

Peer Review

Review of: "Ethical Dimensions of Artificial Intelligence in Educational Technology and Policy: A Global Bibliometric Analysis (2020–2025)"

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1. Assessment of Background Information and Literature Review

Rating Explanation: The chapters exhibit a solid foundation of the current state of AI ethics in education, citing relevant studies, policies, and bibliometric analyses. They reference recent literature (2020–2025), including bibliometric reviews, policy discussions, and thematic analyses, which collectively provide a decent overview of the field's development.

Strengths:

- The literature review describes key ethical issues such as privacy, bias, transparency, and governance, grounding the discussion in recent scholarly work.
- References are diverse, including systematic reviews, bibliometric studies, policy frameworks, and expert opinions.

Weaknesses & Recommendations:

- While current literature is well-represented, there is limited in-depth analysis of foundational theories or classical frameworks of ethics (e.g., consequentialism, deontology, virtue ethics) as applied specifically to AI in education. Integrating these could strengthen the theoretical background.
- The review mostly summarizes recent debates without critically evaluating unresolved issues or methodological debates. Incorporating critiques or contrasting viewpoints could deepen the background.

- To augment this area, the authors could include a comprehensive table summarizing the main ethical concerns identified across different studies, highlighting gaps or areas of contention.

2. Missing Topics or Information

Identified Gaps & Suggestions:

- **Children's Rights and Long-term Impact:** The chapters mention limited engagement on children's rights and long-term educational impacts but seldom delve into specific frameworks or case studies illustrating these issues.
- **Cultural and Regional Perspectives:** While international collaboration is noted, there is limited discussion of how cultural norms influence ethical perceptions or policy implementation.
- **Technological Specifics:** The role of emerging technologies like blockchain, facial recognition, and their ethical implications are flagged as under-studied. Providing detailed case studies or technical explanations could enhance comprehension.
- **Stakeholder Perspectives:** The viewpoints of students, teachers, parents, and policymakers are briefly discussed but not thoroughly explored. Including qualitative insights or survey results would add depth.
- **Legal and Regulatory Frameworks:** A more detailed comparison of existing policies across different jurisdictions would be useful to contextualize the ethical challenges.

Suggestions:

- The authors should consider adding sections that systematically examine regional differences, stakeholder perceptions, and specific case studies of controversial AI applications in education.

3. Clarity in Illustrating Issues, Problems, and Trends

Assessment: The chapters effectively visualize current issues such as privacy, bias, and governance challenges, with bibliometric mapping and thematic analyses illustrating trends and gaps. They highlight the disparity in research focus and international collaboration, which clearly aligns with the theme.

Suggestions for Improvement:

- Incorporate more visual aids (charts, infographics) demonstrating the evolution of ethical concerns over time or across regions.

- Explicitly connect the identified issues to practical educational outcomes or policy implications to contextualize their importance.
- Strengthen the discussion on emergent trends, such as child-centered AI ethics or blockchain's role, to clarify their significance moving forward.

4. Emphasis on Issues, Problems, and Trends

Evaluation: The chapters predominantly emphasize broad themes such as data privacy, bias, and governance, which are well-covered. However, certain emerging or nuanced issues (e.g., AI literacy as an ethical issue, cultural dimensions of ethics) may be under-emphasized.

Recommendations:

- Balance the emphasis by giving more weight to under-represented areas, such as the ethical implications of blockchain or long-term societal impacts.
- Develop a prioritization framework indicating which issues are most urgent or pressing for policy and research.

5. Over- or Under-Emphasis of Issues

Assessment & Suggestions:

- The chapters appear to over-emphasize privacy and bias, which dominate much of the discourse, while topics like children's rights, blockchain, or curriculum integration receive less attention.
- To improve, the authors should allocate balanced coverage to emerging ethical concerns and demonstrate their relevance with concrete examples or case analyses.

6. Weaknesses of the Chapters

Identified Weaknesses:

- **Limited Theoretical Depth:** The chapters lack engagement with foundational ethics theories, which could ground the discourse more firmly.
- **Insufficient Critical Analysis:** Most sections summarize existing work rather than critically evaluating methodologies or identifying contradictions.
- **Fragmented Discussion of Stakeholders:** Little attention is paid to varying stakeholder perspectives or their influence on policy shaping.

- **Narrow Geographical Focus:** Despite mentioning international collaboration, the discussion is heavily weighted toward Western contexts, with less analysis of diverse educational settings.

Suggestions:

- Incorporate theoretical frameworks, critical reflections, and case studies.
- Explicitly analyze differences across countries and educational levels.

7. Strengths of the Chapters

Key Strengths:

- Up-to-date references reflecting recent developments.
- Use of bibliometric and mapping analyses to visualize research gaps and collaboration networks.
- Clear identification of core ethical issues and acknowledgment of existing research gaps.
- Inclusion of policy discussion and implications.

How to Leverage Strengths:

- Use the bibliometric visuals as a core element to synthesize findings.
- Expand on these visualizations with in-depth case studies or stakeholder narratives to enhance engagement.

8. Suitability for the Target Audience

Assessment: The chapters seem well-aligned for an academic or policy-focused readership interested in AI ethics, with technical terminology and references appropriate for scholars, educators, and policymakers.

Suggestions:

- To cater to practitioners or educators less familiar with research methodologies, include summaries of key concepts and practical recommendations.

9. Organization and Flow

Evaluation: The flow primarily follows thematic and bibliometric analyses but can be somewhat disjointed, especially when shifting from broad issues to specific topics like policy models or research gaps.

Suggestions:

- Reorganize to follow a logical progression: introduction of core issues → historical development → current gaps → future directions.
- Use clear signposting, subheadings, and summaries at the end of sections to guide readers through complex analyses.

10. Sufficiency and Currency of References

Assessment: References are recent and relevant, primarily published between 2020 and 2025, including multiple bibliometric and systematic reviews. This indicates an up-to-date reference list.

Suggestions:

- Consider including seminal theoretical works on ethics (e.g., Floridi's or Nissenbaum's foundational texts) for depth.
- Add recent policy documents or position papers from global organizations (e.g., UNESCO, OECD) to contextualize policy frameworks.
- Integrate relevant literature discussing AI literacy, digital equity, and long-term societal impacts for a more holistic approach.

In Sum: The chapters provide a solid and timely overview of AI ethics in education, with strengths in recent references and research visualization. To enhance their comprehensiveness and applicability, they should deepen theoretical engagement, broaden stakeholder perspectives, and integrate practical case studies. Improving the organizational flow and balancing focus across issues will also make the manuscript more accessible and impactful.

Specific Examples of Theoretical Frameworks or Classical Ethics:

Principle-Based Ethics (Autonomy, Beneficence, Non-Maleficence, Justice): Applying Beauchamp and Childress's principles would provide a solid moral foundation for evaluating AI in education, especially in addressing fairness, privacy, and children's rights. For instance, emphasizing children's autonomy and right to data privacy aligns with respecting their dignity and could help clarify ethical boundaries.

Deontological Ethics: Incorporating Kantian ethics would underscore the importance of rights and duties, supporting policies that respect children's rights to data and education fairness, regardless of consequential outcomes, thus emphasizing moral duties over utilitarian calculations.

Virtue Ethics: Focusing on virtues such as honesty, integrity, and fairness would advocate for the development of ethically responsible AI systems and create a culture of ethical awareness among educators and developers.

Data Justice Framework: Integrating frameworks like Data Justice (e.g., agyemang & Cordella, 2020) could deepen the analysis of how AI systems impact social equity, especially for marginalized children, and can guide policy development.

Additional Case Studies or Examples:

1. Children's Rights and AI in Education:

- *Case Study:* The European Court of Justice's Schrems II ruling emphasizes data privacy rights; similar legal standards could be traced when applying AI in classrooms. A case where AI misused children's data, leading to privacy breaches, can illustrate the importance of strict data governance aligned with children's rights.
- *Practical Implication:* An analysis of GDPR's limitations in protecting children's data in AI applications could underscore the need for specialized, child-focused guidelines.

2. Blockchain for Student Data Management:

- *Example:* Implementation of blockchain-based digital diplomas (e.g., MIT's digital certificates) can illustrate how blockchain promotes data security and student ownership of credentials. Conversely, a case where blockchain's transparency led to unintended privacy exposures would highlight security concerns.
- *Practical Implication:* Detailing pilot projects or real-world deployments where blockchain ensures data integrity but faces scalability or regulatory challenges would illustrate both potential and limitations.

3. Under-Represented Topics in Practice:

- *Case Study:* An exploration of AI systems used for adaptive learning that unintentionally reinforce biases against minority or vulnerable children, such as the "Gatekeeper" study where predictive analytics led to disproportionate tracking.
- *Practical Implication:* Demonstrating how these biases affect children's educational opportunities could highlight urgent ethical considerations that are currently under-explored.

Incorporating these frameworks and case examples would enrich the discussion on the ethical dimensions of AI in education, providing both normative guidance and concrete illustrations of complex real-world issues.

Declarations

Potential competing interests: No potential competing interests to declare.