

Artificial Intelligence in Education

A Critical Review of Pedagogical Opportunities, Ethical Risks, and the Future of Human-Centred Learning

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Abstract: Artificial intelligence (AI) is rapidly reshaping educational practice, moving from earlier applications such as intelligent tutoring, adaptive learning and predictive analytics towards generative systems capable of producing explanations, feedback, questions and learning materials. This transformation has created substantial pedagogical possibilities, including personalised support, timely feedback, accessibility, teacher assistance and more flexible learning beyond conventional classroom boundaries. At the same time, it has intensified concerns about academic integrity, misinformation, algorithmic bias, privacy, unequal access, cognitive offloading and the changing meaning of independent learning. This article presents a critical review of secondary literature on AI in education, with particular attention to the conditions under which technological capabilities support or undermine meaningful learning. Rather than treating AI through a simple advantages-versus-disadvantages framework, the review examines the tensions between technological assistance and human agency. The analysis suggests that AI is most educationally valuable when it functions as a scaffold for inquiry, feedback and exploration while leaving interpretation, judgement, reflection and responsibility with learners and teachers. Conversely, when AI substitutes for the cognitive work that education seeks to develop, efficiency may come at the expense of learning. The article therefore argues for a human-centred approach based on pedagogical purpose, AI literacy, human oversight, ethical governance, equity and learner autonomy. It concludes that the future of AI in education should be guided not by the amount of educational work that can be automated, but by whether AI contributes to deeper learning while preserving the human purposes of education.

Keywords - artificial intelligence; generative AI; higher education; pedagogy; critical thinking; learner autonomy; academic integrity; human-centred learning

1. Introduction

Artificial intelligence has moved from a specialised area of computing into an increasingly visible component of educational practice. Its presence is not entirely new. For several decades, educational researchers have investigated intelligent tutoring systems, adaptive learning, automated assessment, learner profiling and predictive analytics. Zawacki-Richter et al. (2019), in a systematic review of AI applications in higher education, identified profiling and prediction, assessment and evaluation, adaptive systems and personalisation, and intelligent tutoring as major areas of application. Their review also exposed an important weakness in the field: much of the research had developed from technological rather than explicitly pedagogical perspectives. This remains relevant because the educational value of AI cannot be inferred from technical sophistication alone.

The emergence of generative artificial intelligence has intensified this question. Large language models can generate natural-language explanations, summaries, questions, examples, feedback and extended written responses. Students can ask for alternative explanations of difficult concepts, use AI to brainstorm ideas, revise language or simulate dialogue, while teachers can employ similar systems to prepare instructional materials, formulate questions and support routine aspects of feedback and planning. Kasneci et al. (2023) note that such systems create significant educational opportunities but also raise concerns regarding accuracy, bias, privacy, assessment and the appropriate boundaries of human oversight.

The central issue, therefore, is not simply whether AI can perform educational tasks. It is whether those capabilities contribute to learning. An AI system that provides rapid feedback may be beneficial when it prompts a learner to reconsider and improve an argument; the same system may be counterproductive when its suggestions are accepted without examination. Personalisation can make instruction more responsive, but it can also encourage dependency. Generative systems can broaden access to information while producing plausible but inaccurate content. Automated assistance can reduce workload while simultaneously making it more difficult to determine what a student actually knows or can do independently. Bond et al. (2024) accordingly argue for greater methodological rigour, ethical attention and collaboration in AI-in-education research.

These tensions make a simple division between the “benefits” and “disadvantages” of AI inadequate. The same capability can support or constrain learning depending on the purpose, context and degree of human involvement. A human-centred perspective is therefore particularly useful. UNESCO’s guidance on generative AI places human agency, inclusion, equity, cultural and linguistic diversity and human development at the centre of responsible educational use (Miao & Holmes, 2023). The present review adopts this orientation and asks how AI can extend educational possibilities without displacing the intellectual, ethical and relational dimensions of learning.

The review addresses four broad questions: what pedagogical opportunities are associated with AI in education; what ethical, social and pedagogical risks accompany its use; how AI-mediated learning may influence critical thinking and learner autonomy; and what principles can guide a human-centred approach. The purpose is not to argue for either unrestricted adoption or technological resistance, but to identify the conditions under which AI can become educationally meaningful.

2. Methodology

This study adopts a structured critical literature review based exclusively on secondary sources. A review-based design is appropriate because the purpose is to synthesise and critically interpret an expanding body of scholarship rather than to measure the effect of a particular AI intervention in a specific institution. The literature considered includes peer-reviewed empirical studies, systematic and scoping reviews, conceptual scholarship and relevant policy guidance that directly address AI in teaching, learning, assessment, academic integrity, critical thinking, equity or educational governance.

The review focuses primarily on contemporary research associated with the expansion of generative AI, while retaining foundational work that helps explain the development of AI in education. Priority is given to scholarly publications addressing educational applications and consequences rather than purely technical studies. Policy documents are used selectively where they contribute normative or governance perspectives, particularly in relation to human agency, inclusion, privacy and responsible implementation. The synthesis is thematic and interpretive rather than statistical because the literature covers heterogeneous technologies, educational levels, research designs and outcome measures.

The analysis organises the literature around five interconnected concerns: pedagogical opportunities; ethical and socio-educational risks; human agency and cognitive work; transformation of teaching and assessment; and principles for human-centred implementation. Particular attention is given to contradictions within the literature. For example, personalised assistance may increase responsiveness while encouraging dependence; automated feedback may expand access to formative support while transmitting errors; and generative assistance may facilitate expression while reducing the intellectual effort involved in producing academic work. These tensions are treated as analytically significant rather than as inconsistencies to be removed.

The review is necessarily limited by its reliance on published secondary evidence. AI research is developing rapidly, so findings may become outdated as systems and educational practices change. The heterogeneity of contexts also makes direct comparison difficult. The article consequently does not claim to establish causal effects. Its contribution lies in synthesising recurring findings and using them to develop a critical, human-centred interpretation of AI in education.

3. AI in Education: From Intelligent Systems to Generative AI

AI in education is best understood as a broad technological domain rather than a single intervention. It encompasses computational systems capable of prediction, pattern recognition, natural-language processing, recommendation, adaptation and automated interaction. Earlier AIED applications were often designed around relatively bounded educational functions. Intelligent tutoring systems could diagnose responses, offer hints and adapt subsequent tasks; adaptive platforms could alter content or difficulty according to learner performance; and predictive systems could identify patterns associated with educational outcomes (Zawacki-Richter et al., 2019).

Generative AI represents an important extension of this trajectory because it can produce new content in response to open-ended prompts. Large language models can participate in activities traditionally associated with explanation, writing, brainstorming, translation and dialogue. Their significance lies not simply in automation but in their ability to mediate interactions between learners and knowledge. A student can ask for an explanation, challenge the response, request a simpler version, compare alternatives and revise an answer through an ongoing dialogue. This flexibility broadens the possible educational role of AI, but it also complicates established ideas about authorship, expertise and independent work.

The apparent fluency of generative systems creates a particular epistemic problem. A coherent answer can create an impression of authority even when it contains factual errors, unsupported claims or biased assumptions. Kasneci et al. (2023) therefore emphasise verification, AI literacy and human oversight. The distinction between linguistic fluency and reliable knowledge is central to education: the ability to generate an answer does not by itself establish that the answer is correct, contextually appropriate or educationally valuable.

AI should consequently be understood less as a replacement for teaching and more as a potential learning mediator. Its educational significance depends on what cognitive work remains with the learner. When AI helps a student formulate questions, compare interpretations or identify weaknesses in an argument, it can function as a scaffold. When it performs the reasoning, interpretation or composition that the student was expected to develop, assistance becomes substitution. This distinction provides the conceptual basis for assessing both the opportunities and risks discussed below.

4. Pedagogical Opportunities of Artificial Intelligence in Education

One of the strongest opportunities associated with AI is the possibility of making educational support more responsive to individual differences. Conventional classrooms require teachers to work with learners who vary in prior knowledge, pace, interests and difficulties. Adaptive systems can analyse responses and modify task difficulty, sequencing, recommendations or feedback. Systematic work on AI-powered tutoring and adaptive learning suggests that such systems can support self-paced and differentiated learning when they are appropriately designed and integrated into instruction (Létourneau et al., 2025).

Generative AI extends this possibility through conversational interaction. A learner can request another explanation, an example, a comparison or a more accessible formulation without waiting for a new lesson or teacher interaction. Such responsiveness can be especially valuable in independent and online learning environments. Yet personalisation should not be equated with simply providing more content. Algorithms can detect patterns in performance without necessarily understanding why a learner is struggling. A repeated error may reflect conceptual misunderstanding, language difficulty, weak prior knowledge or contextual factors that require human interpretation. AI can therefore increase responsiveness, but pedagogical judgement remains necessary. AI can also expand access to tutoring and formative feedback. Intelligent tutoring systems have long attempted to provide individualised guidance, while contemporary generative systems can engage in more flexible dialogue. The ability to respond to follow-up questions can help learners approach the same concept from different directions. At the same time, the value of AI tutoring depends on the learner's capacity to evaluate the response. The system may generate a persuasive explanation without understanding the student's wider educational context. Its greatest value is therefore likely to arise when it complements, rather than replaces, human teaching.

Feedback is another important area. AI can analyse written responses, identify recurring problems, suggest revisions and provide immediate explanations. In language learning, AI-supported tools can assist with writing, pronunciation and personalised practice (Peña-Acuña & Corga Fernandes Durão, 2024). Immediate feedback matters because it can become part of an iterative learning

process: students attempt a task, receive a response, revise and try again. However, speed does not guarantee educational quality. Incorrect or poorly aligned feedback can mislead learners, and uncritical acceptance of automated corrections may reduce reflection. AI therefore has greater pedagogical value when feedback becomes a prompt for revision and reasoning rather than an unquestioned correction.

Accessibility is another significant possibility. Speech recognition, text-to-speech, translation, captioning and conversational interfaces can provide alternative ways of accessing educational material. Generative systems can simplify explanations, transform written content into other forms and support learners working across linguistic barriers. UNESCO's emphasis on inclusion and equity reflects the potential of AI to broaden educational participation (Miao & Holmes, 2023). Yet technological availability is not the same as educational inclusion. Differences in devices, connectivity, digital competence and access to advanced services can create new inequalities. AI can therefore reduce certain barriers while producing others.

For teachers, AI may assist with lesson preparation, question generation, instructional examples, resource organisation and preliminary feedback. Such applications can potentially release time for activities requiring contextual judgement, mentoring and interpersonal engagement. The opportunity should not, however, be interpreted as an argument for replacing teachers. Earlier research already identified limited educator involvement in AI research and development (Zawacki-Richter et al., 2019). More productive integration requires teachers to determine whether an AI application actually serves a learning objective and to evaluate its outputs before they reach students.

AI may also extend learning beyond formal classroom schedules. Students can obtain explanations, practise skills and seek feedback during independent study. In this sense, AI can make learning support more continuous. It can also support exploratory activity by generating alternative viewpoints, hypothetical scenarios and counterarguments. Used critically, such outputs can become objects of analysis: students can identify weaknesses, compare responses and defend their own conclusions. The educational value then lies not in the generated answer but in the learner's intellectual response to it.

Across these opportunities, one principle is consistent: AI's benefits are conditional. Personalisation requires meaningful instructional design; tutoring requires appropriate scaffolding; feedback requires reliability; accessibility requires infrastructure; teacher assistance requires professional judgement; and generative support becomes educationally productive when learners remain active evaluators. The strongest contribution of AI may therefore be less about replacing educational work than about extending the reach and responsiveness of human-led learning.

5. Ethical, Social, and Pedagogical Risks

The same capabilities that create educational opportunities also generate significant risks. As AI becomes involved in writing, assessment, feedback and educational decision-making, questions of accuracy, fairness, privacy, authorship and accountability become inseparable from pedagogy. Mouta et al. (2024) show that ethical research on AI in education encompasses a wide range of concerns while also revealing areas that remain insufficiently explored. These concerns should not be taken to mean that AI is inherently incompatible with education; rather, they demonstrate that responsible use requires institutional and pedagogical conditions.

Academic integrity is one of the most immediate challenges created by generative AI. Conventional assessment assumes that submitted work provides evidence of a learner's knowledge and intellectual effort. Generative systems complicate this assumption because students can obtain sophisticated textual outputs with little direct contribution to the final product. A clear distinction is needed between using AI to identify grammatical errors in independently produced work and using it to generate a complete response. The problem is therefore broader than plagiarism detection. Institutions need assessment practices that make the learning process more visible and establish clear expectations concerning acceptable assistance, disclosure and authorship (Mai et al., 2024; Xia et al., 2024).

Accuracy presents a second major concern. Generative systems can produce plausible but incorrect information, sometimes accompanied by fabricated references or unsupported claims. Students who lack sufficient subject knowledge may find such errors difficult to detect. The educational risk is therefore epistemic: repeated exposure to fluent answers may encourage learners to treat convenience as a substitute for credibility. AI literacy must consequently include verification, source evaluation and awareness of uncertainty, not merely prompt-writing skills (Kasneci et al., 2023).

Bias and representation are equally important. AI systems are developed from data and design choices that may reproduce cultural, linguistic or social biases. In education, such biases can influence generated explanations, recommendations or automated decisions. The apparent objectivity of computational outputs can make these biases particularly difficult to notice. Human oversight must therefore include the capacity to question and override automated recommendations rather than treating algorithmic outputs as neutral.

Privacy and data governance create another layer of concern. AI-enabled educational systems may process performance data, interaction histories, written work and other personal information. Generative AI creates additional risks when users enter unpublished academic work or personal information into external systems without understanding how the data may be handled. Learning analytics can support early intervention, but extensive monitoring can also create a sense of surveillance. Responsible implementation requires clarity about what data are collected, why they are necessary, who can access them and how long they are retained (Fu & Weng, 2024).

Equity is similarly complex. AI is sometimes presented as a democratising technology because it can make information and personalised support widely available. Yet students differ in device access, connectivity, digital literacy, language proficiency and ability to pay for advanced systems. A technological intervention may therefore distribute the same tool while producing unequal educational outcomes. Equity must consequently be understood not simply as access to AI, but as the capacity to benefit from it. Perhaps the most subtle risk concerns cognitive offloading. Students have always used external tools to reduce cognitive demands, but generative AI can delegate more complex activities, including explanation, summarisation, argument construction and problem-solving. A systematic review of over-reliance on AI dialogue systems links excessive dependence with concerns about decision-making, critical thinking and analytical reasoning (Zhai et al., 2024). The issue is not that all cognitive offloading is harmful. A tool may free cognitive resources for higher-order work. The problem arises when it removes the higher-order work itself.

These concerns converge around learner autonomy. Genuine autonomy involves formulating questions, making decisions, evaluating evidence and taking responsibility for learning. If AI increasingly determines what students read, how they frame arguments and which answers they accept, convenience may conceal a reduction in intellectual independence. The paradox is important: AI can provide more individualised assistance while potentially making the learner less independent. The educational objective should therefore be to use AI in ways that strengthen, rather than replace, the learner's capacity to think and act independently.

AI also raises questions about teacher identity and professional judgement. Automation can reduce routine work, but it can also encourage institutions to conceptualise teaching as a collection of tasks that can be automated. Teaching, however, involves contextual interpretation, emotional and social awareness, mentorship and ethical judgement. AI may change the distribution of professional tasks, but this should not be confused with the disappearance of the teacher. The more serious risk is the narrowing of teaching around whatever remains after automation.

Finally, AI may normalise convenience as an educational value. Producing an answer in seconds is efficient, but educational tasks are not always designed merely to produce answers. Writing, problem-solving, research and argumentation are valuable partly because they require sustained effort. If AI removes that effort without creating an alternative form of intellectual engagement, students may produce stronger-looking outputs without experiencing equivalent learning. The challenge is therefore to preserve forms of productive difficulty that develop persistence, reflection and judgement.

6. AI, Critical Thinking, Human Agency, Teaching and Assessment

The question of critical thinking brings together many of the tensions identified above. Education requires learners to question assumptions, evaluate evidence, compare perspectives and reach reasoned conclusions. Generative AI can support these activities when it provides alternative viewpoints or counterarguments, but it can also weaken them when generated responses are treated as conclusions. The effect is therefore not inherently positive or negative; it depends on how cognitive responsibility is distributed between learner and system.

The distinction between assistance and substitution is particularly important. Asking AI to produce several possible arguments leaves the learner with the task of comparing and evaluating them. Asking AI to choose the argument, construct the reasoning, supply the evidence and write the final response transfers much more of the intellectual process to the system. The visible product may look similar, but the learning process is fundamentally different. This suggests that future educational practice should ask not simply whether students use AI, but which parts of the cognitive task remain theirs.

This shift has implications for teaching. The teacher's role is likely to move further from information transmission towards facilitation, mentoring, evaluation and learning design. AI can supply explanations and preliminary resources, but teachers remain responsible for determining whether those materials are accurate, appropriate and aligned with learning objectives. This is especially important because fluent AI output can conceal conceptual weaknesses. Teacher AI literacy should therefore include critical evaluation, verification, privacy awareness, bias recognition and an understanding of when AI should not be used.

Assessment may require an even more substantial transformation. If generative systems can produce essays, answers and other polished outputs, final products alone become less reliable indicators of individual learning. The solution is not necessarily to construct increasingly sophisticated systems for detecting AI-generated text. A more sustainable approach is to design assessment around evidence of reasoning, reflection, application and process. Oral defence, iterative drafts, portfolios, authentic projects, contextual problem-solving and reflection can make the learner's intellectual contribution more visible (Xia et al., 2024; Lu et al., 2024).

This does not mean that conventional written assessment becomes irrelevant. Writing remains an important means of developing and demonstrating thought. The point is that its educational purpose must be made more explicit. Where AI can produce fluent prose, assessment should place greater value on argumentation, source evaluation, disciplinary judgement, revision and the ability to defend one's position. In this sense, AI may act as a catalyst for educational redesign rather than merely a new problem to be controlled.

The broader issue is what should count as learning when information and text can be generated instantly. Knowledge remains essential because students need sufficient understanding to recognise when AI is inaccurate, incomplete or inappropriate. At the same time, the educational value of a task may increasingly lie in the reasoning, experimentation, reflection and judgement involved in completing it. The objective should not be to preserve a world without AI, but to ensure that AI does not make independent thinking unnecessary.

7. Toward a Human-Centred Approach: Discussion and Framework

The evidence reviewed suggests that AI should enter educational environments because it serves an educational purpose, not simply because a new capability exists. This requires a shift from technology-centred adoption to education-centred governance. Fu and Weng (2024) identify transparency, fairness, human oversight and responsible implementation as recurring dimensions of responsible human-centred AI, while Alfredo et al. (2024) emphasise meaningful human control and stakeholder participation in human-centred learning analytics and AI.

A human-centred model begins with educational purpose. Before adopting an AI system, educators and institutions should ask what learning objective it serves and what forms of human activity it will support. AI may be appropriate for generating practice questions, offering alternative explanations or providing preliminary feedback. It may be inappropriate where the intended outcome is independent reasoning that the system would effectively perform on the learner's behalf. The key question is therefore not "Can AI do this?" but "Should AI do this for this learning purpose?"

The second principle is human agency. Learners should remain responsible for directing, evaluating and contextualising AI outputs. AI literacy should be understood as a form of critical literacy: students need to understand not only how systems work at a basic level, but also their limitations, biases, uncertainty and data implications. Teachers likewise need the authority and competence to question AI-generated material rather than becoming passive users of automated resources.

The third principle is pedagogical alignment. AI should be integrated into teaching methods rather than added as an independent technological layer. Its use should strengthen the learning process. For example, students might be asked to compare two AI-

generated explanations, identify factual weaknesses, verify sources or defend a disagreement with an AI response. Such activities turn AI from an answer-producing shortcut into an object of critical inquiry.

Ethical governance provides the fourth principle. Individual teachers and students cannot resolve all AI-related risks through personal responsibility. Institutions need clear policies on privacy, data use, academic integrity, acceptable AI assistance, disclosure, accessibility and accountability. Users should know when AI is being used and how educational data are processed. Responsibility must remain identifiable when automated outputs influence educational decisions.

Equity forms another essential dimension. Equal access to a tool does not guarantee equal benefit. Institutions need to consider infrastructure, affordability, digital competence and linguistic diversity when designing AI-supported learning. Human-centred implementation should therefore ask not only who can use AI, but who benefits from it and under what conditions.

Assessment should be treated as a central part of this framework. The most sustainable response to generative AI is not to create supposedly “AI-proof” tasks, but to strengthen forms of assessment in which human reasoning and contextual judgement remain visible. The question should be: what evidence most convincingly demonstrates that the learner has achieved the intended outcome? This may require a greater combination of product, process and reflection.

Taken together, these principles can be expressed as a conceptual sequence:

Educational purpose → human agency → pedagogical alignment → AI literacy and critical evaluation → human oversight and accountability → ethical governance → equity and inclusion → critical thinking and learner autonomy → meaningful learning.

This is not a rigid linear model. Its elements reinforce one another. AI literacy strengthens agency; governance protects equity and privacy; oversight supports trust; and meaningful learning provides the ultimate criterion for evaluating technological integration. The central proposition is simple: AI should increase educational capability without decreasing human agency.

This framework also offers a way of interpreting the apparent contradictions in the literature. AI can be both enabling and constraining because the same technology interacts differently with different forms of pedagogy. Personalisation can support independence or dependency. Automated feedback can create opportunities for revision or encourage uncritical acceptance. Generative writing can stimulate ideas or remove the need to formulate them. The technology does not determine the outcome by itself; the educational design mediates the relationship.

The emerging model of education is therefore likely to be more process-oriented and dialogic. Teachers increasingly act as facilitators, mentors, evaluators and designers of learning experiences. Students increasingly encounter AI not merely as an answer provider but as a learning assistant and an object of critical evaluation. Assessment increasingly combines product with process, reflection and application. Such changes do not diminish the human role. They make human judgement more important because educational institutions must decide what should be automated, what should be augmented and what should remain fundamentally human.

8. Future Research Directions

The evidence base remains limited by short study durations, methodological variation, uneven geographical representation and insufficient attention to long-term learning consequences. Future research should therefore move beyond asking whether AI can perform educational tasks and examine whether sustained use improves learning, critical thinking, writing, problem-solving, autonomy and knowledge retention. Comparative studies should also distinguish among different patterns of use, including AI as tutor, scaffold, collaborator, evaluator and substitute.

Greater attention is needed to contexts that remain underrepresented in the literature, including different socioeconomic, linguistic, cultural and disciplinary environments. Research should also examine teacher and student experiences together rather than treating AI use as an individual learner variable. Finally, the human-centred principles proposed in this review require empirical testing. Future studies should investigate whether AI literacy, human oversight, ethical governance, equitable access and assessment redesign actually contribute to stronger learning outcomes and learner agency. The field will benefit from evaluating AI by its contribution to human development rather than by technological capability alone.

9. Conclusion

Artificial intelligence is becoming an influential component of contemporary education, creating possibilities for personalised learning, timely feedback, accessibility, teacher support and new forms of interaction with knowledge. At the same time, its integration raises substantial concerns involving academic integrity, misinformation, privacy, bias, inequality, cognitive dependency and the changing nature of teaching and assessment. The literature does not justify either uncritical enthusiasm or outright rejection. Instead, it suggests that educational consequences depend substantially on how AI is designed, governed and incorporated into pedagogical practice.

The central conclusion of this review is that AI's educational value is conditional upon the preservation of human agency. AI can enhance learning when it functions as a scaffold, source of feedback or stimulus for exploration. When it assumes the reasoning, interpretation, creativity or problem-solving that education is intended to develop, technological convenience can weaken rather than strengthen learning. The distinction between AI as support and AI as substitute is therefore fundamental.

Generative AI also requires educational institutions to rethink teaching and assessment. Teachers remain essential as mentors, critical mediators, learning designers and professional decision-makers, while assessment must increasingly make reasoning, reflection, application and process visible. The goal should not be to eliminate AI from education or to automate as much educational work as possible. It should be to determine where AI can contribute meaningfully while preserving the intellectual, ethical and social purposes of education.

The future of AI in education should therefore be human-centred, evidence-based and ethically governed. The most important measure of successful integration is not how much work a system can perform, but whether learners become more knowledgeable, more critical, more autonomous and better able to exercise judgement. AI should expand what teachers and learners can do without diminishing their responsibility to think, question, create and decide for themselves. Biomedical waste management defines waste management as the practices & procedures or the administration of activities that provide for the collection, source separation, storage, transportation, transfer, processing, treatment & disposal of waste . Biomedical

waste management is a routine procedure of hospital administration as prescribed by law .Hospital waste , hospital acquired infection , transfusion transmitted diseases, rising incidence of hepatitis B, HIV & Other diseases, create potential threat of infection, contamination & serious health hazards to doctors, nurses, ward boys, support staff, sanitation workers, rag pickers & other health care workers. Who are regularly exposed to biomedical waste as an occupation hazards as well as general public in the surrounding area .

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