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ASSESSING THE IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE POLICY AT UNIVERSITY LEVEL IN PAKISTAN

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Abstract
The rapid integration of artificial intelligence (AI) in higher education demands well-defined policy frameworks to ensure ethical and effective implementation. However, the extent to which AI policies are developed, communicated, and enforced at universities in Pakistan remains unclear. This study assesses AI policy implementation across 100 Higher Education Commission (HEC)-recognized universities in Pakistan, focusing on policy clarity, communication effectiveness, stakeholder engagement, compliance mechanisms, and resource allocation. Using a structured three-point rating scale questionnaire, data was collected from faculty members, and administrative staff involved in AI policy decision-making. The findings reveal significant gaps in policy communication, resource allocation, and institutional compliance monitoring, with a mean awareness and implementation score of 0.61. Policy clarity remains a major concern (0.52), while communication with stakeholders is notably weak (0.46). Although some institutions demonstrate progress in policy refinement and stakeholder engagement, the overall implementation remains fragmented due to inconsistencies in execution, limited professional development, and a lack of systematic evaluation. The study highlights the need for a more structured, transparent, and inclusive AI policy framework. It recommends strengthening policy communication, increasing resource allocation, fostering stakeholder participation, and establishing robust compliance mechanisms to enhance AI governance in higher education.

Keywords: Artificial intelligence policy, higher education, policy implementation, university governance, stakeholder engagement, AI governance, policy communication, compliance mechanisms, resource allocation, and AI in education.

Introduction

The rapid advancement of artificial intelligence (AI) has significantly impacted various sectors, including higher education. Universities worldwide are integrating AI-driven technologies to enhance academic instruction, streamline administrative processes, and improve overall institutional efficiency. AI-powered tools such as adaptive learning systems, automated grading software, and intelligent tutoring systems are reshaping the traditional educational landscape. These technologies not only provide personalized learning experiences but also optimize decision-making processes within universities. However, with the increasing reliance on AI, institutions must establish clear policies to regulate its implementation, ensuring ethical use, data security, and academic integrity.

In Pakistan, the higher education sector is gradually embracing AI as part of its digital transformation efforts. Universities are beginning to explore AI applications in curriculum design, student engagement, and institutional management. AI-driven analytics help educators assess student performance, predict learning outcomes, and design interventions to support

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struggling learners. Additionally, AI is being utilized in research, assisting scholars in data analysis, literature reviews, and automated content generation. Despite these promising developments, challenges persist in the formulation and implementation of AI policies. Many universities lack the necessary infrastructure, technical expertise, and regulatory frameworks to effectively govern AI adoption.

One of the key challenges in implementing AI policies is striking a balance between innovation and ethical considerations. The use of AI in education raises concerns related to data privacy, algorithmic bias, and the potential devaluation of human-centered teaching practices. Moreover, there is a growing need to equip educators with the knowledge and skills required to integrate AI tools effectively into their pedagogical practices. Without proper training and policy guidelines, AI adoption in higher education may lead to unintended consequences, such as over-reliance on automated systems or inequitable access to AI-driven resources.

This study aims to assess the implementation of AI policies at the university level, focusing on their effectiveness, challenges, and impact on academic and administrative functions. By examining the current state of AI adoption in Pakistani universities, this research seeks to provide insights into policy development strategies that ensure responsible AI integration. Addressing these concerns will be crucial for leveraging AI as an enabler of higher education while mitigating potential risks and ensuring that technology enhances, rather than disrupts, the learning experience.

Review of the Related Literature

The review of the related literature covers various aspects, including AI policy regimes, governance models, and regulatory frameworks. It examines the implementation of AI in tutoring, assessment, and personalized learning while addressing ethical and regulatory challenges such as fairness, accountability, and data privacy. Additionally, it explores Pakistan's AI policy in comparison to global AI governance trends and includes case studies on AI policies in universities. The review also highlights the barriers to AI integration in education and policymaking, emphasizing the need for interdisciplinary collaboration and ethical AI governance.

Research on artificial intelligence (AI) policy remains in its early stages, with AI governance emerging as a critical aspect of technological advancement. AI policy encompasses two key dimensions: the development and implementation of AI technologies and the establishment of regulatory frameworks addressing the social, economic, and political implications of AI (Filgueiras, 2022). The concept of "AI policy regimes" provides an analytical lens to examine AI policy design, linking governance models with political systems to understand the actors and institutions shaping AI strategies. Historically, concerns about AI have paralleled its technological progress. While AI advancements, including machine learning and neural networks, have accelerated in recent years, similar debates about AI's impact on labor markets and ethical considerations have existed for decades (Calo, 2017). Governments worldwide are increasingly engaging in AI policymaking, with national strategies focusing on AI governance, risk management, and regulatory oversight (IESALC, 2025). In particular, AI in education has gained prominence as institutions integrate AI-driven technologies to enhance learning, automate administrative processes, and personalize instruction (Rath et al., 2023).

In higher education, AI is being implemented in diverse ways, including intelligent tutoring systems, automated assessments, and student performance predictions (Helen & Diane, 2023). AI's ability to facilitate personalized learning experiences has contributed to its widespread adoption, improving efficiency and educational outcomes (Begum, 2024). Research highlights that AI policies in higher education play a significant role in workforce

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development, research initiatives, and ethical AI governance (Jain & Jain, 2019). However, challenges persist regarding fairness, accountability, and data privacy, requiring universities to develop comprehensive strategies for AI implementation (Calo, 2017). As nations increasingly integrate AI into their economic and educational frameworks, higher education institutions must actively engage in shaping AI policies. Ensuring ethical AI deployment in academia necessitates interdisciplinary collaboration, policy refinement, and continuous evaluation of AI's impact on teaching and learning (IESALC, 2025).

Artificial intelligence (AI) has a vast scope, influencing multiple policy domains and federal departments. Various government agencies are actively exploring AI's applications, ranging from enhancing food safety to advancing risk management frameworks and autonomous systems. For example, the U.S. Department of Agriculture leverages AI to improve food safety measures, while the Department of Commerce is developing an AI risk management framework to ensure unbiased and trustworthy AI in the marketplace. In defines applications, AI has been employed for targeting exercises and the operation of autonomous, unmanned aerial vehicles (Mittelsteadt, 2023). Furthermore, AI has applications in critical areas such as healthcare, customs and border protection, crime forecasting, traffic management, and financial security, indicating the increasing reliance on AI-driven decision-making across sectors (Mittelsteadt, 2023).

In the context of higher education, generative AI is reshaping academic processes, influencing students, faculty, researchers, and administrators. Despite its transformative potential, AI integration in educational settings remains guided by fragmented and sometimes conflicting recommendations (Spivakovsky et al., 2023). The establishment of institutional policies is crucial in defining AI's appropriate role in teaching, learning, and research. Studies have explored institutional efforts to regulate AI's implementation, such as the case of Kherson State University, where AI policies outline both recommended and discouraged applications for students, faculty, and researchers. These policies aim to foster an inclusive digital learning environment while ensuring AI tools align with ethical and academic integrity standards (Spivakovsky et al., 2023). To address these concerns, Chan (2023) proposed an AI Ecological Education Policy Framework comprising three core dimensions: pedagogical, governance, and operational.

The pedagogical dimension focuses on optimizing AI's role in improving teaching and learning outcomes, while the governance dimension provides guidelines on data privacy, security, and accountability.

The operational dimension, in contrast, addresses AI infrastructure and faculty training.

This framework offers a structured approach to understanding AI integration within educational environments, ensuring that institutions align AI adoption with institutional goals and ethical considerations (Chan, 2023).

As universities increasingly embrace AI, robust governance frameworks are essential for responsible AI adoption. Best practices include evaluating existing AI policies, setting institution-specific goals, and formulating guidelines on data privacy, security, and ethical AI usage (Lee, 2024).

Collaborative policymaking—incorporating input from faculty, administrators, IT experts, and students—ensures that AI regulations address diverse academic needs.

Moreover, AI literacy programs and training initiatives are essential to promote ethical AI usage in educational institutions. As AI technologies and regulatory landscapes evolve, universities must continuously refine governance strategies to maintain compliance and ensure the ethical deployment of AI in academic settings (Lee, 2024).

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The National Artificial Intelligence (AI) Policy of Pakistan aims to create a comprehensive framework for AI adoption while ensuring ethical, responsible, and equitable use. The policy emphasizes raising awareness about AI-based platforms, prioritizing data privacy, enhancing human resource capabilities in AI and related technologies, guiding investment in AI research and development, and addressing socio-economic challenges and risks. A key focus of the policy is investing in research and development (R&D) infrastructure to build domestic AI capabilities. This includes funding research organizations, defining data standards, supporting regulatory and legal frameworks, maintaining computational infrastructure, and fostering international collaborations to exchange best practices. Additionally, the policy promotes ethical AI usage through an AI regulatory directorate to prevent discrimination, ensure transparency, and uphold accountability in AI applications (Government of Pakistan, 2024). Artificial intelligence (AI) has been defined and categorized in various ways based on its objectives and capabilities. The classical definition of AI, as proposed by Turing (1950), suggests that a machine demonstrates intelligence if it exhibits behaviour indistinguishable from that of a human. However, contemporary AI systems, while capable of learning and self-improvement, primarily simulate or imitate human intelligence rather than achieving true indistinguishability (Truby, 2020). Russell and Norvig (2016) provided a framework for defining AI along two dimensions: human versus ideal and thinking versus behaving. Various organizations and scholars have expanded on these classifications. The Alan Turing Institute describes AI as the science of making computers perform tasks that typically require human intelligence, while Deutsche Telekom defines AI as the imitation of human intelligence processes by machines, especially computer systems (Krafft et al., 2020). Recent scholarship has emphasized the need to move from AI principles to actionable governance mechanisms, described by Georgieva et al. as the "third wave of scholarship on ethical AI." However, despite increasing scholarly attention, AI governance remains loosely defined. Butcher and Beridze (2022) characterize AI governance as a broad set of tools, solutions, and levers influencing AI development and applications. Floridi (2022) extends this idea to digital governance, describing it as the practice of establishing and implementing policies, procedures, and standards for managing digital systems.

Based on shared responsibilities, values, and obligations, research institutions should establish a foundational governance framework for AI use, consisting of five core values (Da Mota, 2024):

1. **Preserving Data Integrity**: Protecting digital and physical materials from censorship, loss, or unauthorized modifications.
2. **Preserving Context**: Collecting and safeguarding bibliographical data, provenance, historical context, and metadata to maintain meaningful information.
3. **Promoting Accessibility**: Supporting digitization to enhance access for diverse populations while ensuring informed consent and ethical use.
4. **Sustainability**: Prioritizing long-term data preservation and sustainable AI implementation practices.
5. **Ensuring Equity**: Addressing socio-economic disparities in AI access through inclusive policy development and monitoring (Moorhouse et al., 2023; Wang et al., 2023).

Research indicates a growing openness to integrating generative AI technologies in higher education, alongside concerns about their ethical and practical implications (Miller &

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Thompson, 2023). Addressing these challenges through informed policies and institutional support will be crucial for maximizing AI's benefits in university teaching and learning (Davis et al., 2022).

Organizations across various sectors are increasingly integrating AI due to the rising demand for data intelligence systems. AI-driven decision-making processes have gained prominence, yet studies on AI implementation remain scarce (Merhi, 2021). Existing research highlights critical factors influencing AI adoption, but no comprehensive taxonomy model has been developed to consolidate these elements (Maragno et al., 2023). Policymakers must establish robust AI governance frameworks to ensure ethical, inclusive, and sustainable AI deployment (Folorunso et al., 2024).

Such frameworks are particularly crucial for developing countries, where AI can drive economic growth, improve healthcare access, and optimize educational resources (Galaz et al., 2021). However, challenges such as political will, financial constraints, and digital divides must be addressed to facilitate effective AI implementation (Kumar et al., 2021; Jamil, 2021). Addressing these barriers requires collaborative efforts among governments, private sectors, and civil society organizations to create policies that foster AI-driven innovation while mitigating risks (Moșteanu, 2020; Bühler et al., 2023). By prioritizing AI policy frameworks and digital infrastructure investments, developing countries can harness AI's potential to address pressing societal challenges and drive sustainable development (ÓhÉigeartaigh et al., 2020; Kitsara, 2022). However, reliance on foreign aid for AI projects raises concerns about long-term sustainability, necessitating alternative funding mechanisms such as public-private partnerships (Guenduez & Mettler, 2023). Ultimately, fostering transparency, accountability, and digital literacy initiatives will be critical in ensuring equitable AI adoption across diverse socio-economic contexts (Adam & Fazekas, 2021).

With the rapid advancement of AI technologies, integrating AI into education has become a critical area of focus. However, the responsible adoption of AI-driven methodologies presents significant challenges. Teachers play a crucial role in this transition, yet their readiness to adopt AI-driven tools is influenced by multiple factors. Understanding these factors is essential for designing targeted interventions and support systems to empower educators. Resistance to implementing AI in education stems from personal, technological, and institutional barriers (Graham et al., 2013; Lawrence & Tar, 2018). External challenges such as limited internet connectivity, inadequate financial backing, insufficient ICT infrastructure, lack of training programs, and absence of technical support hinder teachers' ability to integrate AI into their teaching practices (Al-Azawei et al., 2017). Institutional barriers, including unclear policies and ambiguous strategic plans, exacerbate these challenges. In addition to external constraints, internal factors such as ICT proficiency (Jones, 2004; Peralta, 2007), self-confidence in using AI tools (Kusumaningrum, 2019), lack of motivation, and limited awareness about AI applications negatively impact teachers' willingness to embrace innovative technologies (Al-Azawei et al., 2017). Research indicates that systemic barriers significantly deter teachers from utilizing technology in education (Buabeng-Andoh, 2012). Moreover, infrastructure limitations, insufficient human resources, and a scarcity of digital educational tools act as critical impediments (Gupta & Singh, 2017). The additional time and effort required to integrate AI into teaching, coupled with the lack of incentives from management, further diminish teachers' inclination toward ICT adoption (Wee & Zaitun, 2006). Teachers' attitudes,

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competencies, and beliefs significantly influence their technology adoption behaviors. Scholars argue that reluctance to change and negative perceptions of AI integration can impede its adoption (Alsheibani et al., 2018). Furthermore, aligning curriculum objectives with technological tools remains a challenge (Rizvi et al., 2017). The absence of adequate training programs and ineffective technical support mechanisms also act as substantial barriers to AI integration (Rakhyoot, 2017). Additionally, the lack of clear leadership and guidance from educational institutions creates uncertainty regarding AI adoption, reinforcing teachers' skepticism toward technology-enhanced learning (Rizvi et al., 2017). Despite these challenges, several factors can enhance teachers' willingness to adopt AI in education. Both external incentives and internal motivations play vital roles in driving technology adoption (Pokrivcakova, 2019). Support systems, professional development opportunities, and financial incentives can significantly enhance teachers' motivation to integrate AI into their instructional practices (Brooker, 2023). Recognition of digital initiatives further encourages educators to continue leveraging technological advancements (McLaren & Aleven, 2019). Teachers who prioritize quality teaching and value student feedback are more inclined to integrate AI-based tools into their instructional approaches to enhance learning outcomes (Ahmad et al., 2017). The perceived benefits of AI, including its ability to facilitate personalized learning, improve student engagement, and streamline administrative tasks, act as powerful motivators for AI adoption (Hao & Lee, 2015). Additionally, educators who view technology as a means of professional growth are more likely to integrate AI into their teaching practices (Watty et al., 2016). Self-motivated teachers with a drive for continuous learning and professional development are more likely to explore AI's potential in education (Kusumaningrum, 2019). Educational institutions and reform initiatives must provide robust support systems, including AI training programs, access to digital resources, and mentorship opportunities, to assist teachers in effectively integrating AI into their classrooms. The presence of knowledgeable facilitators within schools can significantly enhance the adoption of AI by offering guidance and technical assistance throughout the transition process.

The integration of AI into education presents both challenges and opportunities. While technological, institutional, and personal barriers hinder AI adoption among educators, targeted interventions and well-structured support systems can mitigate these challenges. Encouraging teachers through incentives, recognition, and continuous professional development will play a pivotal role in fostering AI adoption. Future research should focus on designing empirical studies to explore best practices for AI integration, develop operational frameworks, and establish guidelines to support responsible AI-driven educational innovation. By addressing these issues proactively, AI can serve as a transformative force in shaping the future of education.

Statement of the Problem

The rapid integration of artificial intelligence (AI) in higher education necessitates comprehensive policy frameworks to ensure its ethical and effective implementation. However, the extent to which AI policies are developed, communicated, and implemented at the university level in Pakistan remains unclear. This study aims to assess the implementation of AI policy at universities in Pakistan, identifying existing gaps and providing recommendations for enhancing policy effectiveness.

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Objectives of the Study

The study aims to achieve the following objectives:

- To assess the presence and clarity of AI policies at the university level.
- To evaluate the effectiveness of AI policy communication to key stakeholders.
- To examine the mechanisms in place for monitoring AI policy implementation and compliance.
- To investigate the level of stakeholder engagement, including faculty, students, and staff, in AI policy formulation and revision.
- To identify challenges and provide recommendations for improving AI policy implementation in universities.

Research questions

The study aims to achieve the following research questions:

- How are AI policies defined and documented at the university level?
- How effectively are AI policies communicated to key stakeholders, including faculty, students, and administrative staff?
- What mechanisms exist for monitoring and ensuring compliance with AI policies in universities?
- To what extent are faculty, students, and administrative staff involved in AI policy formulation and revision?
- What are the key challenges universities face in implementing AI policies?
- What factors influence stakeholder engagement in AI policy discussions?
- What strategies can be recommended to improve the effectiveness of AI policy implementation in higher education institutions?

Delimitations of the Study

Given the broad scope of AI policy implementation in higher education, this study is restricted to the following parameters:

- The study is limited to 100 universities recognized by the Higher Education Commission (HEC) of Pakistan.
- The focus is on faculty members, and administrative staff directly involved in AI policy-related decision-making.
- The study assesses AI policy implementation from the perspective of governance, resource allocation, and stakeholder engagement.

Methods and Procedures

The study employed a structured three-point rating scale questionnaire to collect data on AI policy implementation. The methodology encompassed survey distribution, data collection, and analysis to assess key dimensions of AI policy awareness and effectiveness.

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Population and Sampling

The study sample consists of 100 universities in Pakistan, selected based on their engagement with AI initiatives and policy development. Participants include university administrators, and faculty members, familiar with AI policy implementation.

Research Instrument

A structured three-point rating scale questionnaire was developed to collect data, covering the following key dimensions:

- Demographic information related to AI policy awareness and implementation.
- Policy communication strategies and effectiveness.
- Monitoring and compliance mechanisms.
- Stakeholder participation in AI policy development and review.
- General perspectives on AI policy challenges and recommendations.

Data Collection and Analysis

The questionnaire was distributed to participants, and responses were collected, tabulated, and analyzed using statistical measures such as mean scores and standard deviations. The data was interpreted to identify trends, gaps, and areas for policy improvement.

Data Analysis

To calculate the mean score, numerical values were assigned to each response category:

- Agree = 2
- Don't Know = 1
- Disagree = 0

The weighted average for each statement was computed using the formula:

Table 1

Assessing the Implementation of Artificial Intelligence Policy at University Level in Pakistan

Statement	Agree (%)	Disagree (%)	Don't Know (%)	Mean Score
The university has a clearly defined AI policy.	8.7	56.5	34.8	0.52
The AI policy is effectively communicated to all stakeholders (faculty, staff, students, etc.).	10.9	65.2	23.9	0.46
There are mechanisms in place to ensure ongoing communication regarding AI policy.	20.0	46.7	33.3	0.73
There are mechanisms in place to ensure ongoing updates regarding AI policy.	15.6	40.0	44.4	0.76
The university effectively implements AI policy across all departments.	8.9	60.0	31.1	0.49
There are sufficient resources allocated to support the implementation of AI policy (e.g., funding, training, infrastructure).	15.6	53.3	31.1	0.62

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Compliance with AI policy is regularly monitored.	15.6	55.6	28.9	0.60
Compliance with AI policy is regularly enforced.	13.3	55.6	31.1	0.58
Faculty members are actively engaging in the review of AI policy.	17.8	46.7	35.6	0.71
Faculty members are actively engaging in the development of AI policy.	20.0	48.9	31.1	0.71
Students are involved in decision-making processes related to AI policy.	15.9	52.3	31.8	0.64
Students are involved in engaged discussions related to AI policy.	20.0	48.9	31.1	0.71
Staff members are provided training on AI policy formulation and its implications.	11.6	55.8	32.6	0.56
The university regularly evaluates the effectiveness of AI policy implementation.	6.8	56.8	36.4	0.50
Feedback from stakeholders is actively solicited for policy updates.	6.8	56.8	36.4	0.50
Feedback from stakeholders is actively incorporated into policy updates.	6.8	56.8	36.4	0.50
There are mechanisms in place to adapt AI policy in response to evolving technological advancements.	15.9	43.2	40.9	0.73
There are mechanisms in place to adapt AI policy in response to evolving ethical considerations.	17.8	42.2	40.0	0.76

The table reveals that

The findings reveal a moderate level of awareness and implementation of AI policies in universities, yet significant gaps exist in policy communication, resource allocation, and stakeholder engagement. Clarity of AI policies remains a concern, with 56.5% of respondents disagreeing those policies are well-defined, and dissemination efforts showing weaknesses. Despite these challenges, universities demonstrate some commitment to continuous policy refinement through regular communication and updates. However, execution across departments is inconsistent, and resource allocation remains partially adequate. Faculty and student involvement in AI policy development is moderate, but staff training requires improvement. Institutional mechanisms for evaluating AI policy effectiveness are limited, and stakeholder feedback integration needs strengthening, though universities show responsiveness to technological and ethical advancements.

Findings

The main findings of the study are as follows:

- The study highlights critical gaps in the implementation of AI policies at the university level in Pakistan.
- A majority of respondents (56.5%) disagree that their university has a clearly defined AI policy, with policy communication (65.2% disagreement) and dissemination mechanisms (60.0% disagreement) being particularly weak.
- Although some universities have mechanisms for ongoing communication (0.73) and updates (0.76), implementation across departments remains inconsistent (60.0% disagreement).

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- Resource allocation for AI policy is partially adequate (0.62), but compliance monitoring (0.60) and enforcement (0.58) require strengthening.
- Faculty and student participation in AI policy discussions and development show moderate engagement (0.71), but staff training remains insufficient (0.56).
- Additionally, systematic evaluation of policy effectiveness (0.50) and stakeholder feedback integration (0.50) are limited, though universities show some adaptability to technological (0.73) and ethical (0.76) advancements.

Conclusion

The findings suggest that while universities recognize the significance of AI policy, substantial challenges persist in its implementation, communication, and compliance. To ensure effective AI governance in higher education, institutions must enhance policy clarity, allocate sufficient resources, and foster meaningful stakeholder engagement. Addressing these gaps will be crucial for developing a more structured, transparent, and inclusive AI policy framework within academic institutions. The results reveal that while universities acknowledge the importance of AI policy, its implementation remains fragmented due to challenges in communication, resource allocation, and compliance monitoring. The lack of policy clarity and ineffective dissemination hinder stakeholder awareness, while inconsistencies in execution and limited institutional review mechanisms further constrain effective governance. Despite these challenges, some universities demonstrate progress in fostering adaptability to technological and ethical advancements, as well as encouraging faculty and student engagement in policy discussions. However, meaningful improvements require a more structured approach, including enhanced policy transparency, stronger accountability measures, increased resource allocation, and capacity-building initiatives for staff and faculty. For AI governance to be effective in higher education, universities must prioritize a holistic and inclusive framework that ensures continuous policy evaluation, stakeholder participation, and alignment with evolving technological trends. Strengthening these areas will be instrumental in fostering a more responsible, adaptive, and future-ready AI policy landscape within academic institutions.

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