BCPR RESEARCH:
Business Communication and Public Relations Journal
E-ISSN: XXXX-XXXX
P-ISSN: XXXX-XXXX
https://journal.e-greenation.org/BCPR greenation.info@gmail.com +62 812-1046-7572
DOI: https://doi.org/10.38035/bcpr.v2i1.68

Ethical Knowledge and Human-Centered Strategic Management in Education: A Philosophy of Science Perspective

Sri Yusriani[1], Adi Dasmin[2], Endi Rekarti[3], Bendaoud Nadif[4]

[1]Indraprasta PGRI University, Jakarta, Indonesia, sriysarahlistener@gmail.com
[2]Indraprasta PGRI University, Jakarta, Indonesia, adidasmin04@gmail.com
[3]Terbuka University, South Tangerang, Indonesia, endirekarti@ecampus.ut.ac.id
[4]Sultan Moulay Slimane University, Morocco, nadifbendaoud@gmail.com

*Corresponding Author: sriysarahlistener@gmail.com[1]

Abstract: The study entitled "Ethical Knowledge and Human-Centered Strategic Management in Education: A Philosophy of Science Perspective" is motivated by the growing use of data, performance measurement, and artificial intelligence in educational management. It aims to explain how ontology, epistemology, and axiology can shape ethical and human-centered strategic management in education. The study employs a conceptual qualitative approach through an integrative synthesis of literature concerning philosophy of science, educational purposes, organizational knowledge, strategic capability, responsible artificial intelligence, and learner agency. The analysis identifies five interrelated themes: ethical knowledge as a strategic foundation, balanced accountability beyond measurable outcomes, artificial intelligence as an epistemic aid under human oversight, governance of knowledge power through justice and care, and institutional capability for ethical learning. The resulting framework positions ethical knowledge governance as the link between philosophical foundations and strategic action. The study concludes that educational institutions should align academic quality, human dignity, inclusion, well-being, and responsible innovation when making strategic decisions. The framework provides a conceptual foundation for future empirical validation in different educational settings.

Keywords: Ethical knowledge, human-centered strategy, philosophy of science, educational management, responsible artificial intelligence

INTRODUCTION

Contemporary education is increasingly organized through assessment data, performance indicators, digital platforms, predictive analytics, and artificial intelligence (AI). These instruments can improve feedback, resource allocation, and institutional decision-making, yet they can also narrow educational value to what can be counted. Datafication is therefore not a neutral technical development; it changes how teachers, students, and institutional leaders are represented and governed (Jarke & Breiter, 2019; Williamson, 2020). When educational quality is equated with dashboards, rankings, or rapid outputs, learners risk being treated as measurable units rather than persons whose agency, identity, relationships, and well-being matter.

Philosophy of science offers a disciplined way to resist that reduction. Ontology asks what kind of reality education addresses; epistemology examines how educational claims are produced and justified; and axiology asks what purposes and values knowledge should serve (Kuhn, 1970; Popper, 1959; Suriasumantri, 1993). In education, these dimensions are inseparable. Evidence can be methodologically rigorous but ethically inadequate when it ignores consent, contextual inequality, or foreseeable harm. Conversely, moral aspirations require credible evidence if they are to guide action responsibly.

Educational purpose is similarly multidimensional. Dewey (1938) connected education with experience and democratic growth, Freire (2000) emphasized critical consciousness and humanization, and Biesta (2010) distinguished qualification, socialization, and subjectification. Together, these perspectives show why academic performance is necessary but insufficient. Education must also cultivate responsible participation, judgment, autonomy, and the capacity to live with others. Learner motivation and agency are strengthened through perceived competence, autonomy, relatedness, and self-efficacy (Bandura, 1997; Deci & Ryan, 2000), while learning remains socially mediated and culturally situated (Vygotsky, 1978).

The same problem appears in strategic management. Knowledge may provide valuable organizational resources, support knowledge creation, and enable institutions to sense, seize, and transform opportunities (Barney, 1991; Nonaka, 1994; Teece, 2007). Strategy, however, is not a linear plan alone; it combines intended direction, emergent learning, positioning, and patterns of action (Mintzberg, 1987). In education, strategic success therefore cannot be reduced to competitive advantage or efficiency. A balanced system should integrate academic outcomes with internal learning, stakeholder value, ethical safeguards, and long-term capability (Kaplan & Norton, 1996).

AI intensifies the need for such integration. It can support personalization, feedback, accessibility, idea development, and administrative efficiency, but it also introduces risks involving bias, privacy, opaque decisions, misinformation, academic integrity, and dependency. Research on AI in higher education repeatedly calls for stronger ethical, contextual, and interdisciplinary grounding (Bond et al., 2024; Crompton & Burke, 2023). Ethical AI in education requires human agency, fairness, transparency, accountability, privacy, and attention to pedagogical purpose rather than technological novelty (Floridi et al., 2018; Holmes et al., 2022; Nguyen et al., 2023; Yang et al., 2021).

This study addresses a conceptual gap between philosophical reflection and operational strategy. Ethical principles are often presented as broad ideals, while strategic management tools are treated as value-neutral mechanisms. The study therefore asks: (1) How can ontology, epistemology, and axiology frame ethical knowledge in education? (2) How can educational strategy balance measurable performance with moral and human development? (3) What institutional capabilities are required for responsible, human-centered use of data and AI? The objective is to develop an integrative framework that translates philosophical foundations into strategic decisions, practices, and evaluation criteria.

METHOD

The study uses a conceptual qualitative design based on integrative literature synthesis. This design is appropriate for clarifying constructs, connecting previously separated bodies of knowledge, and developing a framework that can guide later empirical investigation. The analytical corpus combines foundational works in philosophy of science and educational theory with peer-reviewed scholarship on organizational knowledge, strategy, datafication, learner agency, and ethical AI. Sources were selected for conceptual relevance to three questions: what educational reality is recognized, how knowledge claims are justified, and what values govern strategic action.

Analysis proceeded through four iterative stages. First, key claims were coded under ontology, epistemology, axiology, educational purpose, strategic capability, and digital governance. Second, points of tension were compared, particularly measurement versus meaning, efficiency versus agency, and innovation versus responsibility. Third, related claims were synthesized into higher-order themes. Fourth, the themes were translated into a decision framework linking philosophical foundations, ethical knowledge governance, institutional capabilities, and human-centered outcomes. This procedure follows the logic of thematic analysis while recognizing that the data are scholarly arguments rather than participant transcripts (Braun & Clarke, 2006; Nowell et al., 2017).

Conceptual trustworthiness was supported through transparent question–theme alignment, use of both foundational and contemporary sources, attention to countervailing risks, and explicit separation between literature-grounded interpretation and future empirical propositions. No participants were recruited and no human-subject data were collected; consequently, the paper does not present focus group discussion findings. Instead, Table 1 provides a future validation protocol. Multi-stakeholder focus groups can subsequently test the framework because interaction allows participants to negotiate meanings and expose institutional tensions that individual accounts may not reveal (Krueger & Casey, 2015; Morgan, 1997).

Table 1. Proposed Focus Group Protocol for Future Framework Validation

Dimension	Validation focus	Illustrative question
Ontology	Educational reality and personhood	What does meaningful education include beyond scores, completion, and efficiency?
Epistemology	Evidence quality and justification	How do educators verify assessment data, AI outputs, and institutional claims?
Axiology	Value, justice, and possible harm	Whose interests are served, and who may be excluded or disadvantaged?
Strategy	Capability and implementation	Which leadership, policy, and learning practices make technology use responsible?

Source: Authors' conceptual design (2026).

RESULT AND DISCUSSION

The synthesis produced five mutually reinforcing themes. They are presented as conceptual results because they arise from systematic comparison and integration of scholarly arguments rather than from completed fieldwork. Collectively, the themes answer the study questions by moving from the nature and justification of knowledge to the values, capabilities, and accountability mechanisms required for strategic educational action.

Ethical Knowledge as a Strategic Foundation

The first theme is that knowledge becomes strategically legitimate only when validity and ethical responsibility are considered together. Ontologically, educational reality includes more than observable performance. It includes embodied learners, cultural identities, unequal starting conditions, social relationships, and institutional power. A human-centered ontology therefore rejects the assumption that a data profile is equivalent to the person it represents. This matters because data systems can make selected attributes highly visible while rendering context, vulnerability, and aspiration invisible (Jarke & Breiter, 2019; Williamson, 2020).

Epistemologically, educational leaders must ask how a claim was produced, what assumptions shape it, and whether it can withstand critical scrutiny. Popper's (1959) emphasis on testability supports disciplined error correction, whereas Kuhn (1970) reminds institutions that accepted frameworks shape what researchers see as relevant evidence. In the AI era, verification must extend to provenance, model limitations, hallucinated references, and the distinction between assistance and authorship. Human-centered AI therefore treats technology as an augmenting partner under meaningful human control, not as an autonomous epistemic authority (Yang et al., 2021).

Axiologically, accuracy alone does not establish that an intervention is good. Ethical analysis must also consider beneficence, non-maleficence, autonomy, justice, and accountability (Beauchamp & Childress, 2019; Resnik, 2015). Floridi et al. (2018) translate similar principles into AI governance, while Nguyen et al. (2023) show broad international convergence around transparency, fairness, privacy, responsibility, and human agency in educational AI guidance. Ethical knowledge governance thus operates as the bridge between evidence and action: it asks not only 'Is this claim credible?' but also 'What may happen if we act on it, to whom, and under whose authority?'

Balanced Accountability Beyond Measurable Outcomes

The second theme concerns the tension between accountability and educational reductionism. Assessment and performance information can reveal inequity, identify learning gaps, and support timely intervention. The problem is not measurement itself but the substitution of indicators for educational purpose. Datafication can reorganize teaching around what platforms can capture, intensify managerial surveillance, and redefine professional judgment as compliance with metrics (Williamson, 2020). Pangrazio et al. (2024) consequently frame data practices as matters of justice, because data collection and classification distribute visibility, opportunity, and risk.

A human-centered strategy uses multiple forms of evidence and preserves space for professional interpretation. Biesta's (2010) account of qualification, socialization, and subjectification offers a practical balance: institutions should evaluate what students know and can do, how they participate in shared communities, and how they develop responsible independence. Dewey (1938) and Freire (2000) further locate educational quality in reflective experience, dialogue, and human growth. Outcomes such as honesty, empathy, resilience, and intercultural responsibility may be less readily quantified, but they are not therefore less real.

Strategically, a balanced scorecard logic can be adapted to education by pairing academic indicators with learner well-being, inclusion, teacher agency, ethical incidents, and institutional learning (Kaplan & Norton, 1996). The purpose is not to convert every value into another metric. Rather, it is to prevent any single indicator from dominating judgment. Quantitative signals should trigger inquiry, not automatically determine high-stakes decisions. Qualitative evidence, contextual review, and the right to question or appeal algorithm-supported decisions are essential safeguards.

Artificial Intelligence as an Epistemic Aid Under Human Oversight

The third theme positions AI as an epistemic aid whose educational value depends on task design, user capability, and governance. Reviews of AI in higher education identify expanding applications in personalization, prediction, assessment, and student support, but also reveal persistent gaps in educator involvement, theoretical grounding, and ethical evaluation (Bond et al., 2024; Crompton & Burke, 2023). The technology may accelerate access to explanations and feedback while simultaneously encouraging cognitive offloading, superficial production, or misplaced trust.

Ethical use therefore requires a clear allocation of roles. AI may generate alternatives, detect patterns, translate, summarize, or provide formative prompts. Humans must define educational purposes, examine evidence, evaluate consequences, disclose material assistance, and remain accountable for final decisions. Holmes et al. (2022) emphasize that AI ethics in education involves complex, community-wide questions rather than a checklist attached after deployment. Human-centered learning analytics similarly calls for participatory design, learner agency, explainability, and alignment with educational goals (Alfredo et al., 2024).

Institutional policy should move beyond the binary of prohibition versus unrestricted adoption. Responsible strategy includes AI literacy, source verification, privacy review, equitable access, assessment redesign, explicit disclosure rules, and proportionate human oversight. It also distinguishes low-stakes support from high-stakes decisions. The more consequential the decision; for example admission, progression, discipline, or student-risk classification, the stronger the requirements for explainability, human review, contestability, and documentation. UNESCO (2021) similarly advocates inclusive, transparent, and human-centered AI policy, while recent syntheses demonstrate that fairness, autonomy, privacy, and non-maleficence remain central ethical dimensions (Fu et al., 2024).

Knowledge, Power, and Institutional Justice

The fourth theme reframes the proposition that knowledge is power. Organizational knowledge can generate advantage when it is valuable, difficult to imitate, and embedded in coordinated practice (Barney, 1991). It is also created through interaction between tacit and explicit understanding (Nonaka, 1994), while dynamic capabilities enable institutions to sense change, seize opportunities, and transform routines (Teece, 2007). These theories explain why educational institutions invest in data, expertise, digital systems, and learning networks.

However, power is never merely productive; it can also classify, exclude, and silence. A strategic institution may possess sophisticated analytics and still make poor educational decisions if those tools weaken trust or conceal structural disadvantage. Algorithmic fairness cannot be separated from accountability, because apparently neutral systems reflect choices about categories, objectives, and acceptable error (Sahlgren, 2023). Ethical governance therefore requires stakeholder participation, transparent purpose limitation, responsible data stewardship, and attention to groups that bear disproportionate risk.

Human-centered strategy converts knowledge power into stewardship. Leaders must ensure that information strengthens teacher judgment and student agency rather than replacing them. They should ask whether a system expands access, supports timely care, and enables better learning, or whether it merely increases surveillance and administrative convenience. This orientation aligns strategy with service and social contribution, not only institutional competition.

Institutional Capability for Ethical Learning

The fifth theme is that ethical intention must be supported by organizational capability. Principles remain symbolic when staff lack time, competence, authority, or safe channels for raising concerns. This practical need is reinforced by Sondari et al. (2025), whose work

illustrates how structured digital literacy training can strengthen teachers' readiness to integrate technology-based learning and respond to the demands of educational innovation. Human-centered strategic management therefore requires capability at four levels: individual literacy, pedagogical design, organizational governance, and ecosystem accountability. Individual literacy includes critical evaluation, disclosure, privacy awareness, and confidence to challenge outputs. Pedagogical capability includes authentic assessment, dialogue, feedback, and deliberate protection of productive cognitive effort.

At the organizational level, institutions need cross-functional governance that joins academic leaders, teachers, students, information specialists, technologists, and ethics or legal expertise. Strategy should be iterative: leaders sense emerging opportunities and harms, pilot with bounded risk, evaluate both learning and ethical outcomes, and adapt or withdraw systems when evidence changes. This follows dynamic capability logic (Teece, 2007) and Mintzberg's (1987) recognition that strategy develops through learning as well as formal planning.

At the learner level, self-efficacy and autonomy are not peripheral outcomes. Students who believe they can perform meaningful tasks are more likely to persist and self-regulate (Bandura, 1997). Motivation is also strengthened when learning supports autonomy, competence, and relatedness (Deci & Ryan, 2000). Excessive automation can undermine these resources if it removes challenge, ownership, or human connection. Conversely, well-designed AI can provide scaffolding that expands participation and mastery. The ethical question is therefore whether technology redistributes agency toward learners and teachers or concentrates it in opaque systems and vendors.

Table 2. Strategic Translation of the Five Conceptual Themes

Conceptual theme	Strategic question	Institutional response	Human-centered indicator
Ethical knowledge	Is the evidence valid and ethically defensible?	Evidence review, impact assessment, transparent assumptions	Trust, contestability, documented accountability
Balanced accountability	What important outcomes remain unseen by metrics?	Mixed evidence, contextual review, multiple perspectives	Learning, well-being, inclusion, agency
AI under oversight	Which tasks may be augmented, and which decisions require humans?	Role boundaries, disclosure, verification, proportional oversight	Responsible use and retained human judgment
Knowledge and justice	Who benefits, who bears risk, and who can challenge?	Participation, privacy, fairness review, appeal pathways	Equitable access and reduced disproportionate harm
Ethical capability	Can principles be enacted consistently over time?	Literacy, authentic assessment, governance, iterative evaluation	Staff/student capability and institutional learning

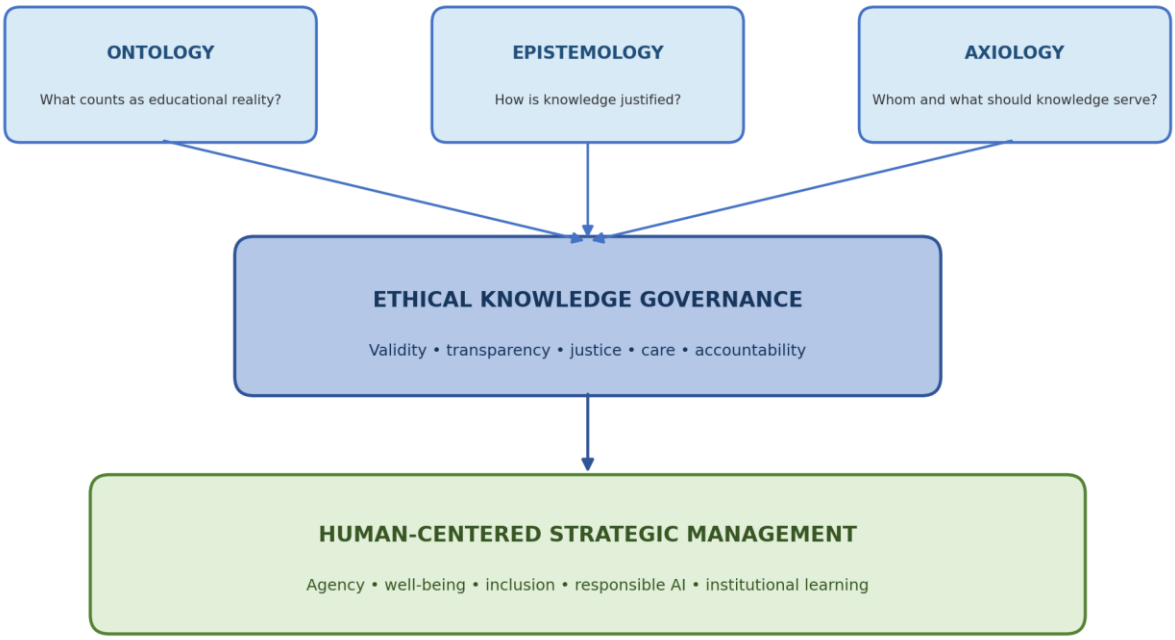
Source: Authors' synthesis (2026).

An Integrated Human-Centered Strategy Framework

Figure 1 integrates the results. Ontology, epistemology, and axiology form three concurrent tests rather than sequential academic abstractions. Ontology prevents institutions from mistaking representations for whole persons. Epistemology establishes standards for credible and revisable claims. Axiology directs attention to purpose, justice, care, and responsibility. Their intersection is ethical knowledge governance: the institutional capacity to

decide what information may be trusted, how it may be used, who participates, and what safeguards are required.

Ethical knowledge governance then informs human-centered strategic management. Its outputs are not only policies but patterns of action that protect agency, well-being, inclusion, responsible AI use, and organizational learning. The feedback relationship is important: strategic experience should revise the institution's assumptions, evidence practices, and priorities. The framework therefore rejects both technological determinism and ethical abstraction. It makes values operational without pretending that every ethical judgment can be automated.



Source: Authors' conceptual framework (2026).

Figure 1. Ethical Knowledge and Human-Centered Strategic Management Framework

Implications for Education and English Language Learning

The framework has direct implications for language education, where knowledge is inseparable from communication, identity, culture, and participation. Ontologically, English education includes more than grammar, vocabulary, and test performance; it includes learners' voices, intercultural encounters, and real communicative purposes. Epistemologically, credible language knowledge emerges through linguistics, pedagogy, assessment, classroom inquiry, and reflective experience. Axiologically, global communication should strengthen dignity, cultural respect, and critical literacy rather than reproduce linguistic hierarchy.

Vygotsky's (1978) social account of learning supports dialogic and scaffolded practice, while Bandura (1997) explains why mastery experiences and credible feedback build communicative self-efficacy. AI can expand opportunities for rehearsal, translation, and individualized feedback, but it should not displace human interaction or allow fluent machine-generated text to masquerade as learner capability. Authentic assessment can include process evidence, oral defense, reflective disclosure, iterative drafting, and tasks grounded in learners' contexts.

For leaders, the practical implication is a shift from technology acquisition to capability-centered implementation. Investment decisions should include teacher preparation, student

access, privacy, pedagogical fit, and mechanisms for evaluation and redress. An institution should be able to explain not merely which AI tool it adopted, but what learning problem it addresses, what evidence supports its use, how risks are monitored, and how teachers and learners retain meaningful control.

Limitations and Future Research

This study is conceptual and does not claim empirical confirmation of the proposed relationships. Its breadth allows integration across philosophy, education, management, and AI ethics, but it may underrepresent context-specific tensions in schools, universities, and national systems. Future research should conduct multi-stakeholder focus groups using Table 1, compare educator and student interpretations, and examine whether the framework changes real decisions. Comparative studies could investigate how regulatory environments, digital infrastructure, cultural values, and institutional resources shape implementation. Longitudinal research should also assess whether human-centered governance improves trust, learning quality, inclusion, and well-being without creating excessive administrative burden.

CONCLUSION

This study demonstrates that philosophy of science can function as a practical architecture for strategic educational management. Ontology broadens the educational realities recognized by institutions beyond data profiles and measurable performance; epistemology establishes how knowledge claims should be produced, verified, interpreted, and revised; and axiology ensures that valid knowledge remains directed toward ethically defensible and socially meaningful purposes. Together, these philosophical foundations support ethical knowledge governance by connecting scientific validity with human dignity, justice, care, and institutional responsibility.

The central contribution of this study is an integrated framework connecting ethical knowledge governance with human-centered strategic capability. The framework addresses the research questions by demonstrating that measurable academic performance and moral formation should be managed through multiple forms of evidence, contextual judgment, participatory safeguards, and continuous institutional learning. Artificial intelligence should therefore augment inquiry, creativity, feedback, and informed decision-making while human actors retain responsibility for defining educational purposes, verifying information, evaluating possible consequences, making high-stakes decisions, and ensuring accountability.

Educational excellence is not achieved by rejecting measurement and technology or by accepting them uncritically. It emerges when institutions use evidence and innovation without reducing learners to indicators, weakening teacher and student agency, overlooking contextual inequalities, or obscuring institutional responsibility. A scientifically sound, strategically capable, and ethically grounded educational institution treats knowledge not merely as power, but as stewardship for learning, dignity, inclusion, well-being, and shared human development.

Because this study is conceptual, the proposed framework requires future empirical validation. The focus group discussion protocol presented in Table 1 is intended to guide this next research stage rather than represent data already collected. Future studies may involve educators, students, school or university leaders, curriculum specialists, and educational technology practitioners to examine how the framework is understood and applied in actual institutional settings. The discussions may explore participants' experiences of balancing academic performance with moral development, evaluating educational data and artificial intelligence outputs, protecting human agency, and translating ethical principles into policy and practice. The resulting data may be analyzed thematically to identify areas of agreement, contextual tension, and necessary framework refinement. Comparative focus groups across different educational levels, institutions, and national contexts would also help determine

whether the framework is transferable or requires contextual adaptation. Such empirical validation could transform the present conceptual framework into a more operational model for responsible and human-centered strategic management in education.

REFERENCES

Alfredo, R., Echeverria, V., Jin, Y., Yan, L., Swiecki, Z., Gašević, D., & Martinez-Maldonado, R. (2024). Human-centred learning analytics and AI in education: A systematic literature review. Computers and Education: Artificial Intelligence, 6, 100215. https://doi.org/10.1016/j.caeai.2024.100215

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99–120. https://doi.org/10.1177/014920639101700108

Beauchamp, T. L., & Childress, J. F. (2019). Principles of biomedical ethics (8th ed.). Oxford University Press.

Biesta, G. (2010). Good education in an age of measurement: Ethics, politics, democracy. Routledge.

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

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

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

Deci, E. L., & Ryan, R. M. (2000). The ‘what’ and ‘why’ of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Dewey, J. (1938). Experience and education. Macmillan.

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People—An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. Minds and Machines, 28, 689–707. https://doi.org/10.1007/s11023-018-9482-5

Freire, P. (2000). Pedagogy of the oppressed (30th anniversary ed.). Continuum.

Fu, Y., Weng, Z., & Wang, J. (2024). Navigating the ethical terrain of AI in education: A systematic review on framing responsible human-centered AI practices. Computers and Education: Artificial Intelligence, 7, 100306. https://doi.org/10.1016/j.caeai.2024.100306

Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., Santos, O. C., Rodrigo, M. 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

Jarke, J., & Breiter, A. (2019). Editorial: The datafication of education. Learning, Media and Technology, 44(1), 1–6. https://doi.org/10.1080/17439884.2019.1573833

Kaplan, R. S., & Norton, D. P. (1996). The balanced scorecard: Translating strategy into action. Harvard Business School Press.

Krueger, R. A., & Casey, M. A. (2015). Focus groups: A practical guide for applied research (5th ed.). SAGE Publications.

Kuhn, T. S. (1970). The structure of scientific revolutions (2nd ed.). University of Chicago Press.

Mintzberg, H. (1987). The strategy concept I: Five Ps for strategy. California Management Review, 30(1), 11–24. https://doi.org/10.2307/41165263

Morgan, D. L. (1997). Focus groups as qualitative research (2nd ed.). SAGE Publications.

Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B.-P. T. (2023). Ethical principles for artificial intelligence in education. Education and Information Technologies, 28, 4221–4241. https://doi.org/10.1007/s10639-022-11316-w

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. Organization Science, 5(1), 14–37. https://doi.org/10.1287/orsc.5.1.14

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. International Journal of Qualitative Methods, 16, 1–13. https://doi.org/10.1177/1609406917733847

Pangrazio, L., Selwyn, N., & Cumbo, B. (2024). Data justice in education: Toward a research agenda. Educational Philosophy and Theory, 56(11), 1089–1101. https://doi.org/10.1080/00131857.2024.2320196

Popper, K. (1959). The logic of scientific discovery. Hutchinson.

Resnik, D. B. (2015). What is ethics in research and why is it important? National Institute of Environmental Health Sciences.

Sahlgren, O. (2023). The politics and reciprocal (re)configuration of accountability and fairness in algorithmic systems: A case study in educational data science. Learning, Media and Technology, 48(1), 64–77. https://doi.org/10.1080/17439884.2021.1986065

Sondari, E., Supadi, S., & Hamidah, N. (2025). Digital literacy training for Al-Khoir foundation teachers in welcoming innovative education to improve technology-based learning. *Jurnal PkM (Pengabdian kepada Masyarakat)*, *8*(1), 150-164. https://doi.org/10.30998/jurnalpkm.v8i1.27653

Suriasumantri, J. S. (1993). Filsafat ilmu: Sebuah pengantar populer. Pustaka Sinar Harapan.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319–1350. https://doi.org/10.1002/smj.640

UNESCO. (2021). AI and education: Guidance for policy-makers. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000376709

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Harvard University Press.

Williamson, B. (2020). The datafication of teaching in higher education: Critical issues and perspectives. Teaching in Higher Education, 25(4), 351–365. https://doi.org/10.1080/13562517.2020.1748811

Yang, S. J. H., Ogata, H., Matsui, T., & Chen, N.-S. (2021). Human-centered artificial intelligence in education: Seeing the invisible through the visible. Computers and Education: Artificial Intelligence, 2, 100008. https://doi.org/10.1016/j.caeai.2021.100008