutional Readiness for AI Curriculum Reform

The third theme was about ethical preparedness, institutional structures, and national policies to do with AI adoptions. George (2023) proposed that the whole concept of curriculum design would need to be revisited and that AI would need new dynamic and inquiry-based learning styles that move away with the concept of content delivery.

Gouseti et al. (2025) further contributed by also providing the ethical risks of AI in education like Algorithm bias and the lack of human agency. Their results, as is characteristic of activities at the school level, raised crucial questions that are also significant to the fashion technology in the areas of privacy and ethical acceptability of design based upon algorithms. In the meantime, Miller-Young & Poth (2022) suggested adding such complex outcomes into the evaluation metrics as ethical thinking and socio-technical awareness.

This theme implied that institutions should couple their AI learning plans to frameworks and policy systems on ethics. In the case of fashion technology, when the concepts of identity, design ethics, and beauty are intersected, such coordination is even more critical. Institutions are encouraged to give more priority to policies that enable proper use of AI tools in the teaching and design process and faculty development and governance processes.

Discussion Based on Previous Studies from the Literature

The findings were closely related to major trends emerging in literature review. The rising power of AI throughout higher education (Jin et al., 2025) was reflected in the transversal integration work suggested by (Southworth et al., 2023). The authors took the theoretical concepts of global curriculum reform further by including such AI-specific skills as prompt engineering, digital fluency, and ethical engagement as the ones that have been identified as essential and cross-disciplinary by Southworth et al. (2023).

The pedagogical concerns expressed by Mohiuddin Babu et al. (2024) confirmed the literature discussion of moving away behaviourist into learner-centred pedagogies (Donmezer et al., 2021). In addition, the conclusions of Julia & Marco (2021) contributed to the position that the scalable delivery designs, such as modular formats and adaptive feedback coaching, gain importance as delivery models in the context of integrating AI, especially when it comes to large or mixed classroom environments.

Regarding readiness and ethics in the institutions, the results built on the literature review in seeing the existence of systemic gaps (Sasson et al., 2022). Although such theoretical approaches as TPACK or Rogers Diffusion of Innovation Theory offered valuable theoretical concepts, the reviewed empirical studies indicated that not many institutions have managed to apply these theoretical concepts practically.

This discussion proved that though theory and policy provide a blueprint towards the integration of AI, there are some impediments on the ground. Curriculum models should not only go the extra mile to engage in conceptualization, but to implement them, where the willingness of the institution is the key to change, adherence of teachers, and effective ethics of governance.

The results emphasized an important consideration of fashion technology engineering programmes that should apply a holistic perspective of integrating artificial intelligence (AI), with a focus on the future. The advent of transversal curriculum models of burying AI literacy in every subject was found necessary to accommodate graduates with both technical and creative skills.

The institutional readiness and ethical considerations emerged to be the main sustainable reform enhancing factors. Institutions have to embrace more than the teaching of the curriculum content, rather they ought to consider training of faculty, policy congruency and student information control. Incorporating AI involves more than technical upskilling, though it needs system change through pedagogical transformation, ethical protection and organisational enterprise. Such implications indicate that education providers ought to shift to adaptive, ethics-based and industry-responsive models so as to guarantee graduate relevance and employability.

CONCLUSION

This study examined how artificial intelligence (AI) is being integrated into fashion technology engineering curricula across leading global institutions. The thematic analysis, three main areas that influence the current practice were identified: the vision shift of AI as transversal literacy, the implementation of model-based, scalable instructional designs, and ethical, aligned to the policies, institutional preparedness. The curriculums that integrated AI throughout their curriculum, and thus could not be contained in units, were shown to be more effective in cultivating the technical fluency, creative thinking, and ethical awareness of students. ADDIE and modular models of instruction made possible flexibility, adaptability and responsiveness on change of technology whereas case studies also highlighted that pedagogical design is important with corresponding concepts of real-world applications.

Based on these findings, curriculum developers are encouraged to adopt scaffolded, interdisciplinary AI learning models tailored to the creative-engineering context. Institutions should invest in faculty development, ethical governance, and digital infrastructure to support sustainable implementation. Education ministries must establish national frameworks that incentivise AI integration in creative STEM disciplines through funding, accreditation standards, and cross-sector partnerships.

Future research could extend this comparative inquiry by exploring AI integration in adjacent disciplines such as industrial design, architecture, or media arts. Regional comparisons across Latin America, Africa, and Southeast Asia would further illuminate context-specific challenges and innovations. By bridging theory, policy, and practice, future studies can contribute to more globally coherent and ethically grounded models of AI-enhanced higher education.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my academic supervisor for their consistent guidance, valuable feedback, and encouragement throughout the development of this research paper. I am also thankful to the faculty members of the Department of Education for providing the necessary resources and academic support. My appreciation extends to the library staff and digital resource team, whose assistance made it easier to access high-quality journals and global case studies. Finally, I am grateful to my family and peers for their patience, motivation, and support during the entire course of this academic journey..

References

Abisoye, A., & Akerele, J. I. (2023). AI literacy in STEM education: Policy strategies for preparing the future workforce. Journal of Frontiers in Multidisciplinary Research, 4(1), 17-24. https://doi.org/10.54660/JFMR.2023.4.1.17-24

Ahn, J., Bae, C., Weiss, P. S., & Kim, I. D. (2021). Celebrating 50 Years of KAIST: Collective Intelligence and Innovation for Confronting Contemporary Issues. ACS nano, 15(2), 1895-1907. https://dx.doi.org/10.1021/acsnano.1c01101

An, H., & Park, M. (2023). An AI-based clothing design process applied to an industry-university fashion design class. Journal of the Korean Society of Clothing and Textiles, 47(4), 666-683. https://doi.org/10.5850/JKSCT.2023.47.4.666

Bueno, R., Niess, M. L., Engin, R. A., Ballejo, C. C., & Lieban, D. (2023). Technological pedagogical content knowledge: Exploring new perspectives. Australasian Journal of Educational Technology, 39(1), 88-105. https://doi.org/10.14742/ajet.7970

Chang, H. J., Bruess, F., & Chong, J. W. (2024). Opportunities and challenges of smart technology for small independent fashion retailers: a reflexive thematic analysis using the technology-organization-environment framework. Fashion and Textiles, 11(1), 26. https://doi.org/10.1186/s40691-024-00391-x

Chong, S. W., & Plonsky, L. (2021). A primer on qualitative research synthesis in TESOL. Tesol Quarterly, 55(3), 1024-1034. https://doi.org/10.1002/tesq.3030

Donmezer, S., Demircioglu, P., Bogrekci, I., Bas, G., & Durakbasa, M. N. (2023). Revolutionizing the garment industry 5.0: Embracing closed-loop design, E-libraries, and digital twins. Sustainability, 15(22), 15839. https://doi.org/10.3390/su152215839

Dupuy, C., Teuber, F., & Van Ingelgom, V. (2022). Citizens' experiences of a policy-ridden environment: A methodological contribution to feedback studies based on qualitative secondary analysis. Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique, 156(1), 124-157. https://doi.org/10.1177/07591063221132342

Epp, S., Reekie, M., Denison, J., de Bosch Kemper, N., Willson, M., & Marck, P. (2021). Radical transformation: Embracing constructivism and pedagogy for an innovative nursing curriculum. Journal of professional nursing, 37(5), 804-809. https://doi.org/10.1016/j.profnurs.2021.06.007

Frei-Landau, R., Muchnik-Rozanov, Y., & Avidov-Ungar, O. (2022). Using Rogers' diffusion of innovation theory to conceptualize the mobile-learning adoption process in teacher education in the COVID-19 era. Education and information technologies, 27(9), 12811-12838. https://doi.org/10.1007/s10639-022-11148-8

George, A. S. (2023). Preparing students for an AI-driven world: Rethinking curriculum and pedagogy in the age of artificial intelligence. Partners Universal Innovative Research Publication, 1(2), 112-136. https://doi.org/10.5281/zenodo.10245675

Gouseti, A., James, F., Fallin, L., & Burden, K. (2025). The ethics of using AI in K-12 education: A systematic literature review. Technology, Pedagogy and Education, 34(2), 161-182. https://doi.org/10.1080/1475939X.2024.2428601

Grimalt-Alvaro, C., & Ametller, J. (2021). A cultural-historical activity theory approach for the design of a qualitative methodology in science educational research. International Journal of Qualitative Methods, 20, 16094069211060664. https://doi.org/10.1177/16094069211060664

Handayani, S., Hussin, M., & Norman, M. (2023). Technological pedagogical content knowledge (TPACK) model in teaching: A review and bibliometric analysis. Pegem Journal of Education and Instruction, 13(3), 176-190. https://doi.org/10.47750/pegegog.13.03.19

Inamdar, A., van Driel, W. D., & Zhang, G. (2024). Digital Twin Technology—A Review and Its Application Model for Prognostics and Health Management of Microelectronics. Electronics, 13(16), 3255. https://doi.org/10.3390/electronics13163255

Jin, Y., Yan, L., Echeverria, V., Gašević, D., & Martinez-Maldonado, R. (2025). Generative AI in higher education: A global perspective of institutional adoption policies and guidelines. Computers and Education: Artificial Intelligence, 8, 100348. https://doi.org/10.1016/j.caeai.2024.100348

Julia, K., & Marco, K. (2021). Educational scalability in MOOCs: Analysing instructional designs to find best practices. Computers & Education, 161, 104054. https://doi.org/10.1016/j.compedu.2020.104054

Jung, D., & Suh, S. (2024). Enhancing soft skills through generative AI in sustainable fashion textile design education. Sustainability, 16(16), 6973. https://doi.org/10.3390/su16166973

Khan, M. R., Haider, Z. M., Malik, F. H., Almasoudi, F. M., Alatawi, K. S. S., & Bhutta, M. S. (2024). A comprehensive review of microgrid energy management strategies considering electric vehicles, energy storage systems, and AI techniques. Processes, 12(2), 270. https://doi.org/10.3390/pr12020270

Malik, K. M., & Zhu, M. (2023). Do project-based learning, hands-on activities, and flipped teaching enhance student's learning of introductory theoretical computing classes?. Education and information technologies, 28(3), 3581-3604. https://doi.org/10.1007/s10639-022-11350-8

Merryman, L., & Lu, S. (2021). Are fashion majors ready for the era of data science? A study on the fashion undergraduate curriculums in US institutions. International Journal of Fashion Design, Technology and Education, 14(2), 139-150. https://doi.org/10.1080/17543266.2021.1884752

Miller-Young, J., & Poth, C. N. (2022). 'Complexifying'our approach to evaluating educational development outcomes: bridging theoretical innovations with frontline practice. International Journal for Academic Development, 27(4), 386-399. https://doi.org/10.1080/1360144X.2021.1887876

Mohiuddin Babu, M., Akter, S., Rahman, M., Billah, M. M., & Hack-Polay, D. (2024). The role of artificial intelligence in shaping the future of Agile fashion industry. Production Planning & Control, 35(15), 2084-2098. https://doi.org/10.1080/09537287.2022.2060858

Molenda, M. H. (2023). History and development of instructional design and technology. In Handbook of open, distance and digital education (pp. 57-74). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-19-2080-6_4#DOI

Padovano, A., & Cardamone, M. (2024). Towards human-AI collaboration in the competency-based curriculum development process: The case of industrial engineering and management education. Computers and Education: Artificial Intelligence, 7, 100256. https://doi.org/10.1016/j.caeai.2024.100256

Paulauskaite-Taraseviciene, A., Lagzdinyte-Budnike, I., Gaiziuniene, L., Sukacke, V., & Daniuseviciute-Brazaite, L. (2022). Assessing education for sustainable development in engineering study programs: A case of AI ecosystem creation. Sustainability, 14(3), 1702. https://doi.org/10.3390/su14031702

Rebelo, E. M. (2025). Artificial Intelligence in Higher Education: Proposal for a Transversal Curricular Unit. Journal of Formative Design in Learning, 1-24. https://doi.org/10.1007/s41686-024-00097-9

Sasson, I., Yehuda, I., Miedijensky, S., & Malkinson, N. (2022). Designing new learning environments: An innovative pedagogical perspective. The Curriculum Journal, 33(1), 61-81. https://doi.org/10.1002/curj.125

Singh, S., Vig, S., & Dwivedi, S. (2024, June). Impact of uses of Artificial Intelligence (AI) in Textile Industry in India. In 2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT) (pp. 1-9). IEEE. https://doi.org/10.1109/ICCCNT61001.2024.10725995

Southworth, J., Migliaccio, K., Glover, J., Glover, J. N., Reed, D., McCarty, C., ... & Thomas, A. (2023). Developing a model for AI Across the curriculum: Transforming the higher education landscape via innovation in AI literacy. Computers and Education: Artificial Intelligence, 4, 100127. https://doi.org/10.1016/j.caeai.2023.100127

Spatioti, A. G., Kazanidis, I., & Pange, J. (2022). A comparative study of the ADDIE instructional design model in distance education. Information, 13(9), 402. https://doi.org/10.3390/info13090402

Van Houtven, C. H., Drake, C., Malo, T. L., Decosimo, K., Tucker, M., Sullivan, C., ... & Zullig, L. L. (2023). Ready, set, go! The role of organizational readiness to predict adoption of a family caregiver training program using the Rogers' diffusion of innovation theory. Implementation science communications, 4(1), 69. https://doi.org/10.1186/s43058-023-00447-x

Vision Research Report, (2025). 'Eu's Vision for Digital Transformation'. Retrieved from: https://www.visionresearchreports.com/ai-in-education-market/40114 [Retrieved on: 08th July, 2025]

Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. International Journal of Educational Technology in Higher Education, 21(1), 15. https://doi.org/10.1186/s41239-024-00448-3

.

.

.