

Structure, Objectives, and Operational Framework for Ethical Integration of Artificial Intelligence in Educational

Ashish K Saxena

<https://orcid.org/0009-0002-1647-9266>

Valeria García

San Diego University for Integrative Studies

Dr. Md. Ruhul Amin

Associate Professor, Dept. of Public administration, Comilla University, Kotbari, Comilla
Bangladesh.

Juan Manuel Rojas Salazar

Engineer and social media researcher, juanmasalazar.com

Dr. Sanjay Dey

Assistant Professor

Department of Zoology

Ananda Mohan College, Kolkata

ABSTRACT

The rapid advancement of Artificial Intelligence (AI) technologies offers unprecedented opportunities for enhancing education but also raises complex ethical concerns. This study introduces the Ethical Observatory for AI in Education, an initiative aimed at addressing these challenges. Through a multidisciplinary approach, the observatory seeks to develop comprehensive ethical guidelines and policy frameworks for AI integration in educational settings, ensuring alignment with core educational values and societal expectations. The observatory aims to promote the ethical development and application of AI technologies in education by fostering an informed dialogue among educators, policymakers, and technologists. This work contributes to the field by outlining the structure, objectives, and operational framework of the Ethical Observatory, providing a strategic guide for stakeholders towards the responsible use of AI in education. The establishment of the observatory highlights the importance of ethical considerations in technological integration and sets a precedent for future research and policy development in the domain, aiming to ensure that AI enhances educational equity, inclusivity, and outcomes.

I. INTRODUCTION

The evolution of technology's integration into the educational domain has been a continuum of progressive innovations and transformative breakthroughs. Historically, each technological advent, from the introduction of the overhead projector to the universal adoption of personal computers, has significantly altered the pedagogical side offering novel methods to facilitate learning [1], [2]. The latter part of the 20th century marked a transition with the advent of the Internet, catalyzing an era characterized by unprecedented accessibility to information and the proliferation of digital learning platforms [3], [4]. This era transcended traditional geographical and temporal constraints beginning a new paradigm in education.

In the recent times, Artificial Intelligence (AI) has surfaced as a seminal force within the educational sphere, propelled by an amalgamation of advanced computational capabilities, the accessibility of extensive data repositories, and sophisticated refinements in machine learning algorithms [5]. The rise of AI within

educational contexts is distinguished by its capacity to tailor learning experiences to individual needs, streamline operations within educational administrations, and refine the methodologies employed in instruction [6], [7]. Far surpassing the mere automation, AI heralds a future envisioned with intelligent systems synergistically collaborating with educators, aiming to substantially enhance learning outcomes. [8]. The exploration and integration of Artificial Intelligence (AI) within the educational sector represent a seminal shift in how teaching and learning processes are perceived and enacted. This digital renaissance, powered by AI is making education more accessible, personalized, and efficient. AI's role transcends traditional boundaries, enabling the creation of adaptive learning environments that respond to the unique needs of each student [9]. Such environments not only cater to individual learning styles and paces but also provide educators with valuable insights into student progress and challenges, thus empowering them to tailor their teaching strategies more effectively [10], [11]. Moreover, AI's predictive capabilities offer unprecedented opportunities for identifying potential learning gaps and interventions, ensuring that all students have the support they need to succeed. As AI continues to evolve, its potential to transform education into a more inclusive, engaging, and learner-centered experience becomes increasingly apparent, heralding a new era of educational excellence and innovation.

This work contributes to the field of education through the establishment of an Ethical Observatory for AI in Education, pioneering a comprehensive framework that addresses the integration and ethical management of Artificial Intelligence (AI) within educational settings. This study argued for the importance of aligning AI applications with ethical principles, inclusivity, and privacy standards by advancing the discourse on ethical AI use, promoting a multidisciplinary approach, and facilitating the responsible integration of AI technologies. It highlights the possibility of AI to enhance educational equity and accessibility, offering a strategic guide for educational institutions to leverage technology effectively..

II. LITERATURE REVIEW

The integration of Artificial Intelligence (AI) into online learning environments has been a significant step forward in the quest to enhance educational experiences. AI has offered promises of efficiency, adaptability, and a level of personalization that was previously unattainable. However, the ethical implications of AI deployment raise serious considerations that must be addressed [12]–[16].

The work by Joan Casas-Roma and Jordi Conesa delves into the ethical challenges at the intersection of AI and online learning, emphasizing the importance of ethical design to ensure that online learning remains accessible, inclusive, and beneficial to society. Their findings serve as a cornerstone for this literature review, which aims to synthesize ethical considerations within the broader context of AI in education [17]. In [18], Lijia Chen et al. explore the role of AI in education, highlighting its significant adoption in various forms, from computer technologies to humanoid robots and web-based chatbots. This seminal study provides a qualitative analysis of AI's capabilities in enhancing administrative efficiency and pedagogical effectiveness. The authors' findings underscore AI's potential in customizing learning experiences to student needs, thereby fostering enhanced engagement and retention. In contrast, the study [19], by Ashraf Alam questions the potential replacement of human instructors with AI-driven systems. Alam's exploration is

founded on the premise that while AI has been widely adopted in educational institutions, its integration raises fundamental questions about the future role of educators and the nature of learning itself. This study challenges us to consider the balance between human and artificial educators and the implications for the learning journey. The practical application of AI in education is exemplified in [20], by Y. Takahashi et al.. Their investigation into the use of a biped robot as a teaching tool in university settings illustrates the hands-on potential of AI to provide tangible, interactive learning experiences, further underscoring the practical utility of AI in educational settings.

The ethical considerations brought forth by Casas-Roma and Conesa are further contextualized by these studies, which collectively present a multi-faceted view of AI in education. From enhancing learning outcomes to potentially replacing traditional teaching methodologies, AI's role in education is both transformative and fraught with ethical dilemmas. In parallel, the technological advancements that underpin AI's capabilities in education can be analogized to the development of graphene, as discussed by Andre K. Geim and Konstantin S. Novoselov. Just as graphene's discovery represented a breakthrough with wide-ranging applications and ethical considerations in material science, AI represents a similar paradigm shift within the of educational technology. While there are growing concerns regarding AI's role in education there are some positive sign too which has also been discussed in the literature too.

AI has significantly contributed to personalizing the learning experience, enabling adaptive learning systems that tailor educational content to meet individual learners' needs. These systems enhance student engagement, motivation, and learning outcomes by providing personalized feedback and support. AI-driven tools like intelligent tutoring systems and adaptive learning platforms have been instrumental in creating more effective and individualized learning paths [18]. AI applications in educational administration have streamlined various administrative tasks, such as grading and student assessments, thereby allowing educators to focus more on teaching and less on time-consuming administrative duties. These advancements have not only improved operational efficiency but have also contributed to more timely and personalized feedback for students, enhancing the educational process's overall quality [21].

III. EMERGENT AI TECHNOLOGIES IN EDUCATION

A. Emerging AI Technologies

New developments in machine learning algorithms, natural language processing (NLP), and predictive analytics have paved the way for effective educational tools and platforms. These technologies have the potential to augment administrative tasks, refine instructional methods, and deepen the personalization of learning experiences.

a. Advanced Machine Learning Algorithms

Contemporary machine learning algorithms have evolved to include deep learning networks that can parse and analyze complex data sets with unprecedented depth. In the educational context, these algorithms enable the development of models that can predict student performance, tailor learning pathways, and provide real-time feedback to both students and educators. For example, convolutional neural networks

(CNNs) are being employed to interpret student-written responses, allowing for more sophisticated assessment of free-form answers and essays. Recurrent neural networks (RNNs), known for their sequence prediction capabilities, are used to anticipate a student’s future learning needs and potential knowledge gaps by analyzing their learning patterns over time.

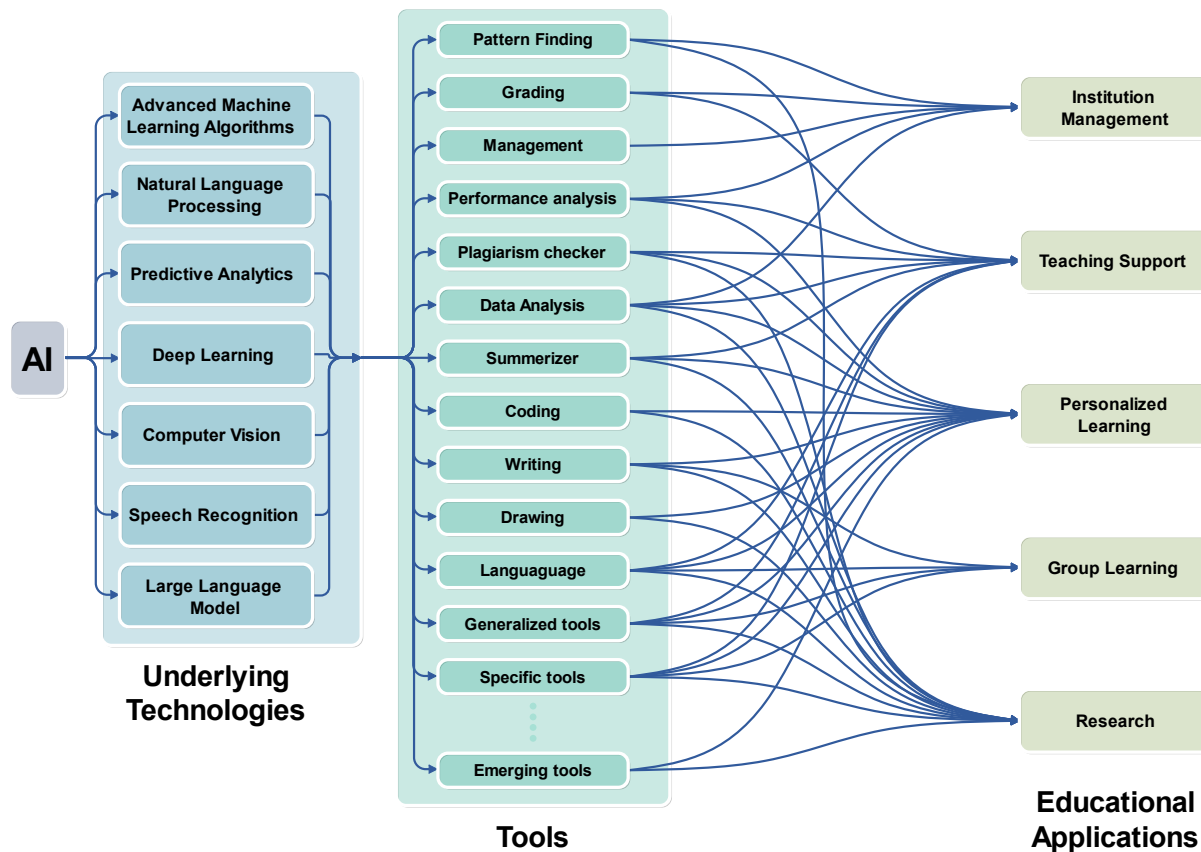


Figure 1. Technologies, tools and applications of AI in Education

b. Natural Language Processing (NLP)

NLP has seen notable advancements in sentiment analysis and language understanding, which can be harnessed to enhance communication between students and educational software. Chatbots powered by advanced NLP can engage in more natural and productive dialogues, assist in resolving student queries, and provide tutoring services. Moreover, the latest NLP models, trained on extensive educational corpora, are adept at interpreting and generating language that aligns with the academic context.

c. Predictive Analytics

Predictive analytics in education uses historical data and statistical algorithms to forecast future trends and outcomes. Educational platforms can anticipate a student’s future performance and learning trajectories, enabling preemptive interventions. This can be transformative in identifying students who are at risk of falling behind, allowing educators to offer targeted support to those who need it most. AI-driven predictive analytics can optimize the allocation of resources within educational institutions, predicting enrollment

trends, and future demand for courses. This not only enhances administrative efficiency but also ensures that institutions can adaptively respond to the evolving educational sector.

B. Applications of AI Technologies in Education and Associated Tools

Table 1. Applications of AI Technologies in Education and Associated Tools

Technology	Tools	Description
Adaptive Learning Platforms	DreamBox Learning, Smart Sparrow	Platforms that adapt to the learner's abilities and personalize the learning experience.
Automated Grading Systems	Turnitin's Gradescope, Knewton	Systems that automate grading, provide consistent feedback, and reduce administrative burden.
Intelligent Tutoring Systems	Carnegie Learning, ALEKS	Personalized instruction systems that simulate one-on-one tutoring for various subjects.
Chatbots and Virtual Assistants	Duolingo, Jill Watson	Interactive programs that offer language education and assist in student queries using natural language.
Learning Analytics Tools	Brightspace Insights, Socrative	Tools that utilize real-time data to assess learning and assist educators in student retention strategies.
Content Creation and Curation Tools	Quillionz, Content Technologies, Inc. (CTI)	AI-driven systems for creating customized quizzes, learning materials, and assessments.
Language Processing Tools	Grammarly, VoiceThread	Writing assistants and engagement tools that improve language learning and discussion through NLP.
Predictive Analytics in Student Information Systems	IBM Watson Education, Civitas Learning	Systems that use data analytics to improve educational outcomes and institutional decision-making.

C. Impact on Education Administration

Recent advancements in Artificial Intelligence (AI) have the potential to significantly transform the administrative aspects of education by automating mundane tasks, facilitating data-driven decision-making processes, and enhancing overall operational efficiency. Expanding upon the conclusions drawn in the initial research, this analysis examines the implications of modern AI technologies and presents a structured framework for their incorporation into educational administrative practices.

a. **Streamlining with Advanced AI:**

AI advancements now encompass deep learning algorithms capable of processing and analyzing vast quantities of unstructured data. Natural Language Processing (NLP) technologies can interpret student feedback or academic publications to discern patterns and sentiment, while AI-driven predictive analytics can forecast enrollment trends and student performance with high accuracy.

- **Automated Routine Operations:** The use of AI for scheduling, resource allocation, and attendance tracking minimizes human error and frees up valuable time for staff.
- **Enhanced Data Management:** AI systems with machine learning capabilities can sift through student data to identify at-risk students, enabling early interventions.
- **Intelligent Assistance:** AI-powered chatbots can provide immediate responses to common student and staff queries regarding administrative matters, reducing workload on staff.

b. **A Framework for AI Integration in Administrative Processes:**

The proposed AI integration framework contains the principles of Efficiency, Scalability, Transparency, and Personalization (ESTP).

- **Efficiency:**
 - Adopt AI tools for automating data entry, processing financial transactions, and managing records.
 - Implement AI-driven analytics for real-time monitoring of administrative tasks, resource utilization, and institutional performance metrics.
- **Scalability:**
 - Design systems that adapt to fluctuating data volumes and evolving administrative needs.
 - Ensure AI tools can integrate seamlessly with existing software and databases, and are scalable to accommodate growth.
- **Transparency:**
 - Maintain an AI audit trail for administrative decisions to ensure accountability and transparency.
 - Develop clear policies around AI use, data privacy, and ethical considerations, ensuring stakeholders are informed and regulations are complied with.
- **Personalization:**
 - Use AI to tailor communication and services to individual student and staff needs.
 - Harness predictive analytics to support personalized learning pathways and career guidance, impacting student success and institutional reputation.

c. **Operationalizing the Framework:**

The operationalization involves a multi-phased approach: assessment, implementation, monitoring, and refinement.

- **Assessment Phase:**

- Conduct a thorough review of existing administrative processes to identify potential areas for AI integration.
- Evaluate the readiness of the institution for AI adoption in terms of infrastructure, staff competencies, and financial resources.
- **Implementation Phase:**
 - Begin with AI applications that offer quick wins in terms of cost savings and efficiency gains.
 - Engage cross-functional teams to facilitate a smooth AI adoption process across administrative functions.
- **Monitoring Phase:**
 - Regularly monitor AI performance against key performance indicators (KPIs) to ensure they align with the institutional goals.
 - Establish feedback mechanisms to collect responses from system users for continuous improvement.
- **Refinement Phase:**
 - Analyze feedback and performance data to identify any issues or areas for improvement.
 - Update AI systems and processes iteratively to adapt to changing administrative demands and educational sector.

D. Influence on Instructional Quality

Artificial Intelligence's footprint in educational pedagogy has markedly deepened, largely facilitating dynamic curriculum development, crafting real-time feedback mechanisms, and fostering highly interactive learning environments. AI's ever-evolving capabilities have endowed educational content with a remarkable adaptability, enabling personalized learning pathways that adjust in real-time to student performance and engagement levels. AI-driven systems are now adept at analyzing student data to dynamically adjust curricula, ensuring that instructional content not only aligns with individual learning styles and paces but also addresses knowledge gaps as they emerge. Intelligent tutoring systems harnessing machine learning algorithms have expanded beyond mere drill-and-practice tools to become sophisticated pedagogical agents. These systems offer nuanced feedback that mirrors the scaffolding a human instructor might provide, but with the added benefit of consistent, round-the-clock availability.

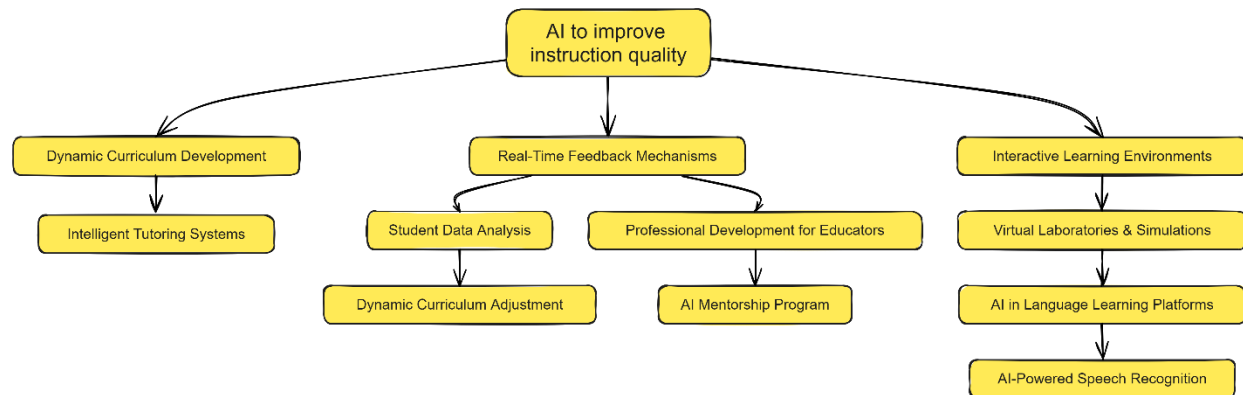


Figure 2. AI use cases to improve instruction quality

Moreover, AI's role in cultivating interactive learning environments has been transformative. Virtual laboratories and simulations powered by AI create immersive experiences that allow students to experiment, engage with complex concepts, and receive immediate feedback, all within a controlled, risk-free virtual setting. For instance, in a hypothetical scenario, an AI-enhanced biology program might simulate lab environments, guiding students through dissections with step-by-step instructions, offering corrective suggestions, and personalizing subsequent tasks based on student performance. A case in point is the integration of AI in language learning platforms post-original study, where NLP technologies have greatly enhanced linguistic acquisition. These platforms, such as those utilizing AI-powered speech recognition, enable learners to practice pronunciation, receive instant corrective feedback, and engage in interactive dialogues that would be logistically challenging in a traditional classroom setting. AI's influence on instructional quality is also evident in the professional development for educators. AI analytics have enabled the creation of tailored professional learning plans and resources, pushing the boundaries of teacher readiness and instructional expertise. For instance, an AI mentorship program could analyze classroom interactions and provide educators with data-driven insights and recommendations for instructional strategies tailored to their unique student demographics.

E. Enhancement of Learning Experience

The advent of Artificial Intelligence (AI) in education caused shift towards personalized learning trajectories, fundamentally redefining the learning experience to cater to the diverse needs and accessibility requirements of individual learners. Educational technologies are capable of offering highly tailored educational content, thereby addressing the unique learning pace, style, and challenges faced by each student. This section explores the analytical dimensions of how AI-enabled personalization acts as a conduit for creating more inclusive and adaptive learning environments, narrowing educational disparities. The essence of AI's contribution to personalized learning lies in its ability to analyze vast datasets concerning learner interactions, performance metrics, and feedback loops. Through sophisticated algorithms, AI identifies patterns and learning gaps, enabling the deployment of customized content and resources that align with the learner's current knowledge state and learning objectives. Such a dynamic approach not only optimizes the learning process for efficiency and effectiveness but also fosters a sense of agency and engagement among learners. Furthermore, the analytical prowess of AI extends to the identification of

learning barriers, including those stemming from disabilities or socio-economic constraints. AI integrates accessibility features such as speech-to-text for hearing-impaired learners or adaptive interfaces for those with visual impairments. The potential of AI to adapt content delivery to the specific needs of learners ensures that educational opportunities are more equitably distributed. This can contribute to the reduction of systemic educational disparities.

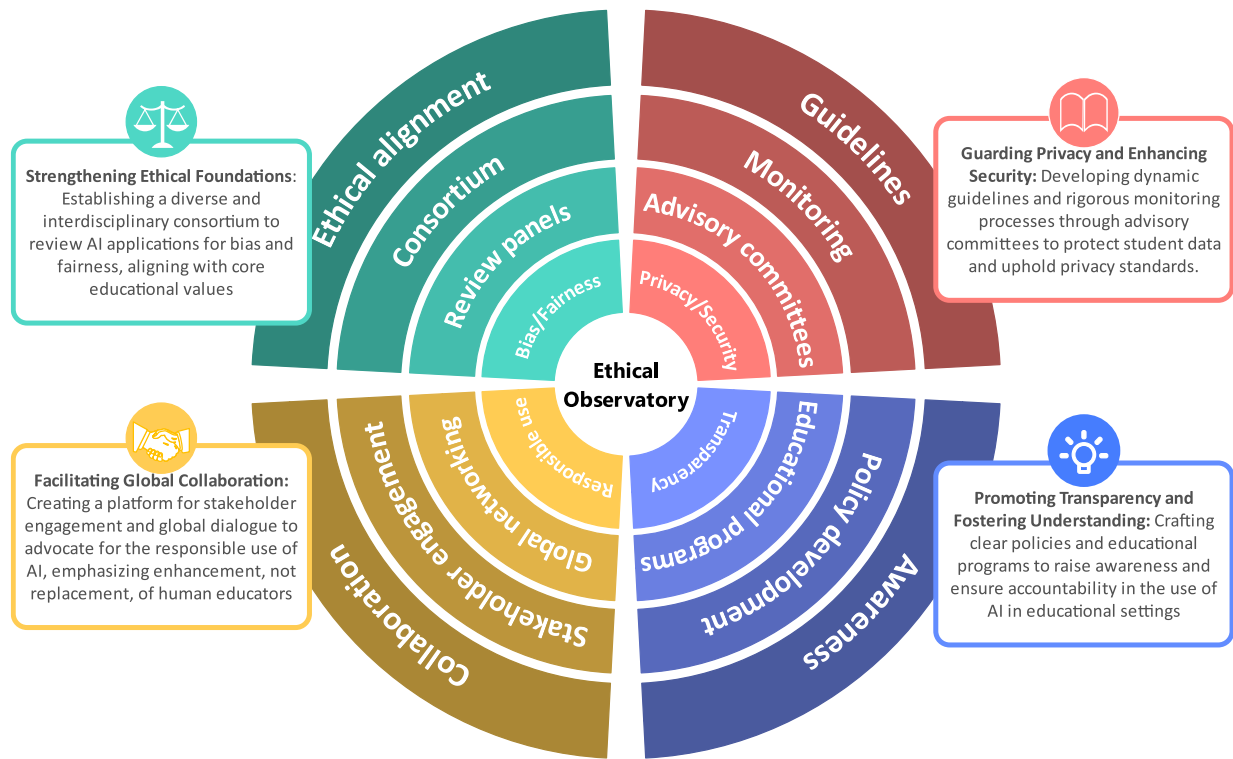


Figure 3. Strategic Framework for Ethical AI in Education. This diagram represents the structure of the Ethical Observatory for AI in Education, outlining the main objectives (green), the structural and operational components (red and blue), and the core ethical considerations (yellow) to guide responsible AI integration.

IV. ETHICAL OBSERVATORY FOR AI IN EDUCATION

A. Objectives of the Ethical Observatory for AI in Education

The Ethical Observatory for AI in Education is conceived to face the ethical issues that accompanies the integration of artificial intelligence within educational settings. Its core objectives encompass the promotion of ethical development and integration of AI technologies, ensuring that these advancements align harmoniously with the core values of education and societal expectations. An important goal is the creation of a guideline and policy framework that addresses critical issues such as privacy, bias, transparency, and accountability in AI applications. Additionally, the observatory aims to increase awareness and understanding of ethical considerations in AI among various stakeholders, including educators, policymakers, and the technology community, thereby fostering an informed dialogue around ethical AI use. Collaborative efforts to establish a platform for knowledge exchange are can be used for encouraging

the sharing of insights, challenges, and strategies among diverse participants to collectively address and navigate ethical challenges in AI-enabled education.

B. Structure and Function of the Ethical Observatory

The structure of the Ethical Observatory for AI in Education is designed to facilitate a multidisciplinary approach, drawing on expertise from various fields to ensure a comprehensive analysis of AI's impact on education from an ethical perspective. This consortium is tasked with continuous monitoring and evaluation of emerging AI technologies, applying rigorous ethical frameworks to assess and predict their implications in educational contexts. One of the observatory's key functions includes the development of actionable guidelines and policy recommendations, grounded in the ethical assessment of AI initiatives. Moreover, it engages in stakeholder education and dialogue, hosting workshops, forums, and programs aimed at elevating ethical literacy and fostering a community of practice committed to the ethical integration of AI in education.

C. Operational Framework

The operational framework of the Ethical Observatory is characterized by the establishment of ethical review panels and policy advisory committees. These panels are responsible for the ethical scrutiny of AI projects, ensuring their alignment with educational values and ethical standards, and making recommendations for modifications or endorsements based on their findings. Policy advisory committees translate these ethical assessments into practical policy recommendations, guiding the ethical adoption and use of AI in education. Furthermore, the observatory is committed to the development and dissemination of educational materials and programs aimed at various audiences to enhance their understanding of AI's ethical dimensions. A global networking initiative supports the sharing of ethical challenges and solutions across different educational contexts, promoting a harmonized approach to ethical standards in AI.

D. Addressing Ethical Concerns

Addressing ethical concerns is a core of the observatory's mission, with particular focus on bias and fairness, data privacy and security, transparency and accountability, and the responsible use of AI. It prioritizes the identification and mitigation of biases in AI systems to foster inclusivity and fairness, advocating for the development of methodologies for bias detection and correction. Data privacy and security are underscored, with the observatory advocating for stringent measures to protect sensitive student information. Transparency and accountability are also critical, as the observatory promotes the development of transparent AI algorithms and decision-making processes to build trust among stakeholders. Lastly, the responsible use of AI is championed, ensuring that AI systems support and enrich educational experiences without diminishing the valuable role of educators.

V. IMPACT ON EDUCATION ADMINISTRATION, INSTRUCTIONAL QUALITY, AND LEARNING EXPERIENCE

The establishment of an Ethical Observatory for AI in Education is an initiative that promises to influence the education administration, instructional quality, and the enhancement of the learning experience. This

observatory, by its design, is poised to play a pivotal role in shaping the ethical formats of AI integration into educational practices, ensuring that the deployment of these technologies aligns with the core values of fairness, equity, and inclusivity.

A. Education Administration

The observatory's contribution to the administrative aspect of education centers on the development and dissemination of ethical frameworks for AI utilization. The observatory enables educational administrators to make informed decisions about incorporating AI technologies into their operational workflows. These frameworks aim to ensure that AI-driven administrative tools — from student data management systems to resource allocation algorithms — are used in ways that prioritize student privacy, data security, and equitable access to educational resources. The overarching goal is to cultivate an administrative culture that leverages AI for efficiency and effectiveness, without compromising ethical standards.

B. Instructional Quality

On the instructional front, the Ethical Observatory's impact is profound. It acts as a guardian of ethical integrity, ensuring that AI tools and platforms used in teaching and learning processes contribute positively to educational outcomes without undermining ethical norms or learner equity. The observatory's ethical guidelines will encourage the development and use of AI systems that support diverse learning needs, adapt to individual learner profiles, and offer personalized feedback, all while avoiding biases that could lead to unequal treatment of students. By fostering an environment where AI tools are scrutinized for ethical compliance, the observatory ensures that technological advancements in education serve to enhance, rather than detract from, the quality of instruction and the richness of the learning experience.

C. Learning Experience

Perhaps most importantly, the Ethical Observatory for AI in Education will ensure that AI's role in personalizing education is executed with a keen sensitivity to learner diversity and inclusivity. This entails a commitment to deploying AI solutions that recognize and address the unique needs of all learners in order for facilitating equitable access to personalized learning opportunities. The observatory's work will help to prevent the perpetuation of existing educational disparities through technology and instead use AI as a means to level the playing field. The observatory underscores the importance of technology as a tool for enriching the educational experiences of all students, irrespective of their backgrounds, abilities, or learning preferences.

VI. CONCLUSION

The Ethical Observatory for AI in Education embodies a futurist approach towards integrating artificial intelligence within the educational sphere, ensuring that its deployment advances teaching and learning while adhering to the highest ethical standards. This initiative represents a step forward in addressing the ethical challenges posed by AI technologies, from safeguarding privacy and ensuring fairness to promoting transparency and accountability. The observatory not only enhances the administrative and instructional quality of education but also enriches the learning experience for students. It ensures that AI-driven

innovations in education administration streamline operations without compromising ethical values, and that instructional technologies augment the educational process while safeguarding equity and inclusiveness. Most importantly, it recognizes the cause of personalized learning experiences that honor and cater to the diversity of student needs for making education more accessible and equitable. The Ethical Observatory for AI in Education sets a precedent for the conscientious use of technology in educational settings, highlighting the importance of ethical considerations in the rapid advancement of AI. As we stand on a new era in education, marked by technological innovations, the establishment of such an observatory hopes to be tool for the educational community's commitment to fostering environments where technology enhances human values and promotes the overall well-being of learners.

One of the primary limitations of this study is the rapidly evolving nature of AI technologies, which may outpace the development and implementation of ethical guidelines and frameworks. Additionally, the diversity in educational systems across different regions may pose challenges to the universal applicability and adoption of the Ethical Observatory's guidelines. There is also a need for empirical research to test the effectiveness of the Ethical Observatory framework in diverse educational settings. Further, the development of collaborative international networks could facilitate the exchange of best practices and enhance the global impact of ethical standards in AI-powered education.

REFERENCES

- [1] K. H. Lee, "Strategic planning for the integration of technology in higher education in newly developed countries : The case of Korea," *J. Educ. Technol.*, vol. 6, no. 1, pp. 47–69, Dec. 1990.
- [2] R. Clemente and B. L. Martin, "Instructional systems design and public schools," *Educ. Technol. Res. Dev.*, vol. 38, no. 3, pp. 81–85, Sep. 1990.
- [3] P. S. Wall and L. Sarver, "Disabled student access in an era of technology," *Internet High. Educ.*, vol. 6, no. 3, pp. 277–284, Jul. 2003.
- [4] R. M. A. Wadi and L. S. Khalf, "Knowledge management in higher education institutions: Facts and challenges," in *Artificial Intelligence Systems and the Internet of Things in the Digital Era*, Cham: Springer International Publishing, 2021, pp. 241–248.
- [5] K. D. Ashley, *Artificial intelligence and legal analytics: new tools for law practice in the digital age*. Cambridge University Press, 2017.
- [6] A. C. Huggins-Manley, B. M. Booth, and S. K. D'Mello, "Toward argument-based fairness with an application to AI-enhanced educational assessments," *J. Educ. Meas.*, vol. 59, no. 3, pp. 362–388, Sep. 2022.
- [7] T. Nazaretsky, M. Cukurova, and G. Alexandron, "An instrument for measuring teachers' trust in AI-based Educational Technology," *EdArXiv*, 13-Dec-2021.
- [8] R. Zhou, D. Xia, Y. Yin, J. Zhang, W. Zhang, and J. Feng, "Analyzing the impact of the internet on higher education," *Int. J. Secur. Appl.*, vol. 10, no. 6, pp. 341–350, Jun. 2016.
- [9] O. H. Embarak, "Internet of Behaviour (IoB)-based AI models for personalized smart education systems," *Procedia Comput. Sci.*, vol. 203, pp. 103–110, 2022.
- [10] Y. Kim and H. Choi, "Kindergarten teachers' perception of early childhood AI education," *Korean Assoc. Learn.-Centered Curric. Instr.*, vol. 22, no. 6, pp. 163–178, Mar. 2022.
- [11] J. J. S. Kovilpillai, A. A. Uzza, A. D. Singh, and Y. Low, "Instructional design for quality education: Role of A Digital Learning Hub," in *Tenth Pan-Commonwealth Forum on Open Learning*, 2022.
- [12] J. C. Bublitz, "Might artificial intelligence become part of the person, and what are the key ethical and legal implications?," *AI & Soc*, Nov. 2022.

- [13] E. Dieterle, C. Dede, and M. Walker, “The cyclical ethical effects of using artificial intelligence in education,” *AI Soc.*, pp. 1–11, Sep. 2022.
- [14] J. Lim, J. Seo, and H. Kwon, “The role of higher education for the ethical AI society,” *The International FLAIRS Conference Proceedings*, vol. 35, May 2022.
- [15] B. S. Selznick and T. N. Titareva, “Postsecondary administrative leadership and educational AI,” in *Strategy, Policy, Practice, and Governance for AI in Higher Education Institutions*, IGI Global, 2022, pp. 73–100.
- [16] S. Akgun and C. Greenhow, “Artificial intelligence in education: Addressing ethical challenges in K-12 settings,” *AI Ethics*, vol. 2, no. 3, pp. 431–440, 2022.
- [17] J. Casas-Roma and J. Conesa, “A literature review on artificial intelligence and ethics in online learning,” in *Intelligent Systems and Learning Data Analytics in Online Education*, Elsevier, 2021, pp. 111–131.
- [18] L. Chen, P. Chen, and Z. Lin, “Artificial intelligence in education: A review,” *IEEE Access*, vol. 8, pp. 75264–75278, 2020.
- [19] A. Alam, “Should robots replace teachers? Mobilisation of AI and learning analytics in education,” in *2021 International Conference on Advances in Computing, Communication, and Control (ICAC3)*, Mumbai, India, 2021.
- [20] Y. Takahashi, M. Kohda, and Y. Ogihara, “Simple biped robot with multi-PIC microcomputer system for university education,” in *SICE 2004 Annual Conference*, 2004, vol. 2, pp. 1334–1339 vol. 2.
- [21] S. Sharma, S. Tiwari, H. Pareek, and D. Kumar, “The role of Ai in digital era,” *Int. J. Psychosoc. Rehabil.*, pp. 133435–133437, Sep. 2020.