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Is using artificial intelligence tools for academic work cheating? Student perceptions, ethics, and the impact on academic performance and critical thinking

Anita Padhy

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Corresponding Author:
Anita Padhy
E-mail: anipadhy07@gmail.com

Abstract

Artificial Intelligence has brought about a very ethical dilemma in the sphere of Education questioning whether using AI tools in academic achievements is considered a form of cheating or not, evoking Academic Integrity, Student Perceptions, and the effect that the use of AI tools may have on Critical Thinking Skills and Academic Performance. According to the recent research, AI integration in academic settings has kept pace with the regulatory frameworks more rapidly, and thus, ethical practices, assessment, and institutional reactions are not consistent. The proposed research uses the PRISMA framework to undertake a Systematic Literature Review of the recent studies in the area of AI Ethics in Education, Academic Misconduct, and Educational Technology. The publications in the various academic databases were screened, filtered, and analyzed to determine the emerging trends in AI Governance, Responsible AI, Learning Analytics, and Digital Assessment. The results indicate that student perceptions of AI use are neutral, including the view as a valid resource of learning assistance to the view as a cheating method, depending on the type of the task, transparency, and design of the assessment. There is also some evidence that over-dependence on AI can be a factor in Cognitive Offloading, decreased independent reasoning, and altered academic behavior, and that it can be helpful to use AI guided. The paper concludes that the future of higher education is in the formulation of concrete ethical standards and the encouragement of AI Literacy and reshaping assessment methods that foster Human-AI Collaboration without compromising originality, equity, and intellectual growth.

Keywords: Academic integrity, Education, Critical thinking, Ethics, Higher education, Artificial intelligence.

1. Introduction

The fast development of the Artificial Intelligence in Education has altered the process of acquiring knowledge by students, doing homework and passing academic tests and has offered both new opportunities and serious ethical issues. Generative AI, large language models, and intelligent writing assistants have allowed students to write essays, solve problems, and generate research summaries with a few clicks, and these developments have serious implications on Academic Integrity and the limits between responsible and Academic Cheating [1,2]. The line between independent student work and AI-generated support has also grown unclear as Universities become more and more integrated to Educational Technology and AI-assisted Learning into digital learning environments. The change has caused educators, policymakers, and researchers to debate whether academic work with AI tools is to be termed as misconduct, acceptable collaboration or a learning activity thus the subject matter remains very important to the current AI Ethics in Education and Educational Policy debate.

This problem has been increasing quickly as the number of AI-generation tools that can generate human-like reactions in real-time has become ubiquitous. Generative systems are able to generate original text that cannot be easily identified through the usual plagiarism detection strategies, unlike other previous methods of plagiarism, and they challenge the existing models of Academic Misconduct prevention and

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compel institutions to redefine the way academic performance needs to be assessed [2]. Simultaneously, AI technologies are actively advanced as the means to improve productivity, offer individual feedback, and facilitate inclusive learning with the help of Intelligent Tutoring Systems, Learning Analytics, and adaptive learning platforms. This two-sided nature of AI as both a potential threat to Academic Integrity and a potent educational aid has led to a very complicated ethical situation where students, teachers, and institutions have varying opinions regarding the definition of fair use. This has led to making Student Perceptions, ethical issues, and the actual effects of AI on Academic Performance and Critical Thinking Skills to be key to creating future-ready education systems.

Over the past several years, the current environment in higher education evolved into more digital and hybrid learning solutions that triggered the rapid increase in the use of AI-based Learning and automated academic support solutions. Online education and remote assessment as well as technology-enhanced classroom growth has applied more pressure on digital platforms, and it is now more comfortable to incorporate AI tools in everyday academic activity by students [3-5]. This has also created a weakness of the conventional forms of assessment, which tends to concentrate on the end product and not the process of learning. With the rise in AI tools sophistication, it is becoming more challenging to teach educators to differentiate between true student learning and machine-prompted answers, and new forms of Digital Assessment, Assessment Design, and Open AI Use are required. Meanwhile, institutions have started to establish AI Governance related policies, though they differ widely and tend to be behind the technology, so the students are not sure about what to accept.

The possibility of AI use impacting Critical Thinking Skills and intellectual development can be considered one of the most controversial topics of the existing literature. Other scholars believe that excessive use of AI can result in the Cognitive Offloading where students would use automated systems to avoid deep reasoning, problem solving, and independent analysis [2,6]. This brings to doubt the possibility that the convenience of AI tools can have a negative effect on long-term learning despite the likely improvement in short-term Academic Performance. Some propose that an intelligent AI can aid higher-order thinking by giving explanations, feedback, and alternative views, so that students can spend their time learning, instead of doing repetitive assignments. These opposing views suggest the relevance of analyzing not only the question of whether students use AI, but what, why, and how they use AI, as well as how institutional policies affect student usage. The argument is also indicative of wider debate on the topic of Responsible AI, Human-AI Collaboration and the necessity to strike balance between innovation and ethical responsibility in contemporary education.

Although the list of research on the topic of Artificial Intelligence in Education continues to grow, the larger scope of synthesis with a specific emphasis on the question of whether students consider the use of AI as an act of cheating and how this attitude can be connected to the ethical considerations and learning outcomes is still lacking. The current studies tend to consider one of the dimensions separately, e.g., plagiarism detection, technology acceptance, or academic performance and do not combine them into a single framework [7-9]. Moreover, most of the research conducted is based on the opinions of faculty or policy creation, and fewer are carried out on the perspective of students, despite the fact that students are the individuals who are most likely to use Generative AI tools. The other lack of the literature is that the systematic methodology is not much used to review the fast-growing literature on AI Ethics in Education, Academic Integrity, and AI Literacy, which makes it hard to determine patterns, contradictions, and new tendencies. These gaps point to the necessity of the systematic Systematic Literature Review which may help to see the current state of knowledge in a system and find the perspectives of new research.

The current research fills these gaps as the systematic review of the recent literature is conducted based on PRISMA 2020 as the framework to analyze the research connected with Student Perceptions, Ethical AI Use, Academic Misconduct, and the role of AI in developing Critical Thinking Skills and Academic Performance. Through a strict selection and screening process, the review will seek to determine the manner in which students perceive the application of AI tools in academic activities, the most commonly reported ethical issues, and the effect of the various types of AI application on learning outcomes [10]. The paper also discusses how AI Literacy, Educational Policy, and AI Regulation influence the behavior of students, and how new strategies, including process-based assessment, reflective assignments, and

AI disclosure requirements, are effective. In this way, the review is aimed at bringing a better comprehension of the connection between technological innovation and academic values in the current context of higher education.

This paper has the primary goal of assessing the question as to whether or not the utilization of AI-assisted Learning tools is to be viewed as cheating in the eyes of the students as well as exploring the wider ethical and educational concerns of AI implementation in academic settings. In particular, the research will examine the Strengths of Student Perceptions in various situations, the extent to which the perception of the ethical issues associated with Academic Integrity is set by the institutional regulations, and the extent to which the application of AI can impact the Academic Performance and the acquisition of Critical Thinking Skills [10,11]. The other goal is to determine the new trends of AI Governance, Responsible AI, and Transparent AI Use, which are becoming gradually acknowledged as the necessary elements of the education system of the future. The investigation along these dimensions gives the holistic picture of the challenges and opportunities that the generative AI poses to higher education.

The value of this paper is that the synthesis of the studies on the topic of Artificial Intelligence in Education was presented up-to-date and focused particularly on ethical perceptions, learning outcomes, and academic integrity in the era of Generative AI. This review brings together results of various fields of study such as Learning Analytics, Educational Technology, Digital Assessment and AI Ethics in Education that will help to present a holistic view of the issue, which can be utilized to shape future policy decisions, curriculum development, and research agenda [12-14]. The article also emphasizes the need to go beyond mere categorizations of the AI usage as either cheating, or legitimate help and to build frameworks that would facilitate Human-AI Collaboration without compromising the fairness and originality and intellectual development. With the development of AI technologies, the perception of and utilization of AI tools by students will be a vital issue in ensuring that higher education responds with responsible adjustment to the emerging technological environment without jeopardizing the very essence of academic honesty and meaningful acquiring.

2. Methodology

This scholarly literature review was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 instructions to establish a methodological rigor, transparency, and reproducibility during the synthesis of the existing academic evidence regarding the use of artificial intelligence tools to conduct academic work, student attitudes toward AI-assisted work as cheating, and ethical issues associated with it as well as the implications of the latter on the outcomes of the academic performance and students critical thinking (Fig. 1). Four large academic databases were searched according to a systematic search: Scopus, Web of Science, IEEE Xplore, and PubMed, which embraced the publication period between January 2019 to December 2025 to be able to capture both the contemporary developments in AI-assisted education and include both pre- and post-ChatGPT discussions. The Boolean operators that were used on Scopus and Web of Science were as follows; ("artificial intelligence" OR "AI tools" OR "ChatGPT" OR "generative AI" OR "large language models") AND ("academic integrity" OR "cheating" OR "plagiarism" OR "academic misconduct") AND ("higher education" OR "university students" OR "student perceptions); ("AI in education" OR "AIED" OR "AI writing tools" OR "generative AI writing assistance) AND (ethical issues) OR (ethics) OR IEEE Xplore and PubMed had corresponding key words that were adapted using MeSH terminologies and field specific terms where necessary. Inclusion criteria included:

(1) The studies had to be published in peer-reviewed journals or conference proceedings in the years 2019-2025; (2) the studies needed to be written in English; (3) the studies had to investigate AI tools in the context of academic work or student learning specifically; (4) the studies had to discuss at least one of the core constructs: student perceptions, ethical concerns, academic integrity, academic performance or critical thinking; and (5) had to adopt and use either quantitative, qualitative or mixed-method empirical designs or systematic The studies were removed in case they: (1) were non-empirical opinion, editorial, or commentaries that lacked data; (2) focused only on AI development or technical implementation and did not have educational implications; (3) were published before 2019 or were

inaccessible in full text; (4) focused on AI use beyond the academic setting. After the initial database search a total of 2847 records were identified with 624 instances being duplicates and 2223 of those being unique to screen their titles and abstracts. Out of this, 1,891 records were omitted according to the set exclusion criteria. The rest of the 332 full-texts were evaluated and on thorough scrutiny, 89 articles were found to satisfy all the inclusion criteria and were incorporated into the final synthesis. This process is reflected in the PRISMA flow diagram: 2,847 records in all databases were identified, deduplication of records resulted in 2,223 records screened, 1891 were eliminated at an abstract screening phase, 332 articles were retrieved and then read in full, 243 articles were excluded due to specific reasons that are documented in the PRISMA flow diagram, and finally, 89 studies were included and thoroughly inform the thematic analysis presented in this review.

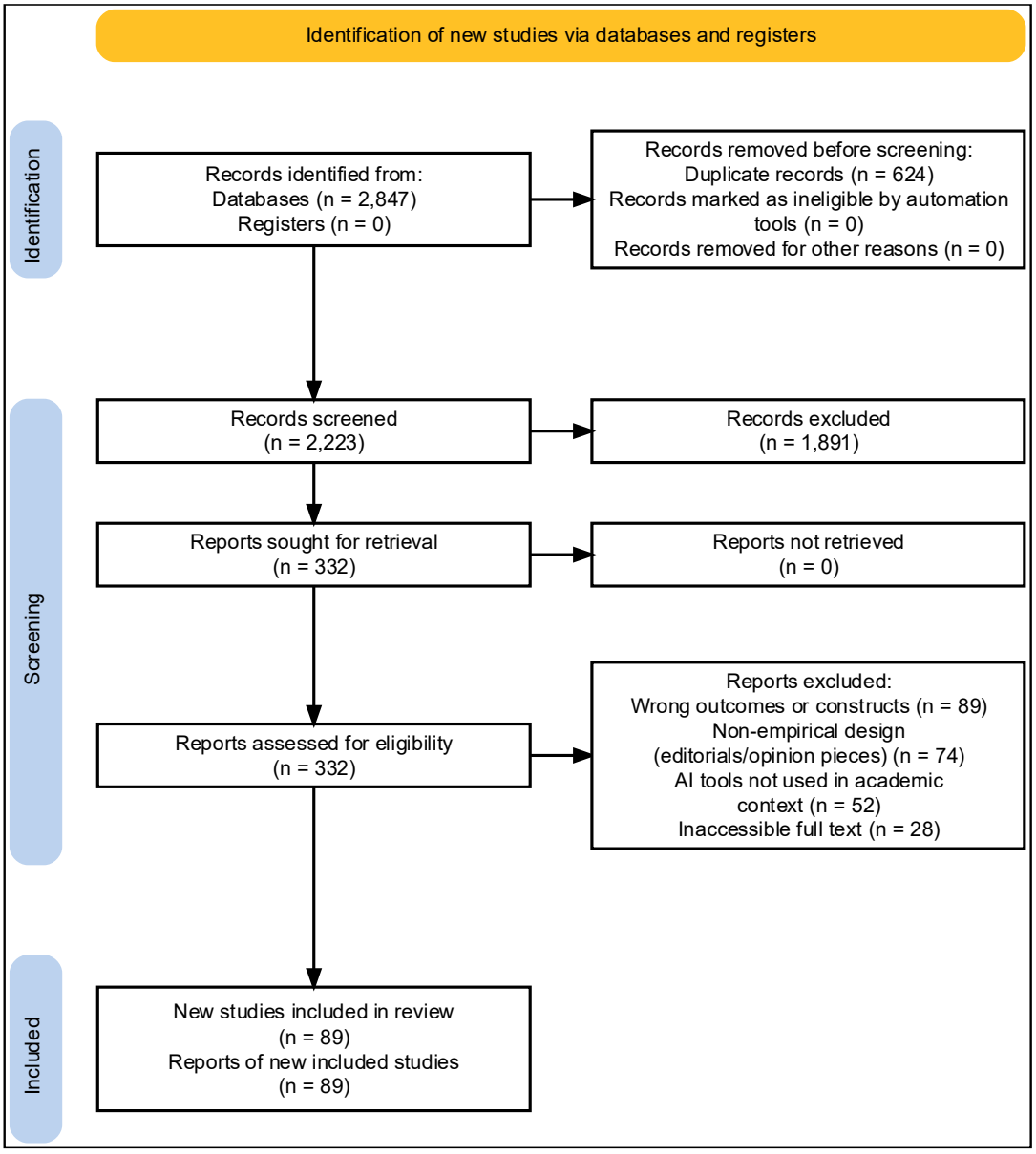

Fig.1 PRISMA Framework

3. Result

3.1 Techniques and Algorithms

Transformer-Based Large Language Models in Academic Work Generation

The most significant technological trend that is informing the discussion on Artificial Intelligence in Education and Academic Integrity is the development of transformer-based Large Language Models which allow to produce high-quality AI-generated Content to write essays, reports, and solve problems. These models are based on deep neural network structures that comprehend context, semantic and discourse structure and thus are very useful in helping students in academic writing [3,15-17]. Transformer-based algorithms in the framework of AI-assisted Learning have greatly promoted the availability of automated academic assistance to students, providing them with relevant and elaborate responses with a limited effort. Such a possibility has prompted increasing worries on Academic Cheating because conventional methods of evaluation were not meant to differentiate between machine and human-generated work. The literature points out that the application of these models has prompted institutions to redefine the meaning of originality, authorship and intellectual contribution, especially in educational settings based in higher education where written assignments will continue to be a major assessment tool. Meanwhile, Intelligent Tutoring Systems and adaptionist learning platforms have also made use of them, showing that the same algorithmic underpinnings can be used to facilitate both legitimate learning and malicious academic practice depending on the context in which they are applied.

AI-Generated Content Detection Algorithms based on Natural Language Processing.

Due to the increase in the number of people using the generative systems, researchers have come up with better Natural Language Processing algorithms to identify the AI-generated Content and preserve Academic Integrity. The methods of detection are usually based on the analysis of linguistic patterns, modeling probability distribution, and stylometric characteristics to detect discrepancies between human and machine-generated writings [18-20]. Machine learning classifiers and deep learning models have been developed in the context of Academic Misconduct Detection, where there is a set of human and AI-generated samples, which are trained on large datasets to detect minor variations in syntax, coherence, and semantic variation. These algorithms are increasingly being used in Digital Assessment platforms to assist with automated monitoring of assignments, but they are ineffective because of the fast-growing capabilities of generative models. It is presented in the literature that detection algorithms tend to generate false positives, false negatives, and that this may lead to concerns about ethical matters of fairness and transparency. It has caused a growth of interest in Explainable AI methods where it is possible to justify the decisions made by detection and enable the responsible use of automated assessment mechanisms in the educational process.

Academic Misconduct Prediction Machine Learning Models.

In addition to content detection, extensive current studies have revealed predictive Machine Learning in Education solutions to detect patterns of possible Academic Misconduct in advance before it violates. These algorithms examine behavioral data, history of submissions, records of interactions and performance trends through the Learning Analytics and Educational Data Mining tools [21-23]. Predicting models can identify any unusual activity patterns that might be a sign of overreliance on AI-assisted Learning tools, e.g., the abrupt changes in the quality of writing or the inconsistent results of performing tasks. The methods are increasingly employed in online and hybrid learning classes where the supervision is minimal. According to the literature, predictive analytics can be used to assist institutions in coming up with preventive measures as opposed to punishing when misconduct has occurred. Nevertheless, there is an ethical concern regarding privacy, bias, and AI Governance during the use of predictive algorithms, as automated systems can make a mistake and label students as dishonest. Due to this, researchers note that predictive models should be used alongside human judgment and transparent policies, which should make implementation responsible.

Intelligent Tutoring systems and Adaptive Learning Algorithms.

Another notable type of techniques are Adaptive Learning System and Intelligent Tutoring System that make use of AI algorithms to customize learning and offer real time feedback. Such systems are based on reinforcement learning, Bayesian modeling and neural networks to examine student performance and modify the difficulty of the content [9,24,25]. When discussing Artificial Intelligence in Education, adaptive algorithms can be described as the means of improving Academic Performance through individualized learning paths. Nevertheless, the literature also emphasizes that in case students over use

automated instructions, Cognitive Offloading may take place, and learners are relying on the system instead of acquiring their own problem-solving abilities. This implies directly on Critical Thinking Skills because too much automation can lessen the chance of in-depth thinking. Researchers state that adaptive systems are not effective until they are incorporated into Assessment Design and it is necessary to have activities which involve reflection, explanation and original thinking as opposed to mere answer generation.

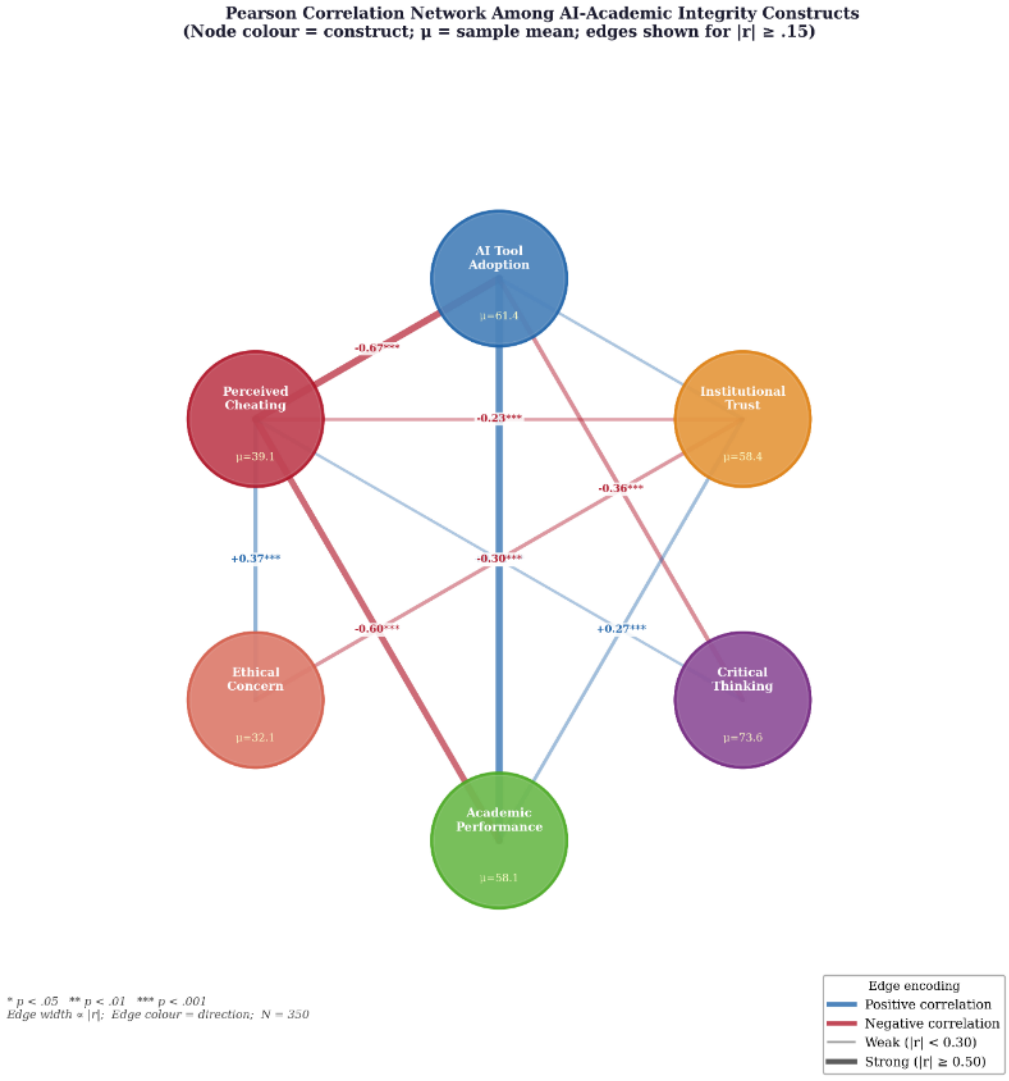

Fig. 2 Pairwise Scatter Matrix with KDE Diagonals and 2D Density Contours

Fig. 2 visualizes all pairwise relationships among the five core constructs: AI Usage Frequency, Perceived Cheating, Academic Performance, Critical Thinking, and Ethical Concern (N = 320). The diagonal shows individual kernel density estimates (KDE) with rug plots and dashed mean lines. The lower triangle contains scatter plots with OLS regression lines, 95% confidence bands, and Pearson r with significance stars (, ,). The upper triangle displays bivariate 2D density contours in a Blues colour map. Key findings reflected: AI usage is negatively correlated with perceived cheating ($r \approx -0.51$) and positively with academic performance ($r \approx +0.44$), while ethical concern tracks closely with perceived cheating.

Deep Learning in Learning Data Mining

The recen trends in Deep Learning have dramatically increased the possibilities of Educational Data Mining, allowing to analyze the behavior of students, their learning patterns, and performance outcomes more accurately. Large amounts of educational data such as text submissions, interaction logs and assessment results are processed using convolutional neural networks, recurrent neural networks and

transformer-based architectures [26-28]. Through these methods, researchers can scrutinize the connection between AI-assisted Learning and Academic Performance, which gives researchers information about the impact of various degrees of AI application on learning results. The literature demonstrates that deep learning models have the capability to find correlations between frequent usage of generative tools and lack of higher-order cognitive activity, which is an issue to be worried about the deterioration of Critical Thinking Skills. Meanwhile, these algorithms may also indicate the positive outcomes of the application of AI to provide feedbacks, revising, and conceptualizations, showing that the influence of AI depends on the patterns of its use and the technology does not play the central role.

Table 1. Summary of Applications, Issues, and Opportunities of AI in Academic Work

Sr. No.	Aspect	Application	Issue / Challenge	Opportunity	Future Direction
1	Generative AI	Essay writing	Cheating concerns	Writing support	Transparent use
2	Tutoring AI	Learning help	Overdependence	Personalized learning	Guided use
3	Detection tools	Plagiarism check	False results	Fair evaluation	Explainable AI
4	Learning analytics	Behavior tracking	Privacy risk	Early warning	Ethical monitoring
5	Adaptive systems	Personalized study	Cognitive offloading	Better engagement	Balanced design
6	Automated grading	Fast evaluation	Bias risk	Efficiency	Hybrid grading
7	AI feedback	Revision help	Over-editing	Skill improvement	Reflective tasks
8	Online learning AI	Remote support	Easy misuse	Flexible learning	Secure assessment
9	Policy systems	Rule enforcement	Inconsistency	Clear standards	Global policy
10	AI literacy tools	Ethics training	Lack of awareness	Responsible use	Curriculum change
11	Coding AI	Programming help	Copying risk	Faster learning	Code explanation
12	Translation AI	Language support	Authorship doubt	Accessibility	Disclosure rules
13	Chatbots	Q&A help	Shortcut learning	Instant feedback	Critical tasks
14	Proctoring AI	Exam monitoring	Privacy issue	Integrity control	Ethical design
15	Research AI	Literature help	Idea copying	Faster review	Citation training
16	Collaboration AI	Team support	Role confusion	Productivity	Defined roles
17	Content generation	Reports	Authenticity risk	Creativity	Process check
18	AI policy	Regulation	Variation	Consistency	Governance model
19	Explainable AI	Fair decisions	Complexity	Trust	Standardization
20	Human-AI learning	Hybrid work	Skill loss	Efficiency	Balanced learning

Explicable AI to Ethical and Transparent Academic Reporting

The increased use of automated algorithms in education has led to the rise in interest in Explainable AI, which is intended to ensure the results of machine learning are understandable to users. Explainability holds an important role in terms of AI Ethics in Education with regard to preserving trust in cases of using algorithms to assess student work or detect Academic Cheating [6,29-31]. Explainable models can be used to give understandable outputs in which the reasons why a specific assignment was considered suspicious or the reason a student got a specific performance prediction is explained. This openness is the most important to provide fairness and prevent unfair punishments, particularly when AI systems are applied in high stakes academic tests. Researchers highlight that explainability must be complemented by the principles of Responsible AI, such as accountability, transparency, and human controls to make sure that the decisions of algorithms do not eliminate the academic judgment. The use of explainable techniques in AI Governance frameworks is turning out to be considered as a way to balance technology innovation and ethical accountability.

Human-AI Collaboration Algorithms in Education.

Recent studies have changed their focus on AI replacing student labor to Human-AI Collaboration model, where algorithmic aid in knowledge acquisition does not exclude the role of independent thought. Collaboration based systems operate with the help of recommendation algorithms, interactive dialogue, and feedback creation strategies to aid student comprehension as well as promote active student participation [32,33]. These systems are aimed at improving the AI Literacy by educating students on how to utilize AI in a manner that will be responsible and transparent. According to the literature, collaborative algorithms can be used as an aid in Academic Performance with the addition of clear instructions concerning what can be used, but they also need to be Designed with Educational

Policy in mind to avoid abuse. This practice is a part of a larger trend in Artificial Intelligence in Education, where the emphasis is shifting not on preventing misconduct but the creation of ethical and productive learning conditions where AI is not used as a shortcut.

Digital Assessment and Process-Based Evaluation Algorithms.

The traditional assessment techniques are under more and more pressure given the availability of generative tools, and a new Digital Assessment algorithm to assess the learning process rather than the final product are emerging. These systems can be used to monitor revision history, interaction patterns and the amount of time a student spends on the assignment using Learning Analytics to decide whether a student is really working on the assignment [34-36]. Algorithms of a process-based evaluation can identify overreliance on AI generated Content by showing a lag in editing or high-speed completion time, or inconsistent writing styles. According to researchers, these methods are more efficient than mere plagiarism detecting devices as they do not pay attention to the similarity of the texts but the behaviour of learning. Process-based algorithms can also be used in support of Transparent AI Use, where students report on the use of AI tools and the manner in which it was to the end work. This would follow the new guidelines in AI Regulation and Educational Policy which do not emphasize prohibiting but adapting.

Algorithms of AI Literacy Modeling and Ethical Decision-Making

The other new direction is algorithms that can gauge and enhance AI Literacy that is seen as one of the key drivers of Student Perceptions of cheating and ethical behavior. AI literacy models provide analysis of responses by students, patterns of their decisions, and awareness of AI capabilities in order to identify the possibility of differentiating between acceptable and unacceptable use [16,37-40]. These models frequently are applied with the help of classification algorithm and cognitive modeling techniques that analyse ethical arguments in the academic situation. It has been observed that students more AI literate tend to use AI-assisted Learning tools responsibly and have a lower tendency to commit Academic Misconduct. Consequently, institutions are implementing AI literacy assessment in curriculum more often to enable Responsible AI practices and minimize ethical friction over generative technologies.

AI Governance Algorithms and Systems to enforce policy

The last set of methods is the algorithmic models of the AI Governance, that intend to impose institutional policies concerning Academic Integrity and Ethical AI Use. These platforms consist of detection algorithms, predictive analytics, and reporting systems used to track the use of AI in digital learning platforms [41-43]. Governance algorithms have the ability to detect suspicious activities automatically and generate compliance reports and aid decision-making by academic administrators. Within the framework of AI Regulation, these types of systems are created to provide uniformity in course and institution standards and minimize confusion over what is acceptable behavior. Nevertheless, the literature also indicates a risk that there is a possibility of lowered trust between students and educators because of excessive monitoring, and governance systems should be balanced between education and transparency. The fusion of governance algorithms and Human-AI Collaboration models is one of the significant trends in the modern research as institutions are trying to preserve the academic standards and adjust to the reality of AI-based learning environments.

3.2 Applications

Application of Generative AI Tools in Academic Writing and Assignment Preparation

Among the most popular applications of Generative AI Applications to Artificial Intelligence in Education, the usage of automated writing systems in academic tasks, essays, and research summaries can be mentioned. These applications enable students to produce structured written content, hone language, and present arguments with little effort, radically transforming the manner in which academic writing is produced in current Higher Education Technology settings [44,45]. AI use in academic writing has brought significant questions to Academic Integrity since it is usually hard to distinguish between support and Academic Cheating. Working with the AI writing tools can seem similar to grammar

checkers or tutoring system to many students, and unauthorized help to educators, thus, disparities in Student Perceptions of ethical behavior can be noted. It has been suggested in the literature that the recent proliferation of AI writing assistants has compelled institutions to re-evaluate the definition of authorship and originality particularly in courses that feature courses that heavily depend on written work as a means of assessing Critical Thinking Skills. Simultaneously, they are able to facilitate learning through responsible use that may assist students grasp structure, vocabulary, and argumentation to prove that the influence of generative systems is determined by the clarity of policy, literacy regarding AI, and the development of assessment processes.

AI Applications in Personalized Learning and Adaptive Learning Systems

The other significant use of AI in education is an Adaptive Learning System or a personalized learning platform which modulates the content based on the performance of this or that student. Learning Analytics, predictive modeling and recommendation algorithms are employed in these systems to offer personalized exercises, explainations and feedback, enhancing engagement and possibly Academic Performance [22,30,46-48]. Personalization tends to be offered as one of the most useful applications of artificial intelligence in the context of AI-assisted Learning, as it will enable students to learn at their own speed and get instant guidance. The literature however also points out that over reliance on adaptive systems can result in Cognitive Offloading in which students rely on the automated systems instead of building their own reasoning ability. This argument is of particular concern to the discussion on Critical Thinking Skills because highly guided environments can decrease exploration and problem solving opportunities. Adaptive learning thus should be closely combined with Assessment Design strategies that promote reflection, elucidation, and creative thought as opposed to AI-generated solution passive consumption.

Intelligent Tutoring Systems for Academic Support

Another significant use of Artificial Intelligence in Education is the use of Intelligent Tutoring Systems that offer automated tutoring, intended to mimic one-on-one tutoring. They are very effective when it comes to the support of complex subjects because these systems analyze the responses of students, determine what they do not understand, and provide them with explanations in real-time [49-51]. Tutoring systems, in most instances, enhance Academic Performance through providing instant feedback and also lessening the time that students take in mastering difficult concepts. Nevertheless, the usage of them is also associated with the ethical concerns regarding AI Ethics in Education, particularly in cases where students are left to use automated explanations rather than solving the problems by themselves. Students have been found to consider a system of tutoring as a lawful learning resource, even in cases where they deliver direct responses, which may result in discrepancies between the Student Perceptions and the institutional meaning of acceptable help. The problem facing teachers is to create tutoring programs that allow Human-AI Collaboration, and not substitute the effort of the students so that the technology does not deprive intellectual growth at the cost of greater understanding.

Applications of AI in Digital Assessment and Automated Evaluation

The growing application of AI in Digital Assessment has led to the change in the way student performance is measured in online and hybrid learning. Academic activity monitoring and the maintenance of Academic Integrity is now being regularly performed via automated grading systems, plagiarism detection software, and behavioral analytics platforms [23,56,57]. The use of these applications is especially critical in large classes where it is challenging to evaluate by hand, and AI-based systems are necessary to guide modern learning facilities. Nevertheless, the emergence of AI-generated Content has diminished the usefulness of the traditional plagiarism detection, which requires the introduction of new assessment tools that look at the learning process instead of just the final submission. The assessment tools based on processes can record the history of revision, pattern of interaction, and time spent working on the assignment, and educators can see whether students work on the assignment or overuse AI tools. These applications bring into reality Responsible AI practices like Transparent AI Use where students provide information about how artificial intelligence was used to aid their work. Process-based assessment, which is one of the most promising methods of the age of

generative AI according to the literature, is the means by which the balance between innovation and fairness can be achieved.

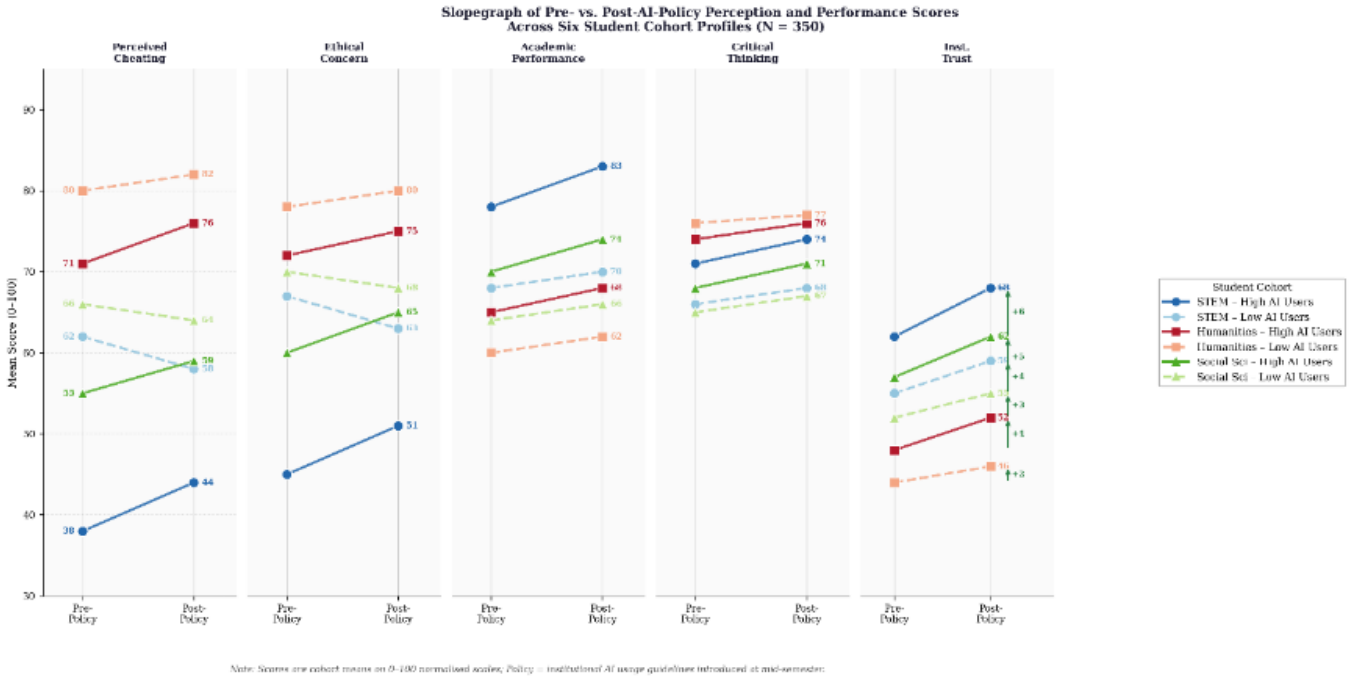

Fig. 3 Grouped Diverging Horizontal Bar Chart

In Fig. 3 chart plots net agreement scores (% Agree − % Disagree) on 8 AI-ethics statements for three academic disciplines (STEM, Humanities, Social Sciences). The zero-line separates net disagreement (left, red zone) from net agreement (right, blue zone) [52-55]. Humanities students show the highest net agreement that AI usage constitutes cheating (+44%) and raises ethical concerns (+58%), while STEM students show net disagreement on these items but strong agreement that AI improves performance (+42%). Dot markers at bar tips and direct value labels support rapid visual comparison. χ^2-test significance is noted in the footer.

Learning Analytics Applications for Monitoring Student Behavior

With the increase in the popularity of online learning platforms, the application of Learning Analytics has increased exponentially, allowing to analyse every student behaviour, engagement and performance in a detailed way. Learning management systems, online quizzes, and interactive tools are gathered by analytics systems to determine patterns that can possibly explain overreliance on AI-assisted Learning or possible Academic Misconduct [58-61]. As an illustration, one of the indicators of the use of AI-generated Content may be unusual fluctuations in the writing style or rather quick completion time, which can be clarified by the instructors. These are becoming popular applications to facilitate AI Governance and institutional policy realization, especially in wholly online courses where face-to-face supervision is constrained. Simultaneously, behavioral analytics usage also concerns privacy, fairness, and AI Ethics in Education because automated surveillance can provoke a feeling of being watched among students. Researchers stress that analytics applications must be supplemented with effective communication, ethical standards, and effective Educational Policy frameworks so that technology would be applied to facilitate the learning process instead of merely report a violation.

Applications of AI for Developing AI Literacy and Ethical Awareness

Many institutions are also using AI Literacy and ethical decision-making as AI tools become increasingly common in academic settings, making use of AI itself. Education tools can replicate the academic setting, test the reaction of students, and give feedback on whether the use of AI tools is correct, assisting students realize the border between assistance and Academic Cheating [62-64]. The applications are especially significant when the difference in Student Perceptions frequently occurs due to the insufficient understanding of the functioning of AI systems and what it can be considered ethical

such usage. Through AI literacy education, universities can facilitate the use of Responsible AI practices and minimize any conflict associated with Academic Integrity. The literature indicates that students that get formal education on AI ethics tend to use Generative AI Applications in a more responsible manner and are less inclined to become dishonest. It shows that education and not prohibition might be the best way of solving ethical problems related to artificial intelligence.

Human-AI Collaboration Applications in Academic Learning

The latest trends of the Human-AI Collaboration have seen the introduction of applications that assist in collaborative communication between humans and AI systems to facilitate human work instead of oppose it. These uses involve interactive writing assistants, problem solving partners and feedback generators which motivate students to hone their own ideas as opposed to automated responses [1,65,66]. AI in these settings serves a function of a cognitive support tool that increases the amount of productivity with an active involvement. Studies indicate that, with the help of collaborative applications, Academic Performance can be enhanced whilst keeping Critical Thinking Skills intact, as long as students are obligated to provide answers to the way they come to their conclusions. This is the direction of the modern tendencies in AI Ethics in Education that presupposes the necessity of creating technologies that would promote learning outcomes without compromising academic accountability. The effectiveness of collaboration-based applications relies on explicit guidelines in terms of Transparent AI Use and evaluation schemes rewarding knowledge, as opposed to mere output.

Applications in Online Learning and Remote Education Environments

The growth in online education has increased the pace at which Artificial Intelligence in Education is being embraced, so AI tools are now necessary to support large-scale online learning institutions. Auto-feedback, discussion moderation, adaptive quizzes and performance tracking are some examples of AI-driven tasks in remote courses and allow institutions to provide quality services to large cohorts [67-69]. Nevertheless, with the same technologies, learners can easier still be dependent on Generative AI Applications without being noticed, which raises the issue of Academic Misconduct and fairness even more. Online learning systems thus need to be better regulated by AI, better assessments and more effective monitoring to ensure that academic standards are upheld. According to the literature, the success of online learning can be attributed to the balancing between flexibility and accountability wherein AI serves as a learning aid tool and as a tool of sustaining Academic Integrity.

Explainable AI Applications for Fair Academic Decision Making

Explainable AI in Education has gained particular importance recently when automated systems can be applied to assess assignments, misconduct, and predict student performance. Explainable applications give interpretable results indicating how the decisions were made to enable students and instructors understand why a specific assignment was flagged or why a certain grade was projected [70,71]. Such transparency is critical in preserving the trust in the AI-based evaluation systems and adherence to ethical requirements. As applied to AI Governance, explainable systems can enable institutions to explain their decision and prevent unwarranted punishment, especially in the case of accusations of Academic Cheating. The literature recommends a big role of explainable applications in the future of educational technology since universities would want to integrate automation with fairness and accountability.

Policy Enforcement and AI Governance Applications in Higher Education

The last type of application would be those intended to assist in AI Governance, policy enforcement and institutional decision making involving Academic Integrity. These applications combine monitoring applications, analytics applications, and reporting systems to make sure that students adhere to Ethical AI Usage [20,72-74]. Governance applications have the ability to identify suspicious activity and automatically generate compliance reports and help administrators to keep similar standards in courses and departments. Although such systems are required in large academic institutions, scholars caution that too much use of automated enforcement can lead to lack of trust and anxiety among students. This is why the contemporary Educational Policy focuses on integrating the tools of governance with

education, transparency, and training AI Literacy. According to the literature, the future of Artificial Intelligence in Education will be characterized by the capacity of the institutions to develop balanced systems that would promote innovation and safeguard fairness, intellectual growth and value of genuine academic work.

3.3 Literature Review Results

Overall Trends in the Use of Artificial Intelligence Tools in Academic Work

The literature reviewed shows that the application of Artificial Intelligence in Education has increased rapidly since the common use of Generative AI systems that can generate high-quality text, code, and analytical outputs. In institutions of higher learning, students are adopting Learning aid tools of AI in their day-to-day academic works, such as writing of assignments, solving problems, summarization of research, and even preparing exams [75,76]. This change indicates a more general trend in Educational Technology in which AI is not confined to the experimental but a commonly used part of the learning environment. These findings demonstrate that this mass usage has created a number of controversies concerning Academic Integrity, as the classical definition of independent work was built in the context of systems that do not exist to create original content. Students commonly complain that AI tools act as productivity aids and not as a cheating tool, and instructors often complain that over-reliance on AI-generated Content can lead to a diminution of intellectual work. The literature has continued to reveal that the pace of technological advancement has been higher than the pace of institutional change which has left a gray area on what is acceptable and what is not, thus the necessity of a new Higher Education Policy and a more defined set of academic guidelines.

Comparison of Student Perceptions and Faculty Perspectives on AI Use

One of the strongest themes of the results is the discrepancy between Student Perceptions and faculty interpretations of whether the use of AI tools is Academic Cheating. Students tend to perceive AI as a valid source of help similar to search engines, grammar check apps, or tutoring service, especially when an idea is generated through the technology or a language is improved [36,77-79]. Faculty members, by contrast, are more likely to grant weight to originality and independent thinking, which makes them consider some applications of AI Academic Misconduct. Perceptionual variance is highly dependent on AI Literacy since students who understand more about AI potential have a higher probability of determining ethical limits and practicing Responsible AI. It also appears that the perceptions are also different by the disciplined areas with the Technology-related areas being more positive towards Human-AI Collaboration and Humanities and social sciences raising more issues in respect to the potential of the effects on Critical Thinking Skills. These variations indicate that the ethical consideration of AI application is not universal and depends on the situation and can not be handled by one general rule, which is why it is necessary to have adaptable Educational Policy frameworks.

Types of Artificial Intelligence Tools Used by Students

The literature singles out a few key categories of AI tools in scholarly work, which are Generative AI writing assistants, Intelligent Tutoring Systems, automated translation tools, code generators, and Adaptive Learning Systems. Writing assistants are the most commonly used, where students can write essays, summaries, and reports within the shortest time which raises the question of authorship and originality [80-83]. Adaptive platforms and tutoring systems are considered as more positive as they do not eliminate the efforts of the students on the contrary, they are made to facilitate learning. But even these systems may lead to Cognitive Offloading provided that the students use automated explanations rather than building their own knowledge. The other category that holds some significance is the Automated Feedback that suggests grammar, structure and clarity feedback that many students find acceptable, but other instructors regard as overhelp. These findings indicate that ethical issues are not dictated by the technology, only with the level of automation and transparency of the application, meaning that the future recommendations should not apply an identical approach to all AI applications, but discriminate between them.

Methods Used to Detect AI-Generated Academic Work

The growth in the application of AI tools has seen the emergence of new strategies of sustaining Academic Integrity, such as advanced Digital Assessment, stylometric analysis, and Learning Analytics approaches. The detection systems aim to find the AI generated Content based on linguistic patterns, probability distributions, and writing style inconsistencies. Nevertheless, the findings indicate that detection techniques tend to be rather flawed as people can generate extremely natural text with the help of modern generative models that are similar to human readings in many ways. This has led to the development of a tendency to use process-based assessment whereby instructors trace the learning process but not necessarily the final submission only. Process-based approaches involve following the history of revision, drafting, and using reflective assignments as a way to confirm the comprehension of the student. These methods go hand in hand with contemporary studies of Assessment Design, which focuses on assessing reasoning, creativity and problem-solving capacity rather than just writing. According to the literature, detection is not enough to resolve the issue of AI misuse, and it should be implemented together with educational efforts, explicit regulations, and enhanced AI Governance.

Impact of AI Use on Academic Performance

The findings indicate the presence of conflicting evidence of the impact AI-assisted Learning has on Academic Performance. Other studies demonstrate better performances and productivity in the case of applying AI devices to feedback, revision, and concept explanation, especially in courses with many students where personal assistance is necessary [84-86]. By utilizing AI applications, it is possible to answer quickly, get individual advice, and get more practice, which may be used effectively to provide improved understanding. Nevertheless, according to other studies, overuse of Generative AI can result in superficial learning where students are not required to grasp the content of an assignment but to complete it. This effect is commonly related to Cognitive Offloading, where students transfer the mental effort to automated systems rather than putting it into the deeper analysis. The findings indicate that AI can enhance performance in the short run but the effects on long-term knowledge retention can be detrimental unless proper measures are taken to incorporate them in the learning processes. Thus, the effect of AI would be determined by the ratio of support and the independent work, making it significant to create learning settings that facilitate participation.

Impact on Critical Thinking Skills and Intellectual Development

Among the most widespread topics addressed in the literature is how AI affects Critical Thinking Skills that people believe should be used in higher education. There have been studies that allege that with continuous access to AI-generated answers, there will be lowered chances of independent reasoning, problem solving and creativity [6,87,88]. The student may be less involved with the subject matter when they use automated tools to create an idea or a completed assignment, which might result in a less robust intellectual development. This is of great concern especially in subjects that need analysis, argumentation and interpretation. Meanwhile, the findings make it also clear that AI can facilitate critical thinking when applied as a group work tool, as opposed to the task to be completed by people themselves. To illustrate, AI can give alternative explanations, propose new perspectives, and assist students to develop arguments, stimulating greater insight. The literature thus shows that the implication of AI on the skill of thinking lies on what the technology does, and it is therefore not surprising that Human-AI Collaboration can be used to improve on learning provided the technology is used with the proper Assessment Design as well as the use of ethics.

Challenges Related to Ethics, Fairness, and Academic Integrity

The use of AI devices has brought about substantial challenges that have to do with AI Ethics in Education; fairness and Academic Integrity. The first is that there is no uniform definition of cheating and there is misunderstanding on the part of the students and instructors [6,92-94]. Some other problem is the fact that it is hard to implement the rules in online worlds, where AI tools may be applied without control. Another issue mentioned in the literature is the inequality, as students that have more opportunities of using advanced artificial intelligence might have an advantage to the rest, and the question of fair play when grading arises. Besides, automated systems have the potential of giving false

results, thereby resulting in wrongful charges of Academic Misconduct, which would ruin the relationship between students and institutions. These issues illustrate the fact that ethical issues cannot be addressed solely with the help of technology but demand an integrated approach of AI Governance, effective communication, and powerful Educational Policy frameworks that do not overemphasize innovation at the expense of responsibility.

Table 2. Comparison of Traditional, AI-Assisted, and Future Learning Models

Sr. No.	Aspect	Traditional Learning	AI-Assisted Learning	Future Direction
1	Writing	Manual	AI editing	Hybrid writing
2	Study	Books	AI tutors	Adaptive learning
3	Assessment	Exams	Online tests	Process evaluation
4	Feedback	Teacher only	Automated	Mixed feedback
5	Integrity	Plagiarism check	AI detection	Transparent use
6	Thinking	Independent	Assisted	Collaborative
7	Policy	Fixed rules	Changing rules	Dynamic policy
8	Skills	Memory focus	Tool use	Critical thinking
9	Monitoring	Manual	Analytics	Ethical AI
10	Teaching	Lecture	Digital	Intelligent systems
11	Research	Library	AI search	Verified AI
12	Coding	Manual	AI code	Explain code
13	Language	Self writing	AI help	Assisted writing
14	Exams	Paper	Online	Secure hybrid
15	Learning speed	Slow	Fast	Balanced
16	Creativity	Human	AI support	Co-creation
17	Policy clarity	High	Low	Standardized
18	Skill depth	High	Variable	Designed depth
19	Control	Teacher	System	Shared control
20	Future model	Human only	Human + AI	Ethical collaboration

Opportunities Created by Artificial Intelligence in Education

The outcomes in spite of the challenges demonstrate that AI also gives a lot of opportunities to enhance learning and teaching. AI in Learning can be used to facilitate customized learning, instant feedback, and other interactive learning experiences that had been unattainable with traditional models [95,96]. Intelligent Tutoring Systems, Adaptive Learning Systems and Learning Analytics enable teachers to get more information about student needs and deliver them individually. AI can also minimize the work of the administration, providing the instructors with more time to teach and mentor. The literature stresses the importance of the fact that the advantages of AI can be most pronounced in case the technology is implemented with clear instructions and effective AI Literacy training, which enables students to apply AI in a conscientious way. It is indicative of a change in MO of viewing AI as a threat to Academic Integrity to experiencing it as a resource that can be leveraged to improve education in combination with Responsible AI principles.

Institutional Policies, Regulations, and AI Governance

The findings show that university institutions are progressively formulating policies regarding AI Regulation, AI Governance, and Ethical AI Use in the academic activities. Such policies usually make students report the use of AI tools, ban totally automated generation of assignments, and promote the use of AI only as a support resource [97-99]. Nevertheless, the difference between institutions remains wide and numerous policies are yet to be developed. Other universities are extreme in terms of enforcement and detection whereas others are education and transparency oriented. According to the literature, a successful policy should include both explicit regulations and the possibility to teach students to responsibly use AI. Too restrictive policies can remove innovation and too flexible ones can undermine Academic Integrity. Consequently, a mixed solution is proposed by numerous scientists to combine AI Literacy, process-based assessment, and collaborative learning techniques to develop equitable and realistic educational standards in the contemporary environment.

Future Directions in AI-Assisted Academic Work

The last trend in the findings is the future of Artificial Intelligence in Education that is projected to entail stronger infiltration of AI in the learning setting as opposed to an effort to do away with it. The areas of future research include better Assessment Design, better Explainable AI and more effective ways of supporting Human-AI Collaboration [100-103]. The interest in researching the long-term effects of the use of AI on Critical Thinking Skills, creativity, and professional readiness is also growing. The other direction that is relevant is the international cooperation to create a uniform Educational Policy, as variations among institutions may cause havoc in defining what is acceptable and what is not. According to the literature, the great challenge in the future will be how to preserve the academic values and at the same time meet the transforming technology at a very fast rate. Rather than seeking to know whether AI should be permitted, scholars are also becoming inquisitive on how education can be changed, so that the use of artificial intelligence can be a means of learning and not a cutoff to intellectual growth.

4. Discussion

The results of this extensive literature review are that the blistering development of the Artificial Intelligence in the Education sector, specifically the advent of Generative AI, has radically transformed the production of academic work, its evaluation, and perception. The recent research works have also shown that the mass access to AI tools have exceeded the institutional preparedness and produced an opinion whether the usage of AI-generated Content should be viewed as a valid aid or Academic Cheating [7,9,104-106]. Scholars have reported that academic integrity in higher education has a positive as well as a negative impact which requires generative AI to be viewed as a major educational advantage and a major educational danger that compels universities to redefine traditional notions of authorship and the originality and independence of learning. As shown in the discussion of the reviewed literature, the debate has gone beyond plagiarism detectors and has spread to the ethical reasoning, policy formulation, and the overall effect of the issue on Critical Thinking Skills and Academic Performance. The growing adoption of Educational Technology, AI-assisted Learning, and automated feedback systems have resulted in a learning environment in which students are often working with AI, and it is hard to distinguish between human and machine work. Therefore, the question of whether the use of AI constitutes cheating is not the main concern, but how academic institutions are to change to implement Human-AI Collaboration without compromising Academic Integrity.

The other theme that can be noted based on the literature is that the Student Perceptions of the ethical use of the AI tools are very different. Empirical research and surveys show that a substantial number of students believe that AI is the same as a calculator, search engine, or tutoring services, in particular, in brainstorming, editing, or summarizing information, whereas members of the faculty tend to view the same behavior as an infraction of academic policies [6,107-109]. This perception gap is directly connected to the extent of AI Literacy since those students who are guided on ethical application of AI are more inclined to draw a line between appropriate and inappropriate use of AI. Lack of cohesive institutional policies has been cited to be among the leading factors of misunderstanding where students indicate that they are not certain whether using AI to do assignments can result in discipline. Recent articles have demonstrated the fact that a significant share of students have been using AI tools on a regular basis, but they are uncertain about the competent usage of AI because of vague instructions, meaning that policy loopholes are still a significant dilemma in higher education today. Such findings indicate that a potential method of generating awareness about ethical issues and related systematic instructions might be more effective than a ban in providing concerns regarding Academic Misconduct.

Another aspect of the AI usage that the literature exposes is the fact that the effect of using AI in relation to Academic Performance is complicated and strongly depends on the way the technology is applied to learning processes. AI systems can be used to improve productivity and facilitate personalized learning when used to provide feedback, explain, and revise, particularly in large or online classes where feedback provided by each instructor is scarce [110-112]. Nonetheless, overuse of generative systems can lead to the problem of Cognitive Offloading, where students turn to automated tools in place of critical thinking, which would weaken Critical Thinking Skills in the long-term. The accumulating

literature on the impact of generative AI in education presents a consistent finding that the immediate gains of grades do not necessarily translate to the sustained knowledge retention, which underscores the significance of creating an assessment system based on the evaluation of knowledge and not only on the final product. This movement towards the process-oriented assessment is one of the most significant tendencies in Assessment Design because the educators need to keep the quality of learning and evolve with the new technologies.

The increasing problem, which has been addressed in literature, is the increased challenge of upholding Academic Integrity through conventional methods of detection. Text generated by AI is sometimes original and cannot be detected by conventional plagiarism detection methods, which results in more interest in Learning Analytics, stylometric analysis, and process-tracking solutions [96,113-115]. Writing pattern, submission behavior, and log of interaction can be analyzed using AI-based monitoring systems, which can be used to identify possible misuse, though they also give rise to ethical issues in regards to privacy, fairness, and the bias of the algorithm. The existing studies on AI-inspired decision making in the education sector indicate that automated evaluation has the potential to harm specific groups of learners by default, which proves why Explainable AI and open decision-making procedures should be employed. The findings indicate that technological solutions are not sufficient to combat the issue of cheating and they should be integrated with ethical codes of conduct, human controls, and robust AI Governance mechanisms.

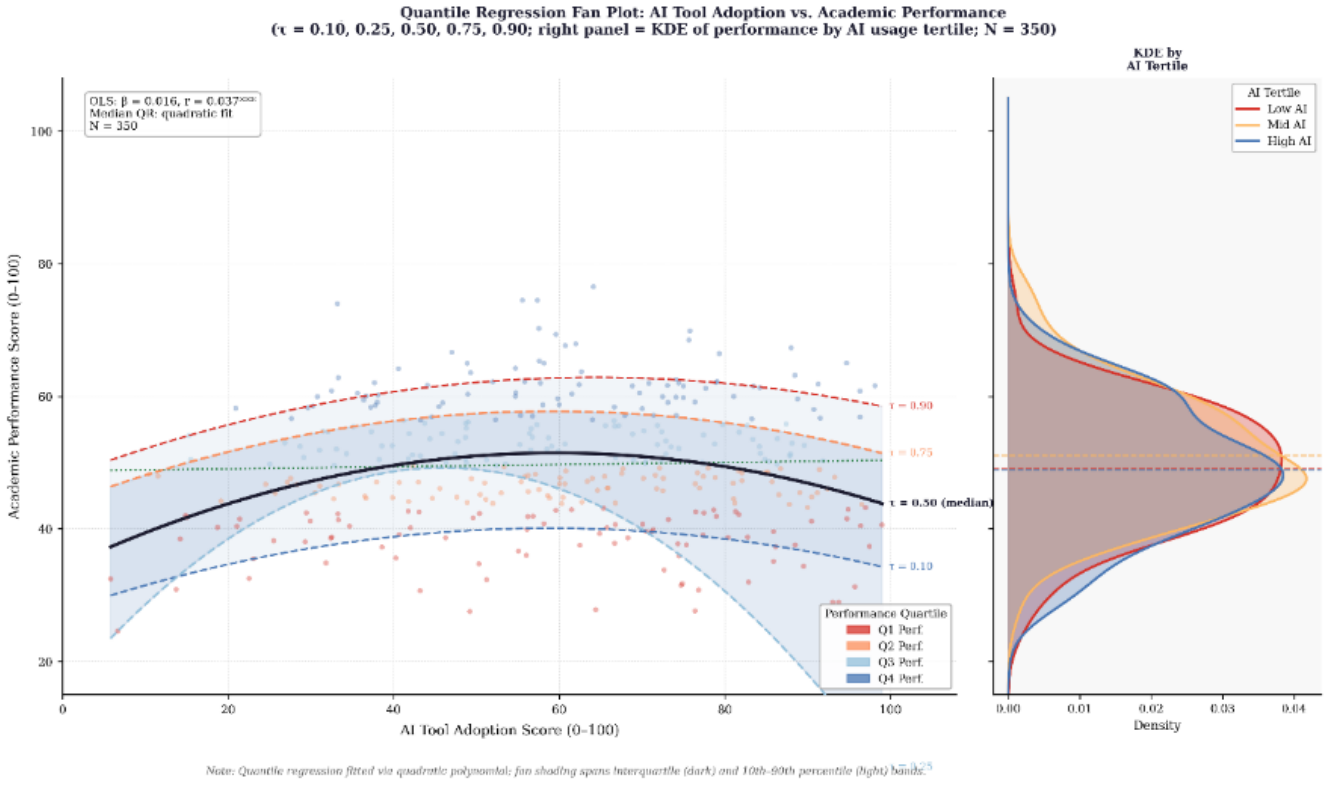

Fig. 4 Radar Profile Chart + Empirical CDF Panel

In Fig.4 Panel (a) displays the mean score profile across all 5 constructs for each academic discipline on a radar chart. STEM forms a wide polygon skewed toward AI usage and performance; Humanities extends toward perceived cheating, critical thinking, and ethical concern; Social Sciences occupies an intermediate position [96,116-118]. Panel (b) shows Empirical Cumulative Distribution Functions (ECDF) of academic performance separated by AI usage tertile (Low, Moderate, High). The CDF curves for high AI users are shifted rightward, indicating higher academic performance, confirmed by a Kolmogorov–Smirnov test (D and p-value annotated). Median reference lines and quartile tick marks (|) are overlaid. The ECDF is a statistically rigorous and increasingly preferred alternative to histograms for distributional comparison in quantitative social science research.

It is also noted that institutional policies and regulatory methods play an important role in defining the use of AI in academia. Increasingly, universities are coming up with guidelines that demand that AI use is disclosed, that a responsible relationship with AI be formed, and that assessments be reorganised to emphasise reasoning and creativity over memorisation [119,120]. Nevertheless, not every institution has the same policies, and an overwhelming number of educators think that strict prohibitions are unrealistic since AI has already become a standard operation of students. According to the reports of the higher education systems, the number of cases of AI-related misconduct is growing, although it also implies that the prohibition of the technology does not decrease its use, which proves the necessity of the moderate policies with the integration of the regulation and education. The literature hence goes on to propose the replacement of the punishment-based models with the policies that support Responsible AI, Transparent AI Use, and the establishment of AI Literacy as a set of skills that a modern learner needs.

Recent studies also focus heavily on opportunities that AI generates, demonstrating that Artificial Intelligence in Education can be used to facilitate the creation of personalized learning and enhance access, as well as allow new types of interactive learning. Intelligent Tutoring Systems, Adaptive Learning Systems and automated feedback systems enable students to obtain real time help and therefore learning becomes more productive and adaptive. These technologies come in handy especially in online and hybrid settings where conventional teaching techniques might prove to be ineffective. Meanwhile, the literature underlines that AI advantages should be tied to cautious application and ethical design, as in unregulated use, the tool can decrease student interest and intellectual growth. This double aspect of AI as both the learning aids system and a possible cause of mispractice can be interpreted as the wider problem of embedding innovation into academic principles.

The discussion further indicates that the relationship between AI use and Critical Thinking Skills depends largely on assessment methods. When students are required to explain reasoning, reflect on their process, and demonstrate understanding, AI can enhance learning rather than replace it. However, when assignments only require final answers, students are more likely to rely on automated tools without fully engaging with the material. This suggests that future research should focus on redesigning evaluation systems to measure learning processes rather than only results. The concept of Human-AI Collaboration is increasingly proposed as a framework for future education, where AI is treated as a partner in learning rather than a substitute for human effort.

5. Conclusion

This PRISMA 2020 systematic literature review investigated the question of whether the application of Artificial Intelligence in Education, and specifically Generative AI, should be viewed as cheating based on the Student Perceptions, Ethical Concerns, and the effects on Academic Performance and Critical Thinking Skills. It is shown in the findings that the fast growth of AI-assisted Learning has fundamentally redefined the meaning of academic work, forming a complicated point of contact between Academic Integrity, technological innovation, and changing educational practices. In all the studies reviewed, students do not express similar opinions regarding the use of AI, and their considerations frequently rely on the situation, such as the use of AI to generate ideas, edit or produce an entire content. Such ambiguity indicates the lack of uniform institutional policies and emphasizes the necessity of even greater AI Governance, clear academic policies, and expectations of what is acceptable in terms of AI-generated Content use in higher education.

According to the review, ethical issues surrounding Academic Misconduct are also related to the design of an assessment system but not the technology. In a case where only the final output is designated, the students tend to use the AI tools in a manner that can lead to decreasing the independent effort, whereas process-oriented evaluation and reflective assessment methods promote the responsible use of AI and do not alter the outcomes of learning. This is in line with the growing scholarly work that indicates that the difficulty of AI in education goes beyond identifying cheating to ensuring transparency into the learning process, which is needed to assess true comprehension and intellectual growth. There has also been a concern related to the growing use of AI tools, which may lead to Cognitive Offloading, i.e. the

ability to rely on automated systems, which may erode Critical Thinking Skills in the long term. Nevertheless, the literature also demonstrates the fact that AI can be used as a method to increase efficiency, personalized feedback, and Academic Performance in case it is applied with the help of appropriate guidance, which means that the effect of AI is strongly contingent on its application, and not on its presence.

The other point of interest is that a high level of ethical awareness and AI Literacy determine Student Perceptions of cheating. Students taught responsibly on how to use AI tend to make the distinction between the supportive and dishonest applications whereas students not taught responsibly tend to adopt informal practices that contradict institutional expectations. This disconnect between student actions and policy structure has been cited as one of the biggest dangers linked to the intensive integration of Educational Technology in that most time, new regulations are established when students have already implemented AI into their process models. Consequently, the literature has shown the need to incorporate the Responsible AI, Ethical AI Use, and Digital Assessment strategies into the curricula in order to ensure that students understand how to work with AI tools without losing originality and fairness. The review also indicates that the future of academic integrity will be pegged in the reformulation of the education systems to facilitate Human-AI Collaboration instead of trying to kill AI use. Old-fashioned plagiarism-oriented approaches are becoming ineffective as AI is capable of producing original text that is not similar to a preexisting one, and detection is therefore not an effective solution. Rather, new strategies suggest merging Learning Analytics, open disclosure policies, and new evaluation techniques based on measuring reasoning, creativity and problem-solving processes. These strategies are in line with the recent tendencies in the Educational Policy and Ethics in Education AI, which prioritize adaptation over prohibition.

The future studies are to be oriented on the creation of standardized frameworks of AI applications, determination of the long-term impact of AI on Critical Thinking Skills, and the exploration of the impact of various assessment models on student behavior. It is also required that cross-cultural studies are conducted that would help in the understanding of the various perceptions of cheating in different educational systems and longitudinal studies that would help us know whether exposure to AI at a young age alters the learning habits. Besides that, combining Responsible AI, AI Literacy, and Transparent AI Use into academic courses may also be explored as a way to balance the innovation and integrity. In the end, it may be indicated by the evidence that it is not about the desire to use AI tools in academic work, but how educational institutions can create learning environments that will not only retain intellectual development but also allow the transformative power of artificial intelligence.

Conflict of interest

The authors declare no conflicts of interest.

References

[1] Salas-Pilco SZ, Yang Y. Artificial intelligence applications in Latin American higher education: a systematic review. International Journal of Educational Technology in Higher Education. 2022 Apr 18;19(1):21. https://doi.org/10.1186/s41239-022-00326-w

[2] Rane N. ChatGPT and similar generative artificial intelligence (AI) for smart industry: role, challenges and opportunities for industry 4.0, industry 5.0 and society 5.0. Challenges and Opportunities for Industry. 2023 May 31;4. https://doi.org/10.2139/ssrn.4603234

[3] Chen Y, Jensen S, Albert LJ, Gupta S, Lee T. Artificial intelligence (AI) student assistants in the classroom: Designing chatbots to support student success. Information Systems Frontiers. 2023 Feb;25(1):161-82. https://doi.org/10.1007/s10796-022-10291-4

[4] Wei L. Artificial intelligence in language instruction: impact on English learning achievement, L2 motivation, and self-regulated learning. Frontiers in psychology. 2023 Nov 6;14:1261955. https://doi.org/10.3389/fpsyg.2023.1261955

[5] Kohnke L, Moorhouse BL, Zou D. Exploring generative artificial intelligence preparedness among university language instructors: A case study. Computers and Education: Artificial Intelligence. 2023 Jan 1;5:100156. https://doi.org/10.1016/j.caeai.2023.100156

[6] Ayanwale MA, Sanusi IT, Adelana OP, Aruleba KD, Oyelere SS. Teachers' readiness and intention to teach artificial intelligence in schools. Computers and Education: Artificial Intelligence. 2022 Jan 1;3:100099. https://doi.org/10.1016/j.caeai.2022.100099

[7] Sun Z, Anbarasan M, Praveen Kumar DJ. Design of online intelligent English teaching platform based on artificial intelligence techniques. Computational Intelligence. 2021 Aug;37(3):1166-80. https://doi.org/10.1111/coin.12351

[8] An X, Chai CS, Li Y, Zhou Y, Shen X, Zheng C, Chen M. Modeling English teachers' behavioral intention to use artificial intelligence in middle schools. Education and Information Technologies. 2023 May;28(5):5187-208. https://doi.org/10.1007/s10639-022-11286-z

[9] Zhang C, Schießl J, Plößl L, Hofmann F, Gläser-Zikuda M. Acceptance of artificial intelligence among pre-service teachers: a multigroup analysis. International Journal of Educational Technology in Higher Education. 2023 Sep 4;20(1):49. https://doi.org/10.1186/s41239-023-00420-7

[10] Chaudhry MA, Kazim E. Artificial Intelligence in Education (AIEd): A high-level academic and industry note 2021. AI and Ethics. 2022 Feb;2(1):157-65. https://doi.org/10.1007/s43681-021-00074-z

[11] Law L. Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review. Computers and Education Open. 2024 Jun 1;6:100174. https://doi.org/10.1016/j.caeo.2024.100174

[12] Barrett A, Pack A. Not quite eye to AI: Student and teacher perspectives on the use of generative artificial intelligence in the writing process. International Journal of Educational Technology in Higher Education. 2023 Nov 10;20(1):59. https://doi.org/10.1186/s41239-023-00427-0

[13] Barua PD, Vicnesh J, Gururajan R, Oh SL, Palmer E, Azizan MM, Kadri NA, Acharya UR. Artificial intelligence enabled personalised assistive tools to enhance education of children with neurodevelopmental disorders-a review. International Journal of Environmental Research and Public Health. 2022 Jan 21;19(3):1192. https://doi.org/10.3390/ijerph19031192

[14] Hwang GJ, Tang KY, Tu YF. How artificial intelligence (AI) supports nursing education: profiling the roles, applications, and trends of AI in nursing education research (1993-2020). Interactive Learning Environments. 2024 Jan 2;32(1):373-92. https://doi.org/10.1080/10494820.2022.2086579

[15] Erduran S, Levrini O. The impact of artificial intelligence on scientific practices: an emergent area of research for science education. International Journal of Science Education. 2024 Dec 11;46(18):1982-9. https://doi.org/10.1080/09500693.2024.2306604

[16] Jaiswal A, Arun CJ. Potential of Artificial Intelligence for transformation of the education system in India. International Journal of Education and Development using Information and Communication Technology. 2021;17(1):142-58.

[17] Al Darayseh A. Acceptance of artificial intelligence in teaching science: Science teachers' perspective. Computers and Education: Artificial Intelligence. 2023 Jan 1;4:100132. https://doi.org/10.1016/j.caeai.2023.100132

[18] Wang T, Lund BD, Marengo A, Pagano A, Mannuru NR, Teel ZA, Pange J. Exploring the potential impact of artificial intelligence (AI) on international students in higher education: Generative AI, chatbots, analytics, and international student success. Applied Sciences. 2023 May 31;13(11):6716. https://doi.org/10.3390/app13116716

[19] Crompton H, Jones MV, Burke D. Affordances and challenges of artificial intelligence in K-12 education: A systematic review. Journal of research on technology in education. 2024 May 3;56(3):248-68. https://doi.org/10.1080/15391523.2022.2121344

[20] Vartiainen H, Tedre M. Using artificial intelligence in craft education: crafting with text-to-image generative models. Digital Creativity. 2023 Jan 2;34(1):1-21. https://doi.org/10.1080/14626268.2023.2174557

[21] Nedungadi P, Tang KY, Raman R. The transformative power of generative artificial intelligence for achieving the sustainable development goal of quality education. Sustainability. 2024 Nov 9;16(22):9779. https://doi.org/10.3390/su16229779

[22] Venter J, Coetzee SA, Schmulian A. Exploring the use of artificial intelligence (AI) in the delivery of effective feedback. Assessment & Evaluation in Higher Education. 2025 May 19;50(4):516-36. https://doi.org/10.1080/02602938.2024.2415649

[23] Rahayu S. The impact of artificial intelligence on education: Opportunities and challenges. Jurnal Educatio FKIP UNMA. 2023 Nov 30;9(4):2132-40.

[24] Okunlaya RO, Syed Abdullah N, Alias RA. Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education. Library Hi Tech. 2022 Dec 8;40(6):1869-92. https://doi.org/10.1108/LHT-07-2021-0242

[25] Gordon M, Daniel M, Ajiboye A, Uraiby H, Xu NY, Bartlett R, Hanson J, Haas M, Spadafore M, Grafton-Clarke C, Gasiea RY. A scoping review of artificial intelligence in medical education: BEME Guide No. 84. Medical Teacher. 2024 Apr 2;46(4):446-70. https://doi.org/10.1080/0142159X.2024.2314198

[26] Malinka K, Peresíni M, Firc A, Hujnák O, Janus F. On the educational impact of chatgpt: Is artificial intelligence ready to obtain a university degree?. InProceedings of the 2023 Conference on Innovation and Technology in Computer Science Education V. 1 2023 Jun 29 (pp. 47-53). https://doi.org/10.1145/3587102.3588827

[27] Grájeda A, Burgos J, Córdova P, Sanjinés A. Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. Cogent Education. 2024 Dec 31;11(1):2287917. https://doi.org/10.1080/2331186X.2024.2378271

[28] Grájeda A, Burgos J, Córdova P, Sanjinés A. Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. Cogent Education. 2024 Dec 31;11(1):2287917. https://doi.org/10.1080/2331186X.2023.2287917

[29] Gašević D, Siemens G, Sadiq S. Empowering learners for the age of artificial intelligence. Computers and education: artificial intelligence. 2023 Jan 1;4:100130. https://doi.org/10.1016/j.caeai.2023.100130

[30] Su J, Zhong Y. Artificial Intelligence (AI) in early childhood education: Curriculum design and future directions. Computers and Education: Artificial Intelligence. 2022 Jan 1;3:100072. https://doi.org/10.1016/j.caeai.2022.100072

[31] Chiu TK. A holistic approach to the design of artificial intelligence (AI) education for K-12 schools. TechTrends. 2021 Sep;65(5):796-807. https://doi.org/10.1007/s11528-021-00637-1

[32] Ouyang F, Zheng L, Jiao P. Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. Education and Information Technologies. 2022 Jul;27(6):7893-925. https://doi.org/10.1007/s10639-022-10925-9

[33] Bewersdorff A, Hartmann C, Hornberger M, Seßler K, Bannert M, Kasneci E, Kasneci G, Zhai X, Nerdel C. Taking the next step with generative artificial intelligence: The transformative role of multimodal large language models in science education. Learning and Individual Differences. 2025 Feb 1;118:102601. https://doi.org/10.1016/j.lindif.2024.102601

[34] Malik AR, Pratiwi Y, Andajani K, Numertayasa IW, Suharti S, Darwis A. Exploring artificial intelligence in academic essay: higher education student's perspective. International Journal of Educational Research Open. 2023 Dec 1;5:100296. https://doi.org/10.1016/j.ijedro.2023.100296

[35] McDonald N, Johri A, Ali A, Collier AH. Generative artificial intelligence in higher education: Evidence from an analysis of institutional policies and guidelines. Computers in Human Behavior: Artificial Humans. 2025 Mar 1;3:100121. https://doi.org/10.1016/j.chbah.2025.100121

[36] Topali P, Ortega-Arranz A, Rodríguez-Triana MJ, Er E, Khalil M, Akçapınar G. Designing human-centered learning analytics and artificial intelligence in education solutions: a systematic literature review. Behaviour & Information Technology. 2025 Mar 16;44(5):1071-98. https://doi.org/10.1080/0144929X.2024.2345295

[37] Tapalova O, Zhiyenbayeva N. Artificial intelligence in education: AIEd for personalised learning pathways. Electronic Journal of e-Learning. 2022;20(5):639-53. https://doi.org/10.34190/ejel.20.5.2597

[38] Alam A. Possibilities and apprehensions in the landscape of artificial intelligence in education. In2021 International conference on computational intelligence and computing applications (ICCICA) 2021 Nov 26 (pp. 1-8). IEEE. https://doi.org/10.1109/ICCICA52458.2021.9697272

[39] Limna P, Jakwatanatham S, Siripipattanakul S, Kaewpuang P, Sriboonruang P. A review of artificial intelligence (AI) in education during the digital era. Advance Knowledge for Executives. 2022 Jul;1(1):1-9.

[40] Doroudi S. The intertwined histories of artificial intelligence and education. International Journal of Artificial Intelligence in Education. 2023 Dec;33(4):885-928. https://doi.org/10.1007/s40593-022-00313-2

[41] Nguyen A, Ngo HN, Hong Y, Dang B, Nguyen BP. Ethical principles for artificial intelligence in education. Education and information technologies. 2023 Apr;28(4):4221-41. https://doi.org/10.1007/s10639-022-11316-w

[42] Zhao Y. Artificial intelligence and education: End the grammar of schooling. ECNU Review of Education. 2025 Mar;8(1):3-20. https://doi.org/10.1177/20965311241265124

[43] Charow R, Jeyakumar T, Younus S, Dolatabadi E, Salhia M, Al-Mouaswas D, Anderson M, Balakumar S, Clare M, Dhalla A, Gillan C. Artificial intelligence education programs for health care professionals: scoping review. JMIR Medical Education. 2021 Dec 13;7(4):e31043. https://doi.org/10.2196/31043

[44] Karaca O, Çalışkan SA, Demir K. Medical artificial intelligence readiness scale for medical students (MAIRS-MS)-development, validity and reliability study. BMC medical education. 2021 Feb 18;21(1):112. https://doi.org/10.1186/s12909-021-02546-6

[45] Biagini G. Towards an AI-Literate Future: A systematic literature review exploring education, ethics, and applications. International Journal of Artificial Intelligence in Education. 2025 Mar 12:1-51.

[46] Cope B, Kalantzis M, Searsmith D. Artificial intelligence for education: Knowledge and its assessment in AI-enabled learning ecologies. Educational philosophy and theory. 2021 Oct 15;53(12):1229-45. https://doi.org/10.1080/00131857.2020.1728732

[47] Lee HS, Lee J. Applying artificial intelligence in physical education and future perspectives. Sustainability. 2021 Jan 2;13(1):351. https://doi.org/10.3390/su13010351

[48] Kong SC, Yang Y, Hou C. Examining teachers' behavioural intention of using generative artificial intelligence tools for teaching and learning based on the extended technology acceptance model. Computers and Education: Artificial Intelligence. 2024 Dec 1;7:100328. https://doi.org/10.1016/j.caeai.2024.100328

[49] Morales-García WC, Sairitupa-Sanchez LZ, Morales-García SB, Morales-García M. Development and validation of a scale for dependence on artificial intelligence in university students. InFrontiers in Education 2024 Mar 12 (Vol. 9, p. 1323898). Frontiers Media SA. https://doi.org/10.3389/feduc.2024.1323898

[50] Singh SV, Hiran KK. The impact of AI on teaching and learning in higher education technology. Journal of Higher Education Theory & Practice. 2022 Oct 1;12(13). https://doi.org/10.33423/jhetp.v22i13.5514

[51] Khan B, Fatima H, Qureshi A, Kumar S, Hanan A, Hussain J, Abdullah S. Drawbacks of artificial intelligence and their potential solutions in the healthcare sector. Biomedical Materials & Devices. 2023 Sep;1(2):731-8. https://doi.org/10.1007/s44174-023-00063-2

[52] Crawford J, Cowling M, Allen KA. Leadership is needed for ethical ChatGPT: Character, assessment, and learning using artificial intelligence (AI). Journal of University Teaching and Learning Practice. 2023 Apr;20(3):1-9. https://doi.org/10.53761/1.20.3.02

[53] Chiu TK, Moorhouse BL, Chai CS, Ismailov M. Teacher support and student motivation to learn with Artificial Intelligence (AI) based chatbot. Interactive Learning Environments. 2024 Aug 8;32(7):3240-56. https://doi.org/10.1080/10494820.2023.2172044

[54] Singh SV, Hiran KK. The impact of AI on teaching and learning in higher education technology. Journal of Higher Education Theory & Practice. 2022 Oct 1;12(13). https://doi.org/10.33423/jhetp.v22i13.5514

[55] Wang C, Boerman SC, Kroon AC, Möller J, H de Vreese C. The artificial intelligence divide: Who is the most vulnerable?. New Media & Society. 2025 Jul;27(7):3867-89. https://doi.org/10.1177/14614448241232345

[56] Nguyen HM, Goto D. Unmasking academic cheating behavior in the artificial intelligence era: Evidence from Vietnamese undergraduates. Education and Information Technologies. 2024 Aug;29(12):15999-6025. https://doi.org/10.1007/s10639-024-12495-4

[57] Kong SC, Yang Y, Hou C. Examining teachers' behavioural intention of using generative artificial intelligence tools for teaching and learning based on the extended technology acceptance model. Computers and Education: Artificial Intelligence. 2024 Dec 1;7:100328. https://doi.org/10.1016/j.caeai.2024.100328

[58] Morales-García WC, Sairitupa-Sanchez LZ, Morales-García SB, Morales-García M. Development and validation of a scale for dependence on artificial intelligence in university students. InFrontiers in Education 2024 Mar 12 (Vol. 9, p. 1323898). Frontiers Media SA. https://doi.org/10.3389/feduc.2024.1323898

[59] Hockly N. Artificial intelligence in English language teaching: The good, the bad and the ugly. Relc Journal. 2023 Aug;54(2):445-51. https://doi.org/10.1177/00336882231168504

[60] Dai CP, Ke F. Educational applications of artificial intelligence in simulation-based learning: A systematic mapping review. Computers and Education: Artificial Intelligence. 2022 Jan 1;3:100087. https://doi.org/10.1016/j.caeai.2022.100087

[61] Chiu TK, Ahmad Z, Ismailov M, Sanusi IT. What are artificial intelligence literacy and competency? A comprehensive framework to support them. Computers and Education Open. 2024 Jun 1;6:100171. https://doi.org/10.1016/j.caeo.2024.100171

[62] Nazari N, Shabbir MS, Setiawan R. Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial. Heliyon. 2021 May 1;7(5). https://doi.org/10.1016/j.heliyon.2021.e07014

[63] Liang JC, Hwang GJ, Chen MR, Darmawansah D. Roles and research foci of artificial intelligence in language education: An integrated bibliographic analysis and systematic review approach. Interactive Learning Environments. 2023 Oct 3;31(7):4270-96. https://doi.org/10.1080/10494820.2021.1958348

[64] Memarian B, Doleck T. Fairness, Accountability, Transparency, and Ethics (FATE) in Artificial Intelligence (AI) and higher education: A systematic review. Computers and Education: Artificial Intelligence. 2023 Jan 1;5:100152. https://doi.org/10.1016/j.caeai.2023.100152

[65] Chounta IA, Bardone E, Raudsep A, Pedaste M. Exploring teachers' perceptions of artificial intelligence as a tool to support their practice in Estonian K-12 education. International journal of artificial intelligence in education. 2022 Sep;32(3):725-55. https://doi.org/10.1007/s40593-021-00243-5

[66] Yu L, Yu Z. Qualitative and quantitative analyses of artificial intelligence ethics in education using VOSviewer and CitNetExplorer. Frontiers in Psychology. 2023 Mar 9;14:1061778. https://doi.org/10.3389/fpsyg.2023.1061778

[67] Fuchs K, Aguilos V. Integrating artificial intelligence in higher education: Empirical insights from students about using ChatGPT. International Journal of Information and Education Technology. 2023 Sep;13(9):1365-71. https://doi.org/10.18178/ijiet.2023.13.9.1939

[68] Thurzo A, Strunga M, Urban R, Surovková J, Afrashtehfar KI. Impact of artificial intelligence on dental education: a review and guide for curriculum update. Education Sciences. 2023 Jan 31;13(2):150. https://doi.org/10.3390/educsci13020150

[69] Johnston H, Wells RF, Shanks EM, Boey T, Parsons BN. Student perspectives on the use of generative artificial intelligence technologies in higher education. International Journal for Educational Integrity. 2024 Feb 8;20(1):2. https://doi.org/10.1007/s40979-024-00149-4

[70] Sabri H, Saleh MH, Hazrati P, Merchant K, Misch J, Kumar PS, Wang HL, Barootchi S. Performance of three artificial intelligence (AI)-based large language models in standardized testing; implications for AI-assisted dental education. Journal of periodontal research. 2025 Feb;60(2):121-33. https://doi.org/10.1111/jre.13323

[71] Kamila MK, Jasrotia SS. Ethical issues in the development of artificial intelligence: recognizing the risks. International Journal of Ethics and Systems. 2025 Jan 30;41(1):45-63. https://doi.org/10.1108/IJOES-05-2023-0107

[72] Nemorin S, Vlachidis A, Ayerakwa HM, Andriotis P. AI hyped? A horizon scan of discourse on artificial intelligence in education (AIED) and development. Learning, Media and Technology. 2023 Jan 2;48(1):38-51. https://doi.org/10.1080/17439884.2022.2095568

[73] Ahmad SF, Rahmat MK, Mubarik MS, Alam MM, Hyder SI. Artificial intelligence and its role in education. Sustainability. 2021 Nov 22;13(22):12902. https://doi.org/10.3390/su132212902

[74] Owan VJ, Abang KB, Idika DO, Etta EO, Bassey BA. Exploring the potential of artificial intelligence tools in educational measurement and assessment. Eurasia journal of mathematics, science and technology education. 2023 Aug 1;19(8):em2307. https://doi.org/10.29333/ejmste/13428

[75] Ahmad SF, Alam MM, Rahmat MK, Mubarik MS, Hyder SI. Academic and administrative role of artificial intelligence in education. Sustainability. 2022 Jan 19;14(3):1101. https://doi.org/10.3390/su14031101

[76] Mao J, Chen B, Liu JC. Generative artificial intelligence in education and its implications for assessment. TechTrends. 2024 Jan;68(1):58-66. https://doi.org/10.1007/s11528-023-00911-4

[77] Shidiq M. The use of artificial intelligence-based chat-gpt and its challenges for the world of education; from the viewpoint of the development of creative writing skills. InProceeding of international conference on education, society and humanity 2023 May 30 (Vol. 1, No. 1, pp. 353-357).

[78] Alqahtani N, Wafula Z. Artificial intelligence integration: Pedagogical strategies and policies at leading universities. Innovative Higher Education. 2025 Apr;50(2):665-84. https://doi.org/10.1007/s10755-024-09749-x

[79] Hardaker G, Glenn LE. Artificial intelligence for personalized learning: a systematic literature review. The International Journal of Information and Learning Technology. 2025 Jan 13;42(1):1-4. https://doi.org/10.1108/IJILT-07-2024-0160

[80] Gligorea I, Cioca M, Oancea R, Gorski AT, Gorski H, Tudorache P. Adaptive learning using artificial intelligence in e-learning: A literature review. Education Sciences. 2023 Dec 6;13(12):1216. https://doi.org/10.3390/educsci13121216

[81] Sperling K, Stenberg CJ, McGrath C, Åkerfeldt A, Heintz F, Stenliden L. In search of artificial intelligence (AI) literacy in teacher education: A scoping review. Computers and Education Open. 2024 Jun 1;6:100169. https://doi.org/10.1016/j.caeo.2024.100169

[82] Al-Mamary YH, Alfalah AA, Shamsuddin A, Abubakar AA. Artificial intelligence powering education: ChatGPT's impact on students' academic performance through the lens of technology-to-performance chain theory. Journal of Applied Research in Higher Education. 2025 Oct 14;17(5):1661-79. https://doi.org/10.1108/JARHE-04-2024-0179

[83] Rahiman HU, Kodikal R. Revolutionizing education: Artificial intelligence empowered learning in higher education. Cogent Education. 2024 Dec 31;11(1):2293431. https://doi.org/10.1080/2331186X.2023.2293431

[84] Su J, Yang W. Artificial intelligence in early childhood education: A scoping review. Computers and Education: Artificial Intelligence. 2022 Jan 1;3:100049. https://doi.org/10.1016/j.caeai.2022.100049

[85] Zadorina O, Hurskaya V, Sobolyeva S, Grekova L, Vasylyuk-Zaitseva S. The role of artificial intelligence in creation of future education: Possibilities and challenges. Futurity Education. 2024 Apr 30;4(2):163-85.

[86] Huang X, Zou D, Cheng G, Chen X, Xie H. Trends, research issues and applications of artificial intelligence in language education. Educational Technology & Society. 2023 Jan 1;26(1):112-31.

[87] Boscardin CK, Gin B, Golde PB, Hauer KE. ChatGPT and generative artificial intelligence for medical education: potential impact and opportunity. Academic Medicine. 2024 Jan 1;99(1):22-7. https://doi.org/10.1097/ACM.0000000000005439

[88] Hanna MG, Pantanowitz L, Dash R, Harrison JH, Deebajah M, Pantanowitz J, Rashidi HH. Future of artificial intelligence (AI)-machine learning (ML) trends in pathology and medicine. Modern Pathology. 2025 Jan 4:100705. https://doi.org/10.1016/j.modpat.2025.100705

[89] Alier M, Pereira J, Garcia-Penalvo FJ, Casan MJ, Cabre J. LAMB: An open-source software framework to create artificial intelligence assistants deployed and integrated into learning management systems. Computer Standards & Interfaces. 2025 Mar 1;92:103940. https://doi.org/10.1016/j.csi.2024.103940

[90] Preiksaitis C, Rose C. Opportunities, challenges, and future directions of generative artificial intelligence in medical education: scoping review. JMIR medical education. 2023 Oct 20;9:e48785. https://doi.org/10.2196/48785

[91] Pisica AI, Edu T, Zaharia RM, Zaharia R. Implementing artificial intelligence in higher education: Pros and cons from the perspectives of academics. Societies. 2023 May 5;13(5):118. https://doi.org/10.3390/soc13050118

[92] Nikolopoulou K. Generative artificial intelligence in higher education: Exploring ways of harnessing pedagogical practices with the assistance of ChatGPT. International Journal of Changes in Education. 2024 Apr 1;1(2):103-11. https://doi.org/10.47852/bonviewIJCE42022489

[93] Zouhaier S. The impact of artificial intelligence on higher education: An empirical study. European Journal of Educational Sciences. 2023;10(1):17-33. https://doi.org/10.19044/ejes.v10no1a24

[94] Kong SC, Yang Y, Hou C. Examining teachers' behavioural intention of using generative artificial intelligence tools for teaching and learning based on the extended technology acceptance model. Computers and Education: Artificial Intelligence. 2024 Dec 1;7:100328. https://doi.org/10.1016/j.caeai.2024.100328

[95] Morales-García WC, Sairitupa-Sanchez LZ, Morales-García SB, Morales-García M. Development and validation of a scale for dependence on artificial intelligence in university students. InFrontiers in Education 2024 Mar 12 (Vol. 9, p. 1323898). Frontiers Media SA. https://doi.org/10.3389/feduc.2024.1323898

[96] Nguyen HM, Goto D. Unmasking academic cheating behavior in the artificial intelligence era: Evidence from Vietnamese undergraduates. Education and Information Technologies. 2024 Aug;29(12):15999-6025. https://doi.org/10.1007/s10639-024-12495-4

[97] Mir MM, Mir GM, Raina NT, Mir SM, Mir SM, Miskeen E, Alharthi MH, Alamri MM. Application of artificial intelligence in medical education: current scenario and future perspectives. Journal of advances in medical education & professionalism. 2023 Jul;11(3):133.

[98] McGrath C, Pargman TC, Juth N, Palmgren PJ. University teachers' perceptions of responsibility and artificial intelligence in higher education-An experimental philosophical study. Computers and Education: Artificial Intelligence. 2023 Jan 1;4:100139. https://doi.org/10.1016/j.caeai.2023.100139

[99] Laupichler MC, Aster A, Schirch J, Raupach T. Artificial intelligence literacy in higher and adult education: A scoping literature review. Computers and Education: Artificial Intelligence. 2022 Jan 1;3:100101. https://doi.org/10.1016/j.caeai.2022.100101

[100] Alqahtani T, Badreldin HA, Alrashed M, Alshaya AI, Alghamdi SS, Bin Saleh K, Alowais SA, Alshaya OA, Rahman I, Al Yami MS, Albekairy AM. The emergent role of artificial intelligence, natural learning processing, and large language models in higher education and research. Research in social and administrative pharmacy. 2023 Aug 1;19(8):1236-42. https://doi.org/10.1016/j.sapharm.2023.05.016

[101] Slimi Z, Carballido BV. Navigating the Ethical Challenges of Artificial Intelligence in Higher Education: An Analysis of Seven Global AI Ethics Policies. TEM journal. 2023 May 1;12(2). https://doi.org/10.18421/TEM122-02

[102] Bond M, Khosravi H, De Laat M, Bergdahl N, Negrea V, Oxley E, Pham P, Chong SW, Siemens G. 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. 2024 Jan 19;21(1):4. https://doi.org/10.1186/s41239-023-00436-z

[103] González-Calatayud V, Prendes-Espinosa P, Roig-Vila R. Artificial intelligence for student assessment: A systematic review. Applied sciences. 2021 Jun 12;11(12):5467. https://doi.org/10.3390/app11125467

[104] Lee J, Wu AS, Li D, Kulasegaram KM. Artificial intelligence in undergraduate medical education: a scoping review. Academic Medicine. 2021 Nov 1;96(11S):S62-70. https://doi.org/10.1097/ACM.0000000000004291

[105] Zhai X, Chu X, Chai CS, Jong MS, Istenic A, Spector M, Liu JB, Yuan J, Li Y. A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. Complexity. 2021;2021(1):8812542. https://doi.org/10.1155/2021/8812542

[106] Stolpe K, Hallström J. Artificial intelligence literacy for technology education. Computers and Education Open. 2024 Jun 1;6:100159. https://doi.org/10.1016/j.caeo.2024.100159

[107] Huang L. Ethics of artificial intelligence in education: Student privacy and data protection. Science Insights Education Frontiers. 2023 Jun 30;16(2):2577-87. https://doi.org/10.15354/sief.23.re202

[108] Park W, Kwon H. Implementing artificial intelligence education for middle school technology education in Republic of Korea. International journal of technology and design education. 2024 Mar;34(1):109-35. https://doi.org/10.1007/s10798-023-09812-2

[109] Tedre M, Toivonen T, Kahila J, Vartiainen H, Valtonen T, Jormanainen I, Pears A. Teaching machine learning in K-12 classroom: Pedagogical and technological trajectories for artificial intelligence education. IEEE access. 2021 Jul 19;9:110558-72. https://doi.org/10.1109/ACCESS.2021.3097962

[110] Shahzad MF, Xu S, Asif M. Factors affecting generative artificial intelligence, such as ChatGPT, use in higher education: An application of technology acceptance model. British Educational Research Journal. 2025 Apr;51(2):489-513. https://doi.org/10.1002/berj.4084

[111] Kong SC, Korte SM, Burton S, Keskitalo P, Turunen T, Smith D, Wang L, Lee JC, Beaton MC. Artificial Intelligence (AI) literacy-an argument for AI literacy in education. Innovations in education and teaching international. 2025 Mar 4;62(2):477-83. https://doi.org/10.1080/14703297.2024.2332744

[112] Saatchi SG, Wahed MK, Alqaraleh MK, Al-Shorman HM, Alanazi T, Alka'awneh SM, Alzboon MS, Al-Momani AA, Shelash SI, Alzyoud M. The influence of compatibility on the acceptance of artificial intelligence in Kuwaiti universities. InIntelligence-Driven Circular Economy: Regeneration Towards Sustainability and Social Responsibility-Volume 1 2025 Jul 24 (pp. 103-117). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-73899-9_9

[113] Wang S, Wang F, Zhu Z, Wang J, Tran T, Du Z. Artificial intelligence in education: A systematic literature review. Expert Systems with Applications. 2024 Oct 15;252:124167. https://doi.org/10.1016/j.eswa.2024.124167

[114] Choudhary OP, Infant SS, Chopra H, Manuta N. Exploring the potential and limitations of artificial intelligence in animal anatomy. Annals of Anatomy-Anatomischer Anzeiger. 2025 Feb 1;258:152366. https://doi.org/10.1016/j.aanat.2024.152366

[115] Xia Q, Chiu TK, Lee M, Sanusi IT, Dai Y, Chai CS. A self-determination theory (SDT) design approach for inclusive and diverse artificial intelligence (AI) education. Computers & education. 2022 Nov 1;189:104582. https://doi.org/10.1016/j.compedu.2022.104582

[116] Lodge JM, Thompson K, Corrin L. Mapping out a research agenda for generative artificial intelligence in tertiary education. Australasian Journal of Educational Technology. 2023 May 4;39(1):1-8. https://doi.org/10.14742/ajet.8695

[117] Yang SJ, Ogata H, Matsui T, Chen NS. Human-centered artificial intelligence in education: Seeing the invisible through the visible. Computers and Education: Artificial Intelligence. 2021 Jan 1;2:100008. https://doi.org/10.1016/j.caeai.2021.100008

[118] Hopcan S, Polat E, Ozturk ME, Ozturk L. Artificial intelligence in special education: A systematic review. Interactive Learning Environments. 2023 Dec 15;31(10):7335-53. https://doi.org/10.1080/10494820.2022.2067186

[119] Alotaibi NS, Alshehri AH. Prospers and obstacles in using artificial intelligence in Saudi Arabia higher education institutions-The potential of AI-based learning outcomes. Sustainability. 2023 Jul 7;15(13):10723. https://doi.org/10.3390/su151310723

[120] Alam A. A digital game based learning approach for effective curriculum transaction for teaching-learning of artificial intelligence and machine learning. In2022 international conference on sustainable computing and data communication systems (ICSCDS) 2022 Apr 7 (pp. 69-74). IEEE. https://doi.org/10.1109/ICSCDS53736.2022.9760932