VISIORA
Journal of Creative Industries and Vocational Inovation

Journal of Creative Industries and Vocational Innovation
E-ISSN: 3123-2450
Vol. 2, No. 1, (2026), pp. 97-108
Journal homepage: https://journal.unesa.ac.id/index.php/visiora/index

Human Centred Educational Technology and Generative AI for Vocational and Creative Education: A Critical Integrative Review

Fitria[1]*, Abdul Hafid Hasim[2]
[1]Faculty of Vocational Studies, State University of Surabaya, Surabaya, Indonesia
[2]Faculty of engineering, State University of Makassar, Makassar, Indonesia
*Corresponding Author: fitriafitria@unesa.ac.id

ABSTRACT

Educational technology and Generative Artificial Intelligence (GenAI) can expand feedback, simulation, ideation, and access to learning resources, yet their educational value depends on pedagogy, inclusion, integrity, and institutional accountability. This critical integrative review examines how these conditions shape responsible technology integration and how they apply to vocational and creative education. A purposive analytical corpus of 20 peer-reviewed articles published in 2021–2024 comprised 12 reviews or syntheses, four empirical studies, and four conceptual or critical studies. Design-sensitive appraisal and a framework-based thematic synthesis produced six themes: pedagogical alignment; teacher capability and workload; learner agency and authentic assessment; equity and accessibility; ethics, privacy, authorship, and intellectual property; and governance through staged evidence. The synthesis indicates that GenAI is most defensible when it supports rather than substitutes for human judgement, disciplinary practice, iterative feedback, and visible evidence of learning. In vocational and creative settings, applications include graphic ideation, content production, portfolio development, workplace simulation, and prototype feedback, but implementation should retain process records, human critique, copyright safeguards, and industry validation. The review contributes a human centred ecosystem and an evidence gated implementation roadmap linking learning quality, equity, integrity, workload, and accountability. Because the corpus was purposively retained from an earlier review archive and formal search strings and screening counts were unavailable, the findings do not establish prevalence, causality, or comprehensive coverage. Future research should validate the framework through multi-site vocational and creative education pilots.

Keywords: educational technology; generative artificial intelligence; vocational education; creative education; human centred learning

Correspondence:
Full name : Fitria
Email : fitriafitria@unesa.ac.id
Address : Universitas Negeri Surabaya, Jalan Lidah Wetan, Surabaya, Indonesia

Article History:
Received : July 24, 2026
Revised : October 12, 2026
Accepted : October 12, 2026
Publish : October 20, 2026

INTRODUCTION

Digital platforms and GenAI increasingly shape how learners obtain explanations, create artefacts, receive feedback, and demonstrate competence. Reviews of artificial intelligence in education report applications in tutoring, prediction, assessment, content generation, and learning support, while also identifying weak pedagogical grounding, uneven evidence, and persistent ethical concerns (Chiu et al., 2023; Crompton & Burke, 2023; Ouyang et al., 2022). GenAI adds a distinctive challenge because it can produce plausible text, images, code, and designs without making the learner's reasoning or authorship visible (Kasneci et al., 2023; Lo, 2023).

These tensions are especially consequential in vocational and creative education. Competence is demonstrated through situated performance, safe procedures, material knowledge, iterative design, and responsiveness to client or industry requirements. In creative disciplines, a polished AI-assisted artefact may conceal weak conceptual development, unacknowledged source material, or limited technical judgement. In vocational settings, inaccurate guidance may also affect safety and professional standards. Evidence specific to these sectors is emerging: vocational reviews emphasise personalised learning, simulation, and practical learning media (Muttaqin et al., 2024; Rosyadi et al., 2023), whereas design studies show both greater ideation efficiency and continuing need for critique, domain knowledge, and transparent process evidence (Huang et al., 2024; Li et al., 2024).

The literature nevertheless remains fragmented. Broad reviews often aggregate heterogeneous technologies and contexts; empirical studies are frequently short-term and context-bound; and ethical frameworks do not by themselves demonstrate educational effectiveness (Bond et al., 2024; Holmes et al., 2022). Consequently, institutions need a synthesis that separates evidence types, makes interpretive limits visible, and translates cross-cutting principles into decisions suitable for practice-based education. In this review, educational value means a demonstrable contribution to the intended learning process or outcome, rather than novelty, activity, or technology use alone. Human-centred integration means that learner agency, professional judgement, inclusion, transparency, and meaningful human interaction remain visible and consequential in technology-supported learning.

This review therefore aims to synthesise pedagogical, equity, ethical, and governance conditions for human-centred educational technology and GenAI integration, with specific interpretation for vocational and creative education. It addresses three questions: (RQ1) What pedagogical, equity, ethical, and governance themes characterise educational technology and GenAI integration? (RQ2) How do these themes apply to vocational and creative education? (RQ3) What evidence and governance conditions are required for responsible implementation? The contribution is a design-sensitive evidence synthesis, a human-centred ecosystem, and an evidence-gated roadmap. The framework is a synthesis-derived conceptual proposition rather than a validated predictive model.

METHOD

Review Design and Positionality

The study used a critical integrative review, appropriate for combining empirical, review level, and conceptual evidence to generate a bounded explanatory synthesis (Torraco, 2005). It was not reported as a systematic or scoping review because the historical search archive did not preserve reproducible database strings, stage by stage counts, or a deduplication record. No PRISMA compliant selection claim is therefore made.

The author approaches the topic from vocational and creative-industry education, with an interest in applied learning and responsible digital innovation. This position supports sensitivity to practice, portfolio assessment, and industry relevance, but may privilege implementation oriented interpretations. To mitigate that influence, the synthesis separated evidence classes, recorded disconfirming findings, applied an explicit claim rule, and retained the distinction between corpus evidence and later contextual sources.

Corpus Boundaries and Selection Logic

The analytical corpus was fixed at 20 peer-reviewed articles published from 2021 through 2024. Articles were eligible when they directly addressed educational technology or AI/GenAI in relation to pedagogy, teacher capability, learner experience, equity, assessment, ethics, governance, vocational learning, or creative/design practice. Articles were excluded when technology was incidental, educational implications were speculative without a developed argument, publication details could not be verified, or the study fell outside the date boundary. Purposive maximum-variation sampling retained different evidence forms and contexts while replacing peripheral emergency-remote-teaching sources with directly relevant vocational and design studies. Sampling stopped when all three review questions were represented across review, empirical, and conceptual evidence and additional retained records did not materially extend the six analytical categories. This stopping rule supports conceptual coverage, not exhaustiveness.

The final corpus comprised 12 reviews or syntheses, four empirical studies, and four conceptual or critical studies. Policy, theoretical, and Indonesian sources published outside 2021–2024 were used only for interpretation and were not counted, coded, or used to increase thematic support. Figure 1 presents the recoverable audit trail without inventing missing screening counts.

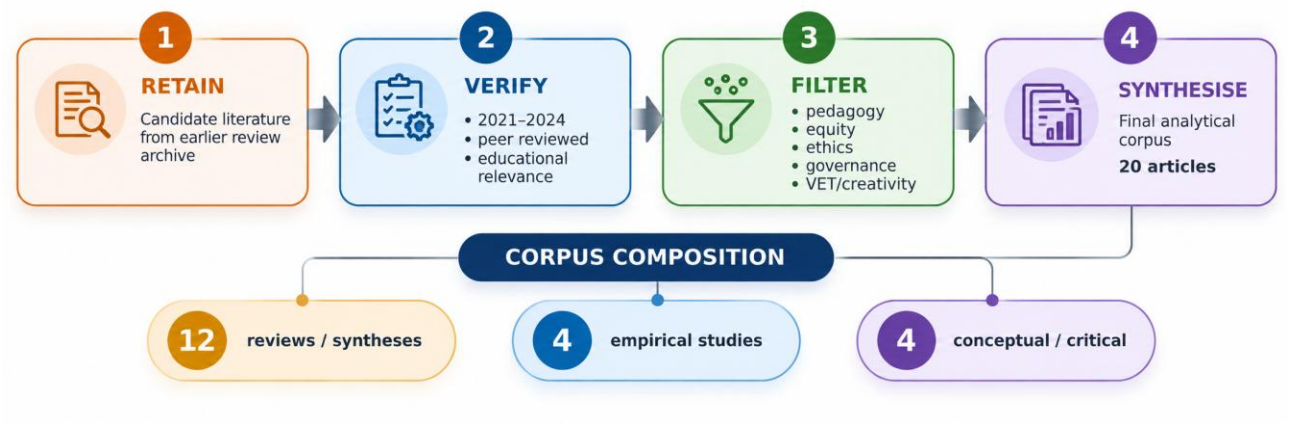


Figure 1. Recoverable selection logic for the critical integrative review

Source: Authors' synthesis.

Table 1. Corpus composition and permitted inference

Evidence class	n	Primary contribution	Interpretive limit
Review/synthesis	12	Recurring patterns, gaps, and propositions across prior literature	Potential overlap among primary studies; not independent replications
Empirical	4	Context-specific observations and tested relationships	Short-term or local evidence; limited causal and cross-context inference
Conceptual/critical	4	Ethical reasoning, policy logic, and design principles	No direct estimate of learning effects

Data Extraction and Critical Appraisal

For each article, extraction covered context, design, participants or source base, focal technology, findings, limitations, evidence role, initial codes, and candidate themes. Design-sensitive appraisal used five transparent domains: clarity of purpose; appropriateness of method or argument; adequacy of evidence/source base; transparency of analysis; and alignment between evidence and conclusions. Review articles were additionally checked for search and selection transparency; empirical articles for sampling, measures, and analytic coherence; and conceptual articles for construct clarity, engagement with

counterarguments, and warrant for recommendations. Each domain was marked Yes, Partial, or No. The checklist is reported article by article in Appendix B. Ratings guide interpretive weight and are not converted into a misleading aggregate score.

Framework-Based Thematic Synthesis

The analysis used framework-based thematic synthesis. Initial deductive categories—pedagogy, equity, ethics, and governance—were derived from the review questions. Inductive coding then added teacher capability, learner agency, authentic assessment, creative process, industry validity, and evidence thresholds. Codes were compared across evidence classes, collapsed into six themes, and checked against contradictory or qualified findings. Appendix C provides the article–code–theme–evidence matrix. The analysis was conducted by one reviewer; no inter-rater reliability statistic is claimed.

Overlap and Sensitivity Analysis

Because 12 corpus articles are reviews or syntheses, the unit of interpretation was the proposition rather than the number of publications. Reviews with overlapping higher-education AI/GenAI coverage were treated as convergent secondary evidence, not as independent confirmation. Sensitivity analysis then compared the six-theme solution with the four empirical studies alone. Themes concerning pedagogical alignment, learner agency, teacher mediation, and authentic process evidence remained directly observable. Equity, privacy, and institutional governance were less fully represented in the empirical subset and therefore rely more heavily on review and conceptual evidence. This difference is reported as an evidence gap rather than concealed through vote counting.

RESULTS AND DISCUSSION

Evidence Profile and Appraisal

The corpus is weighted toward secondary evidence, which provides breadth but limits claims about effectiveness. Appraisal found that most reviews clearly stated their purpose and synthesis focus, but search transparency and study overlap varied. The empirical studies provided the strongest sector-specific observations, although samples and implementation periods were bounded. Conceptual studies were valuable for governance and ethics but could not demonstrate learning gains. Accordingly, the synthesis uses cautious verbs such as indicates, suggests, and supports, and avoids prevalence or causal claims.

Table 2. Six themes, supporting evidence, and sector-specific interpretation

Theme	Illustrative support	Cross-study synthesis	Vocational and creative application
1. Pedagogical alignment	Chiu et al.; Ouyang et al.; Huang et al.; Li et al.	Technology contributes when tied to learning tasks, feedback, iteration, and disciplinary criteria.	Use GenAI for ideation and critique, followed by material or technical validation.
2. Teacher capability and workload	Bond et al.; Chan; Rosyadi et al.; Muttaqin et al.	Teacher judgement, policy literacy, and workload determine implementation quality.	Provide protected development time, prompt/rubric examples, and escalation routes.
3. Learner agency and authentic assessment	Cotton et al.; Lo; Huang et al.; Li et al.	Process evidence and reflection are more informative than output detection alone.	Assess briefs, prompt histories, iterations, critiques, prototypes, and oral defence.

Theme	Illustrative support	Cross-study synthesis	Vocational and creative application
4. Equity and accessibility	Chiu et al.; Bond et al.; Holmes et al.	Access includes connectivity, language, disability, digital capability, and paid-tool differences.	Provide non-AI alternatives, accessible tools, devices, and supported lab access.
5. Ethics, privacy, authorship, and IP	Holmes et al.; Kasneci et al.; Lim et al.; Cotton et al.	Responsible use requires disclosure, data minimisation, provenance, and human accountability.	Protect client data, document sources, label AI assistance, and review copyright risk.
6. Evidence-gated governance	Chan; Bond et al.; Farrokhnia et al.; Yusuf et al.	Policies should connect permission, risk, evidence, responsibility, and stop/revise decisions.	Pilot with industry partners and scale only after learning, equity, integrity, and workload gates.

Theme 1: Pedagogical Alignment Before Tool Adoption

Across broad AI reviews, benefits were conditional on the relationship between the tool, learning design, feedback, and disciplinary goals (Banihashem et al., 2022; Chiu et al., 2023; Ouyang et al., 2022). Banihashem et al. (2022) further show that analytics only improves feedback when data, feedback purposes, and stakeholder needs are aligned. Studies of product and design learning provide more direct evidence. Huang et al. (2024) found that AIGC-supported ideation could strengthen self-efficacy and learning processes, but gains depended on learner proficiency and structured teaching. Li et al. (2024), using interviews, observation, and artefact analysis with design students, found that AIGC created both conveniences and problems; domain knowledge and student strategies shaped whether efficiency became learning. Thus, review and empirical evidence agree that GenAI can widen the space of possibilities, but the empirical studies reject the assumption that faster generation automatically means deeper competence.

In graphic design, media production, and creative entrepreneurship, GenAI can generate alternative compositions, scripts, mood boards, storyboards, or campaign concepts. The pedagogical sequence should nevertheless require students to interpret the brief, justify selections, test feasibility, and refine outputs through human critique. In technical vocational courses, generated procedures should be checked against equipment manuals, safety protocols, and instructor demonstration before practice.

Theme 2: Teacher Capability, Judgement, and Workload

Reviews consistently identify teacher capability as an implementation condition rather than an optional support (Bond et al., 2024; Chiu et al., 2023; Montenegro-Rueda et al., 2023; Ogunleye et al., 2024). Montenegro-Rueda et al. (2023) emphasise educator preparation in early ChatGPT implementation, while Ogunleye et al. (2024) identify continuing gaps in curriculum guidance and interdisciplinary collaboration. Vocational reviews add that AI-enabled learning media can personalise feedback and enrich simulation, but teachers must align these functions with occupational competencies (Muttaqin et al., 2024; Rosyadi et al., 2023). Chan (2023) similarly shows that policy becomes meaningful only when pedagogical, governance, and operational responsibilities are connected. The evidence converges on the importance of capability, yet empirical estimates of workload and professional-development effects remain limited.

Institutions should therefore allocate time for teachers to test tools, develop examples, redesign assessment, and review risks. In studio and workshop settings, teacher capability includes knowing when AI advice must be overridden, when material constraints invalidate a generated design, and when client or industry data should not be uploaded.

Theme 3: Learner Agency and Authentic Assessment

Assessment-focused literature recommends redesign rather than dependence on unreliable detection (Cotton et al., 2024; Lo, 2023). Design studies reinforce this recommendation: students benefit when GenAI supports exploration but remain responsible for framing, selection, iteration, and explanation (Huang et al., 2024; Li et al., 2024). The convergence is strongest around process visibility; evidence is weaker for long-term effects on independent skill.

A vocational or creative portfolio should therefore contain the initial brief, research notes, prompt or interaction records where relevant, rejected alternatives, peer or client feedback, prototype changes, and a reflection identifying which decisions were human and AI-assisted. Demonstrations, oral defence, timed practical work, and comparison between digital proposals and physical outcomes can protect authenticity without prohibiting responsible assistance.

Theme 4: Equity and Accessibility

Equity concerns recur across reviews and ethical frameworks, although direct sector-specific testing is scarce (Chiu et al., 2023; Holmes et al., 2022). Unequal devices, bandwidth, language performance, disability access, and premium subscriptions can turn an apparently universal tool into a differentiated learning advantage. Sensitivity analysis confirmed that this theme is not well established by the four empirical studies alone; it should therefore be treated as a governance requirement and an urgent empirical question.

Implementation should include supported campus access, accessible formats, low-bandwidth alternatives, transparent rules for paid features, and a non-AI route to the same learning outcome. Equity monitoring should compare participation, completion, quality, and learner burden across relevant groups rather than report average satisfaction only.

Theme 5: Ethics, Privacy, Authorship, and Intellectual Property

Conceptual and critical studies consistently identify hallucination, bias, privacy, opacity, and overreliance, while academic-integrity literature adds concerns about attribution and assessment validity (Holmes et al., 2022; Kasneci et al., 2023; Lim et al., 2023). Tlili et al. (2023) add case-based evidence that usefulness can coexist with misinformation, privacy, manipulation, and trust concerns. These sources do not establish the frequency of harm, but they identify plausible risks and accountability principles. In creative education, authorship and intellectual property are particularly salient because generated images or text may obscure training-data provenance and the contribution of individual learners.

Students should disclose tools and material uses, avoid uploading confidential client work or personal data, retain source and process records, and distinguish inspiration, transformation, and substitution. Teachers and industry partners should agree in advance which assets may be processed, who owns resulting artefacts, and how AI assistance is represented in public portfolios.

Theme 6: Evidence-Gated Governance

Governance literature supports policy frameworks that connect pedagogical purpose, ethical safeguards, operational responsibility, and review (Bond et al., 2024; Chan, 2023; Farrokhnia et al., 2024). The corpus does not support universal thresholds, but it supports staged decision-making. A pilot should be revised or stopped when it does not improve the intended learning process, excludes learner groups, weakens process authenticity, creates unacceptable privacy exposure, or imposes unsustainable teacher workload.

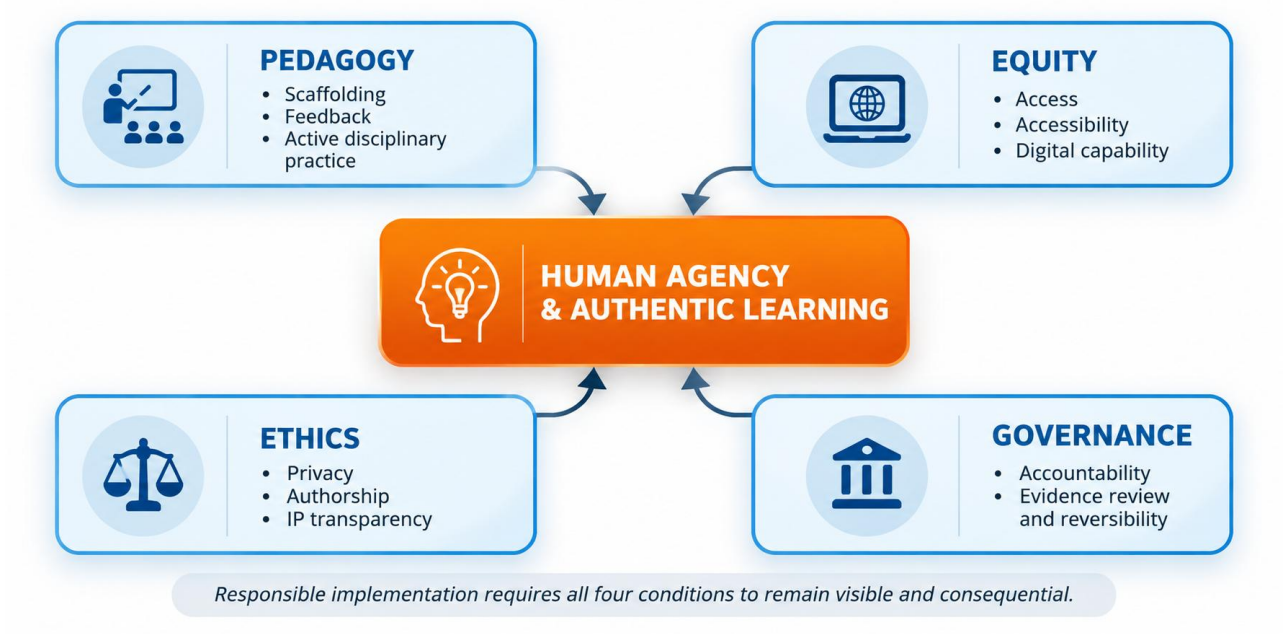


Figure 2. Human-centred ecosystem for vocational and creative education

Source: Authors' synthesis.

Framework Contribution and Novelty

The proposed framework does not replace established guidance. Its novelty is the combination of four elements that are often separated: heterogeneous-evidence weighting, process-authentic assessment, vocational/creative practice conditions, and explicit evidence gates for scale-up. Table 3 clarifies this incremental contribution.

Table 3. Relationship to established frameworks

Framework	Primary emphasis	Value retained	Added contribution of this review
UNESCO guidance (Miao & Holmes, 2023; UNESCO, 2023)	Human agency, inclusion, safety, and policy	Human-centred and rights-based principles	Connects principles to portfolio evidence and staged vocational/creative pilots.
OECD digital ecosystem (OECD, 2023)	System capacity and digital transformation	Whole-system perspective	Adds task-level learning, integrity, and workload gates.
Chan's AI policy framework (Chan, 2023)	Pedagogical, governance, and operational policy	Integrated institutional responsibility	Adds sector-specific process evidence and stop/revise decisions.
Holmes et al. ethics framework (Holmes et al., 2022)	Fairness, agency, transparency, accountability	Participatory ethical reasoning	Adds implementation indicators and industry validation.
Proposed synthesis	Human-centred, practice-based implementation	Integrates the above contributions	Links evidence class, authentic process, sector risk, and scale decisions.

Evidence-Gated Implementation Roadmap

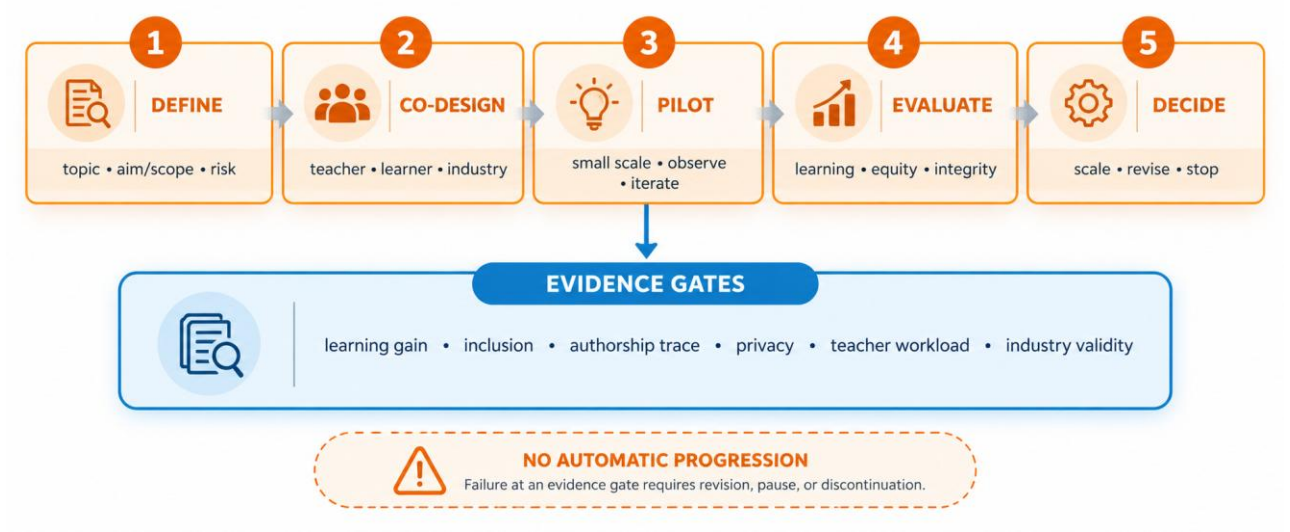


Figure 3. Evidence-gated implementation roadmap

Source: Authors' synthesis.

Table 4. Operational roadmap and decision responsibility

Stage	Required evidence	Responsible parties	Decision
Define	Learning outcome, task, user group, risk tier, non-AI alternative	Course team; programme lead	Proceed only with a clear educational purpose.
Co-design	Assessment map, disclosure rule, privacy/IP check, accessibility plan	Teachers; students; IT/legal; industry partner	Revise controls before tool access.
Pilot	Small cohort, baseline, process records, incident log	Course team; quality unit	Continue, revise, or stop the pilot.
Evaluate	Learning quality, inclusion, integrity, workload, user experience	Independent evaluator or quality unit	Compare against locally approved thresholds.
Scale/review	Replicated benefit, manageable risk, resources, review date	Faculty leadership; programme; industry board	Scale conditionally, retain pilot status, or discontinue.

Table 5. Suggested evaluation indicators for vocational and creative education

Domain	Indicator	Evidence source	Interpretation
Learning quality	Rubric improvement in disciplinary reasoning and execution	Blind-rated artefacts; practical tests; oral defence	A polished output alone is insufficient.
Creative process	Diversity of alternatives and justified refinement	Process portfolio; critique records	Track ideation and judgement, not output volume.
Workplace validity	Alignment with standards, safety, and client brief	Industry assessor; simulation checklist	Industry approval does not replace academic judgement.

Domain	Indicator	Evidence source	Interpretation
Equity	Participation, completion, burden, and outcomes by access group	Usage log; survey; subgroup comparison	Investigate gaps before scale-up.
Integrity/IP	Disclosure completeness, provenance, and verified authorship	Declaration; source log; viva	Use process evidence instead of detector scores.
Teacher workload	Preparation, moderation, support, and incident hours	Teacher log; workload review	Benefits must not depend on hidden labour.
Governance	Incidents resolved, responsibilities enacted, review completed	Risk register; audit record	Unresolved high-risk incidents trigger pause.

For vocational and creative institutions, the central evaluation criterion should be capability transfer rather than tool adoption. Evidence of success should show that learners can perform independently in unfamiliar situations, explain and defend decisions, collaborate, meet disciplinary or occupational standards, and use technology responsibly. In creative programmes, this also requires visible process evidence linking ideation, curation, authorship, revision, and final artefacts. In vocational programmes, assisted or simulated performance should ultimately connect to authentic tasks, verification, safety, and professional judgement. These indicators are proposed for validation rather than treated as established effect measures.

Implementation decisions should also account for the full institutional burden of a technology, not only immediate classroom convenience. Evaluation should consider accessibility, privacy, security, interoperability, licensing and support costs, staff development, verification workload, vendor dependency, and the ability to provide an equivalent non-AI route when a tool is unavailable or inappropriate. This reversibility principle strengthens evidence-gated governance: a tool should be modified, paused, or discontinued when its educational value does not justify its learning, equity, integrity, workload, or institutional risks.

Indonesian Policy Context Outside the Analytical Corpus

Indonesian sources published after the corpus boundary were used only to contextualise implementation. Guidance from Kementerian Pendidikan Dasar dan Menengah Republik Indonesia (2025a, 2025b) supports ethical, teacher-mediated, and context-sensitive use of AI. Kementerian Komunikasi dan Digital Republik Indonesia (2026) provides a later governance reference. These documents were not coded as corpus studies and do not constitute evidence of educational effectiveness. Detailed APJII percentages were removed because the page-specific survey report required to support the numerical claim was not available in the retained record.

The implementation emphasis is also compatible with UNESCO's teacher competency guidance, which treats AI capability as pedagogical and ethical professional capacity rather than mere tool operation (Miao & Cukurova, 2024). This source is interpretive guidance outside the analytical corpus.

Table 6. Separation of analytical corpus and contextual sources

Source group	Years	Role	Included in thematic counts?
Peer-reviewed analytical corpus	2021–2024	Critical appraisal, coding, thematic synthesis	Yes: n = 20
Policy and guidance	2025–2026	Interpret Indonesian implementation context	No

Source group	Years	Role	Included in thematic counts?
Foundational theory/method	2005–2024	Define review method and interpret frameworks	No

LIMITATIONS

This review has six principal limitations. First, it uses a purposively retained corpus because reproducible historical search strings and stage-by-stage screening counts were unavailable; it therefore cannot claim comprehensive coverage, publication prevalence, or a PRISMA compliant selection process. Second, the 20-article corpus is methodologically heterogeneous and weighted toward higher education. Third, 12 articles are reviews or syntheses with likely overlap in underlying primary studies. Fourth, sector-specific empirical evidence remains limited and geographically narrow. Fifth, coding and appraisal were completed by one reviewer. Sixth, the proposed ecosystem, indicators, and evidence-gated roadmap are synthesis-derived conceptual outputs that have not yet undergone expert validation or prospective field testing. These constraints limit causal, prevalence, and generalisability claims, but they are made explicit so that the framework can be tested rather than treated as established effectiveness evidence.

Future research should validate the framework in vocational and creative institutions using transparent systematic or scoping procedures, design-appropriate appraisal, and multi-site empirical studies. Priority outcomes include transfer to authentic work, independent performance, portfolio and process quality, assessment validity, teacher workload, accessibility, equity, data and intellectual-property governance, and longer-term learner capability. Studies should report implementation fidelity, baseline conditions, comparison conditions where feasible, and the distribution of benefits and burdens across learner groups.

CONCLUSION

Educational technology and GenAI integration is most defensible when pedagogy, teacher capability, learner agency, equity, ethics, and governance are treated as interdependent conditions. For vocational and creative education, GenAI can support ideation, content production, workplace simulation, portfolios, and prototype feedback, but assessment must retain visible process evidence, human critique, copyright safeguards, and industry-relevant validation. The review contributes a synthesis-derived human-centred ecosystem and an evidence-gated roadmap; neither is presented as a validated causal model. Future work should conduct expert review followed by multi-site pilots that compare learning quality, inclusion, integrity, workload, and workplace validity over time.

REFERENCES

Banihashem, S. K., Noroozi, O., Van Ginkel, S., Macfadyen, L. P., & Biemans, H. J. A. (2022). A systematic review of the role of learning analytics in enhancing feedback practices in higher education. *Educational Research Review, 37*, 100489. https://doi.org/10.1016/j.edurev.2022.100489

Bond, M., Khosravi, H., De Laat, M., Bergdahl, N., Negrea, V., Oxley, E., Pham, P., Chong, S. W., & Siemens, G. (2024). A meta systematic review of artificial intelligence in higher education: A call for increased ethics, collaboration, and rigour. *International Journal of Educational Technology in Higher Education, 21*, 4. https://doi.org/10.1186/s41239-023-00436-z

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education, 20*, 38. https://doi.org/10.1186/s41239-023-00408-3

Chiu, T. K. F., Xia, Q., Zhou, X., Chai, C. S., & Cheng, M. (2023). Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education. *Computers and Education: Artificial Intelligence, 4*, 100118. https://doi.org/10.1016/j.caeai.2022.100118

Cotton, D. R. E., Cotton, P. A., & Shipway, J. R. (2024). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International, 61*(2), 228–239. https://doi.org/10.1080/14703297.2023.2190148

Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education, 20*, 22. https://doi.org/10.1186/s41239-023-00392-8

Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2024). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International, 61*(3), 460–474. https://doi.org/10.1080/14703297.2023.2195846

Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Buckingham Shum, S., Santos, O. C., Rodrigo, M. T., Cukurova, M., Bittencourt, I. I., & Koedinger, K. R. (2022). Ethics of AI in education: Towards a community-wide framework. *International Journal of Artificial Intelligence in Education, 32*, 504–526. https://doi.org/10.1007/s40593-021-00239-1

Huang, K.-L., Liu, Y.-C., Dong, M.-Q., & Lu, C.-C. (2024). Integrating AIGC into product design ideation teaching: An empirical study on self-efficacy and learning outcomes. *Learning and Instruction, 92*, 101929. https://doi.org/10.1016/j.learninstruc.2024.101929

Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günnemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., … Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences, 103*, 102274. https://doi.org/10.1016/j.lindif.2023.102274

Kementerian Komunikasi dan Digital Republik Indonesia. (2026). *Keputusan Menteri Komunikasi dan Digital Nomor 117 Tahun 2026 tentang pedoman pemanfaatan dan pembelajaran teknologi digital dan kecerdasan artifisial di jalur pendidikan formal, nonformal, dan informal*. https://jdih.komdigi.go.id/produk_hukum/view/id/1015/

Kementerian Pendidikan Dasar dan Menengah Republik Indonesia. (2025a). *Panduan pemanfaatan kecerdasan artifisial untuk guru pendidikan anak usia dini, pendidikan dasar, dan pendidikan menengah*. Pusat Kurikulum dan Pembelajaran. https://repositori.kemendikdasmen.go.id/36443/

Kementerian Pendidikan Dasar dan Menengah Republik Indonesia. (2025b). *Keputusan Menteri Pendidikan Dasar dan Menengah Republik Indonesia Nomor 127/P/2025 tentang pedoman implementasi koding dan kecerdasan artifisial*. https://smk.kemendikdasmen.go.id/terbitan/keputusan-menteri-pendidikan-dasar-dan-menengah-republik-indonesia-nomor-127p2025/

Li, Y., Ma, H., & Zhao, D. (2024). A study of students' learning experience impacted by using AIGC tools in design subjects in China. In *DRS2024: Boston*. https://doi.org/10.21606/drs.2024.1348

Lim, W. M., Gunasekara, A., Pallant, J. L., Pallant, J. I., & Pechenkina, E. (2023). Generative AI and the future of education: Ragnarök or reformation? A paradoxical perspective from management educators. *The International Journal of Management Education, 21*(2), 100790. https://doi.org/10.1016/j.ijme.2023.100790

Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences, 13*(4), 410. https://doi.org/10.3390/educsci13040410

Miao, F., & Cukurova, M. (2024). *AI competency framework for teachers*. UNESCO.

Miao, F., & Holmes, W. (2023). *Guidance for generative AI in education and research*. UNESCO.

Montenegro-Rueda, M., Fernández-Cerero, J., Fernández-Batanero, J. M., & López-Meneses, E. (2023). Impact of the implementation of ChatGPT in education: A systematic review. *Computers, 12*(8), 153. https://doi.org/10.3390/computers12080153

Muttaqin, M. F., Sukrawan, Y., & Rosyadi, M. I. (2024). Exploring the role of artificial intelligence in learning media for vocational education: A systematic literature review. *Journal of Vocational Education Studies, 7*(2), 181–190. https://doi.org/10.12928/joves.v7i2.10364

OECD. (2023). *OECD digital education outlook 2023: Towards an effective digital education ecosystem*. OECD Publishing. https://doi.org/10.1787/c74f03de-en

Ogunleye, B., Zakariyyah, K. I., Ajao, O., Olayinka, O., & Sharma, H. (2024). A systematic review of generative AI for teaching and learning practice. *Education Sciences, 14*(6), 636. https://doi.org/10.3390/educsci14060636

Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies, 27*(6), 7893–7925. https://doi.org/10.1007/s10639-022-10925-9

Rosyadi, M. I., Kustiawan, I., Tetehfio, E. O., & Joshua, Q. (2023). The role of AI in vocational education: A systematic literature review. *Journal of Vocational Education Studies, 6*(2), 244–263. https://doi.org/10.12928/joves.v6i2.9032

Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review, 4*(3), 356–367. https://doi.org/10.1177/1534484305278283

Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments, 10*, 15. https://doi.org/10.1186/s40561-023-00237-x

UNESCO. (2023). *Global education monitoring report 2023: Technology in education—A tool on whose terms?* UNESCO. https://doi.org/10.54676/UZQV8501

Yusuf, A., Pervin, N., Román-González, M., & Noor, N. M. (2024). Generative AI in education and research: A systematic mapping review. *Review of Education, 12*, e3489. https://doi.org/10.1002/rev3.3489