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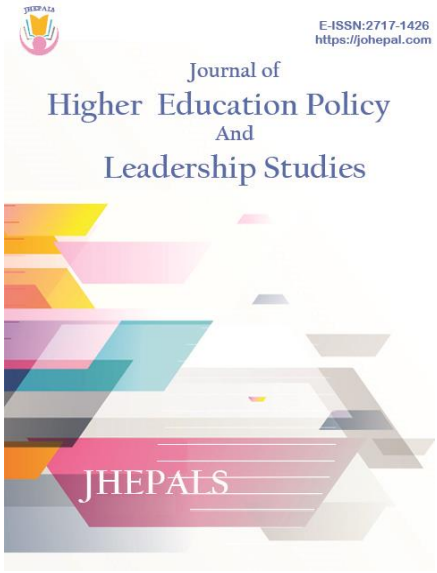
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AI Meets Public Policy: Tackling Higher Education Challenges in Egypt



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Abstract

The purpose of this research is to propose a blended approach of utilizing AI in policymaking. The authors rely on AI to identify main policy issues/challenges facing higher education in Egypt, and to generate policy alternatives for each of those challenges. Next, the authors devise a survey instrument targeting a purposive non-random sample of academics in Egyptian universities to assess the AI policy alternatives generated. Predetermined assessment criteria were given to the human experts that covered the degree of perceived effectiveness, novelty, political acceptability, administrative feasibility, and fundability of the AI generated policy alternative solutions. Findings showed that the highest-ranked policy alternative solutions were encouraging joint research initiatives with international partners, integrating modern technology into education, increasing student and academics exchange programs, and expanding access to online learning platforms. The authors recommend this blended approach, of AI generated policy alternatives assessed by human experts, for optimal context specific policy making.

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Keywords: AI in Policy-Making; ChatGPT; Higher Education Challenges; Public Policy Making; Blended Approach; Egypt

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Introduction

The intersection of Artificial Intelligence (AI) and public policy has emerged as a critical topic in recent years, gaining increasing attention from governments, scholars, and practitioners worldwide. AI has the potential to revolutionize how public policies are developed, implemented, and evaluated, and providing innovative solutions to complex governance challenges (Agba et al., 2023; Maphoza & Maphoza, 2023). Progress in artificial intelligence is captured in the yearly AI Index Report produced by the Stanford Institute for Human-Centered Artificial Intelligence. Their sixth report to date, 2023, claims to be the world's most "credible and authoritative source for data and insights about AI" (AI Index Report, 2023, p. 2). One of the important takeaways of the report is that there is increased interest by policymakers in AI as evidenced by the fact that on a global scale, in 2016, there was only one law that had mention of 'artificial intelligence', but this number increased to 37 in 2022; and that the analysis of parliamentary records showed a 6.5 times increase in the mention of AI from 2016 to 2022 in the 81 countries whose records were analyzed (AI Index Report, 2023).

Different opinions, perspectives, and concerns about the use of AI in government are voiced by scholars and practitioners (Rodrigues et al., 2023; Van Noordt et Misuraca 2022; Pencheva et al., 2020). Several studies have been conducted with the purpose of investigating the level of citizens' trust in how governments use AI, and they have come up with mixed results (Robles & Mallinson, 2025; Schiff et al.,2020). On the positive and optimistic side, Goyal and Shekhawat (2022) write about how AI and data science have the capability to 'revolutionize' public policy making. Focusing on India, they explain how the government has accumulated huge amounts of data through the digitization process and how this data can be used in the public policy making process to help come up with more effective policies. They give examples from various sectors. For example, in the health sector big data analytics can be used to offer personalized healthcare treatment and cut costs (Goyal & Shekhawat, 2022). In the education sector AI can be used to make online learning more interactive. Meanwhile, Longoni et al. (2023) focusing on the U.S., explain how there are already reports on AI decision systems being used in various policy domains, including healthcare, environmental protection, communication with citizens, workplace safety, and other areas (Longoni et al., 2023).

On the cautious front regarding the link between AI and public policy, and how there is a need for public policies to regulate AI, Nordström (2022) argues that any kind of decisions regarding public policies for AI are characterized by a high level of uncertainty. She worries that there is no clear consensus on how to define AI, its decision-making capabilities, how it can affect humans, or how it can impact democratic values. Therefore, caution and flexibility are needed when thinking of regulating AI through public policies (Nordström, 2022). Additionally, one of the main factors that bother policymakers when thinking of regulating AI, is the machine learning ability, where the outputs are no longer within the control of the programmer, a matter that complicates the assignment of legal liabilities, especially when things go wrong, or there are negative impacts that result from the use of AI (Zech, 2021). Add to that there are still lingering concerns about data security and citizens' rights to privacy, which governments and policymakers struggle to regulate (Goyal & Shekhawat, 2022).

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In the context of higher education, AI can play a transformative role by offering data-driven insights, automating administrative processes, and generating policy alternatives tailored to specific challenges (UNESCO, 2019). In Egypt, the higher education sector faces persistent challenges, including governance, quality, research productivity, employability, and infrastructure. Despite ongoing reforms, these issues hinder the full potential of higher education as a driver of socio-economic development. Addressing these challenges is crucial, as higher education is key to developing human capital, fostering innovation, and enhancing Egypt's global competitiveness.

Policymakers, top level decision makers and academics are increasingly expressing interest in using AI in various functions related to the educational process, including figuring out solutions for existing problems and proposing solutions for policy issues (Iqbal et al., 2024). Nonetheless, there is a significant lack of clarity on how AI-generated policy alternatives compare to those developed through traditional human expertise regarding their effectiveness, feasibility, acceptability and novelty. This study aims at addressing this gap by experimenting with the integration of the AI tools, such as ChatGPT3.5, with the opinions of higher education experts to create and refine policy alternatives.

Research Purpose and Problem

With the rapid rate of development in AI and the wide-scale use of various tools and applications on a wide scale, the lack of consensus regarding their utility, effectiveness and ethical implications, the authors decided to experiment with the use of AI in generating public policy alternatives, focusing on the higher education sector in Egypt. The aim is to figure out to what extent a hybrid AI/Human approach in policy making in the higher education sector in Egypt may lead to more optimal and acceptable results. So, the main research question is: To what extent can AI help contribute to developing better policy solutions for the Higher Education sector in Egypt?

Conceptual Framework

AI is a term that encompasses various definitions, primarily referring to the development of software systems, typically using algorithms, to perform tasks that traditionally required human intelligence, such as vision, speech, language processing, and reasoning activities like induction and deduction (Khuram & Bartosz Jakub, 2020). Artificial intelligence as a term was first coined by McCarthy in 1995 and was defined by him as "the science and engineering of making intelligent machines" (Standford, 2020). Aldosari (2020) added AI involves creating systems that require advanced human intelligence to carry out tasks demanding a high level of "inference, deduction, and perception" (p.145). August and Tsaima (2021) described AI as the discipline dedicated to designing computers capable of carrying out tasks that typically require human intelligence.

AI has emerged as a vital instrument in public management and governance worldwide. This technology excels at analyzing large datasets, generating forecasts, and delivering insights that can enhance decision-making processes (Agba et al., 2023). AI tools like ChatGPT, and Co-Pilot have swiftly advanced, enabling the creation of outputs that closely resemble human responses. Since the release of ChatGPT by OpenAI in November 2022, these AI technologies have captured public attention and begun reshaping various

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industries, including healthcare, finance, entertainment, and higher education (Firaina & Sulisworo, 2023; Khuram & Bartosz Jakub, 2020).

The conceptual framework diagram (Figure 1) illustrates the proposed blend between the AI based process of policy alternatives generation, and the use of human experts in the assessment of the policy alternatives generated.

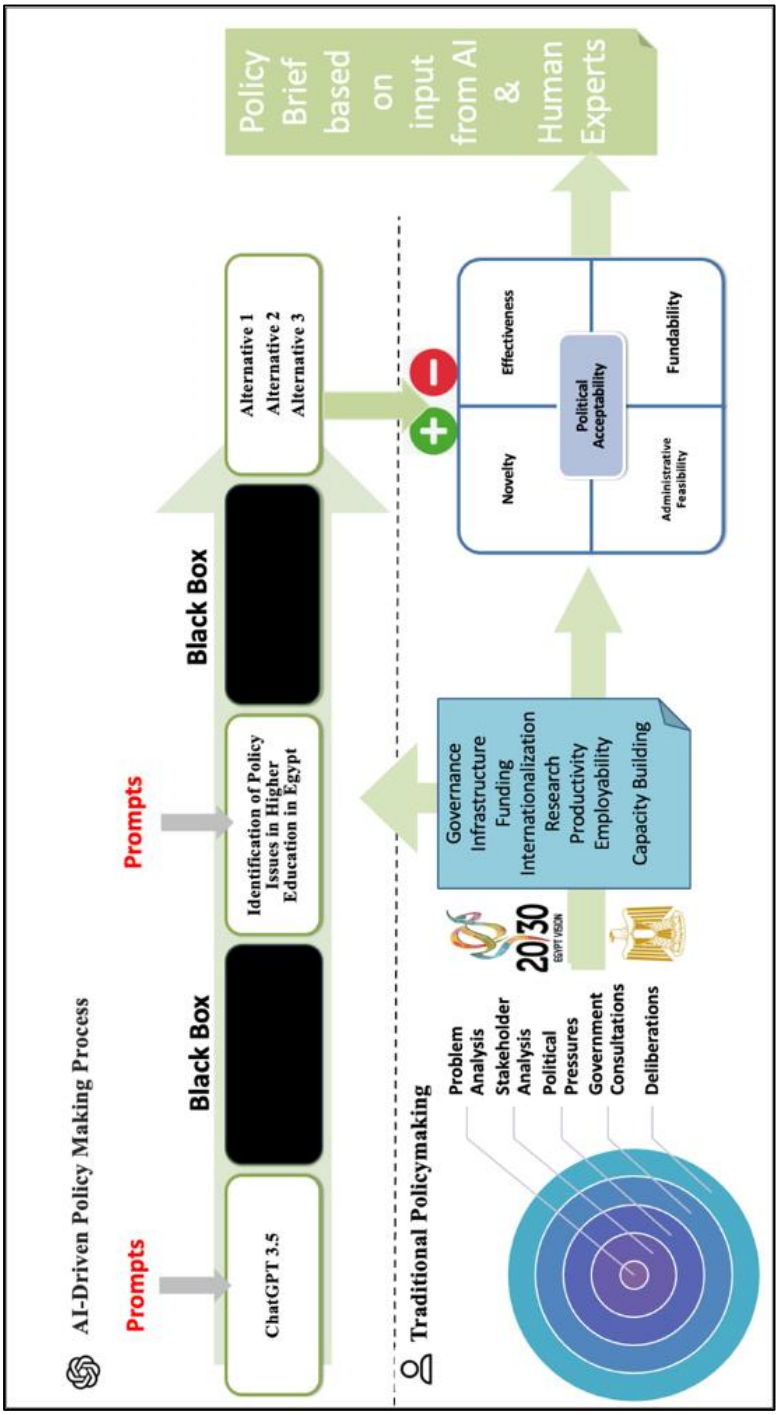


Figure 1. Conceptual Framework Showing the Blend between AI and Traditional Policymaking in the Higher Education Sector in Egypt (Source: Authors)

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The upper section of the diagram shows how prompts were given to ChatGPT, then inputted into the black box representing the processing phase through ChatGPT. This is followed by a list of policy issues that get to be identified in seconds. The generated issues are validated through a comparison with the seven strategic issues listed in the two main government policy documents governing higher education in Egypt. Next, another set of prompts are given to ChatGPT, hence another black box, leading to the identification of three policy alternatives/solutions for each of the seven issues generated.

The lower section of the diagram depicts the traditional policymaking process that led to the writing up of the two main higher education policy documents by the government of Egypt (GOE) namely: Sustainable Development Strategy Egypt's vision 2030 and in the latest Ministry of Higher Education and Scientific Research National Strategy for Science, Technology, and Innovation 2030. The authors assume that in producing these two policy documents, and to identify the seven strategic policy issues, a range of functions were performed by humans covering: problem analysis, stakeholder analysis, government consultations, political pressures, production of strategy papers, more consultations and deliberations and other functions.

The policy alternatives generated by ChatGPT3.5 for each of the seven strategic objectives are assessed by humans – surveyed experts – using the set of predetermined evaluation criteria: effectiveness, novelty, political acceptability, administrative feasibility and fundability. Finally, the right-hand side of the conceptual diagram shows the output which is the policy brief based on the adoption of a hybrid utilization of both humans and AI.

Literature Review

This section explores the significant influence of AI on public governance, particularly in developing and implementing policy alternatives. It highlights the increasing global investment in AI technologies and their role in enhancing public management through data-driven solutions. The review also examines real-world applications that are reshaping governance and addresses the associated challenges, such as ethical concerns and the need for transparency.

Deployment of Artificial Intelligence in Public Policy

AI plays a crucial role in enhancing public policy by providing data-driven solutions that assist in problem identification, agenda setting, policy formulation, and evaluating public initiatives. Its ability to process large datasets quickly, significantly improves evidence-based decision-making in both developed and developing economies (Agba et al., 2023). According to Patel et al. (2021), during the problem identification phase, AI analyzes large datasets to identify patterns and prioritize issues. In the policy formulation stage, it conducts scenario analyses and forecasting to explore detailed policy options. In the adoption stage, AI gathers insights to support decision-making. During implementation, AI improves the speed of service delivery and enables real-time adjustments for effectiveness. Finally, in the evaluation stage, it enhances policy impact by recommending necessary adjustments and improvements. Our paper focuses specifically on the policy formulation stage, where AI technologies can generate policy alternatives for addressing higher education challenges in Egypt as shown in (Figure 2).

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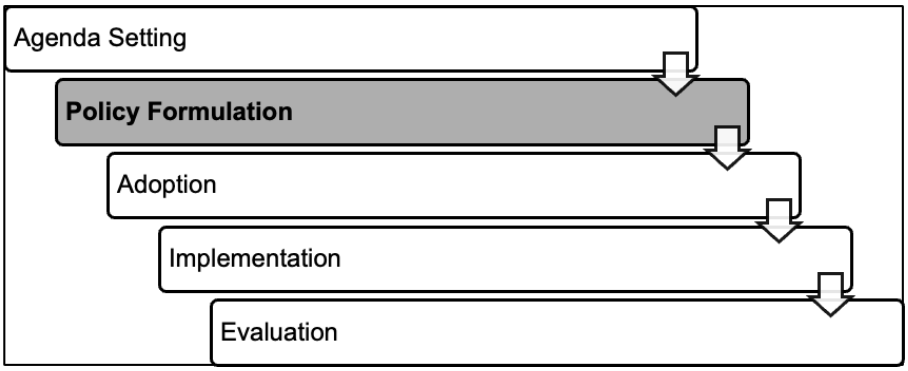


Figure 2. AI-Enhanced Policy-making Process (Source: Authors)

AI's capacity to improve policy development and assessment goes beyond theoretical advantages, manifesting in real-world applications across the globe. This widespread influence is evident in numerous national initiatives that are fundamentally reshaping public management and governance. In Singapore, AI chatbots enhance public service accessibility, while Estonia's e-Health system employs AI algorithms for personalized healthcare solutions. India's Ayushman Bharat program utilizes AI to identify health risks, and the United Kingdom implements AI in law enforcement and medical diagnostics. China's Social Credit System exemplifies AI's controversial applications in monitoring citizen behavior. The United States leverages AI across defense and healthcare sectors, while Ghana's Open Data Initiative utilizes AI to inform policy-making. Additionally, South Africa and Kenya apply AI to improve urban services and healthcare delivery, respectively. Japan employs AI for predictive maintenance of public infrastructure, and France and Canada utilize AI to optimize resource management and increase revenue generation (Agba et al., 2023; Adirim & Madsen, 2024)

AI in Higher Education Policy

The rapid integration of AI into higher education presents significant potential to transform policy development in this field and to resolve and number of policy issues (Debo, 2024). According to Bates et al. (2020), AI algorithms can process vast amounts of data, providing administrators and decision-makers with insights based on facts rather than relying solely on intuition or past experiences. This shift fosters a culture of evidence-based decision-making, where data-driven insights are essential for shaping strategies and policies.

UNESO published the "Artificial Intelligence and Education: Guidance for Policymakers," designed to help policymakers understand the potential and implications of AI in teaching and learning. This guidance supports the development of institutional policies to ensure AI contributes to achieving Sustainable Development Goal 4 (SDG 4), which aims for inclusive, equitable quality education and lifelong learning for all. It underscores the necessity of effectively leveraging AI to improve educational outcomes in line with global development goals. In 2023, UNESCO built on this framework by introducing the "Guidance for Generative AI in Education and Research," which aids countries in formulating both short-term and long-term policies with a human-centered approach to Generative AI (Miao & Holmes, 2023). This latest guidance demonstrates UNESCO's ongoing commitment to shaping the role of AI in education worldwide.

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Limitations of AI in Public Governance and Management

Governments in both developed and developing economies are increasingly using AI in public management and governance to boost efficiency, transparency, and accountability. However, this shift also poses challenges, including ethical concerns, potential biases, data privacy issues, and the high costs of implementation. As educational institutions increasingly turn to AI for guidance in decision-making processes, it is crucial to address the complexities that come with its implementation. One significant concern is the reliance on large amounts of user data, which is essential for developing AI applications focused on assessments (Luckin, 2017). In addition, as these systems become increasingly embedded in decision-making processes, it is essential for users to have a clear understanding of their functioning and the rationale behind decisions to maintain transparency and accountability. Lastly, the necessity for global coordination arises since AI operates on an international scale, making it challenging to establish consistent regulations across various nations due to differing cultural and ethical viewpoints (Slimi & Carballido, 2023).

Background of Higher Education in Egypt

Ages ago, Egypt was perceived as the 'lighthouse' of scientific research and innovation in both the Middle East and globally (Abdel-Fattah et al., 2013). For centuries, Egyptian scholars, researchers, and philosophers have made notable contributions in areas like astronomy, mathematics, medicine, philosophy, and architecture (El Khachab, 2021). As a central cultural and educational hub in the region, Egypt has been instrumental in advancing higher education. Furthermore, the constitution of Egypt guarantees free education at all levels (Abou-Zeid, 2015).

The structure of higher education in Egypt is divided into three categories, primarily consisting of: universities, which offer academic degrees over a span of four to seven years; institutes, further divided into upper-intermediate institutes providing two-year technical degrees; and higher institutes offering professional degrees over four to five years (Abdelkhalek & Langsten, 2019). Both the public and private sectors are involved in the delivery of higher education.

According to the Central Agency for Public Mobilization and Statistics (CAPMAS), Egypt is one of the most populous countries in the Middle East, with a population exceeding 105 million (CAPMAS, 2024). Overall, higher education enrollment in 2023 totaled 3.7 million students. In the 2022/2023 academic year, 2.5 million students were enrolled in public and Al-Azhar universities, which constituted 66.5% of the total higher education student population. Additionally, enrollment in private universities reached 296.9 thousand students, representing 8% of all higher education students, which is a significant increase of 29.7% compared to 228.9 thousand in the prior year (The Egyptian Gazette, 2025).

Moreover, 199.1 thousand students enrolled in government and private upper-medium technical institutes, accounting for 5.4% of the overall higher education student body, up from 181.4 thousand students in 2022/2023, reflecting a 9.8% increase. Furthermore, 45.3 thousand students were enrolled in various private institutes, representing 1.2% of the total higher education population, marking a substantial increase of 75.6% from 25.8 thousand the previous year (The Egyptian Gazette, 2025).

As part of Egypt's Vision 2030 sustainable development strategy, the government is intensifying efforts to expand and modernize its higher education sector by establishing new

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international universities. A key element of this initiative is attracting prestigious global institutions to open branches in the New Administrative Capital. The goal is to elevate the country's educational standards and increase its global competitiveness. Several top-tier international universities have already opened campuses in the New Capital, including Coventry University, University of Hertfordshire, and The European Universities in Egypt. These institutions began academic operations between the 2020-2021 academic year and beyond, offering a wide range of programs in fields such as engineering, business, and the natural and social sciences, reinforcing Egypt's role as an educational hub in the region (Egypt Independent, 2022).

Higher Education and AI in Egypt

In parallel with these efforts in higher education, Egypt has also been advancing its AI initiatives. The country's AI journey began in 2014 with the launch of the Egypt Sustainable Development Strategy, which aimed to use AI to build on the country's strengths. In 2019, the National Council for Artificial Intelligence (NCAI) was created to help develop AI technologies. This council, which includes members from important ministries, private sector leaders, and experts, focuses on creating a good environment for AI investment and improving the skills of the workforce. Together, these initiatives in education and AI show Egypt's commitment to becoming a leader in both fields, as part of its Vision 2030 goals (MCIT, 2021).

Building on these foundations, Egypt continued to expand its AI capabilities in 2019 and 2020 by opening seven AI faculties and planning for ten more. The government also broadened the scope of the Science and Technology Development Fund, which has supported AI research since 2007, and enhanced the role of the Technology Innovation & Entrepreneurship Center, established in 2010, to support startups. Further demonstrating its commitment, the Egyptian government introduced in 2019 the "Egyptian Charter for Responsible AI". This charter is Egypt's first formal set of guidelines on ethical AI, providing actionable insights for the responsible development, deployment, and management of AI systems, tailored to the local context (Ministry of Higher Education and Scientfic Research, 2019).

In the same year of 2019, Egypt's National AI Strategy, initiated in 2019 by the National Council for Artificial Intelligence (NCAI) produced Egypt National AI strategy. This strategy is structured around four key pillars: AI for Government, which focuses on automating processes and enhancing public services; AI for Development, targeting integration in critical sectors like agriculture and healthcare; Capacity Building, aimed at equipping the workforce with essential skills; and International Cooperation, fostering partnerships for collaborative initiatives. Recently, a new phase of this strategy has been announced, set to commence in mid-2024, which will further enhance AI's role in national development and strengthen Egypt's technological capabilities (OECD, 2024).

Research Methodology

This section explains the nature of the experimental methodology adopted by the authors. The authors started with reviewing the main GOE Higher Education policies as articulated in the Sustainable Development Strategy Egypt's vision 2030 (MoPMAR, n.d.), and in the latest

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Ministry of Higher Education and Scientific Research National Strategy for Science, Technology, and Innovation 2030 (Ministry of Higher Education and Scientfic Research, 2019).

The review process of the two core policy documents helped in identifying the main broad issues of concern in reforming Higher Education in Egypt. For MoHESR, the challenges were drawn from the National Strategy for Science, Technology, and Innovation 2030, which provided a comprehensive list of the "most important challenges facing the system of scientific research and innovation in Egypt" based on a SWOT analysis. Similarly, for the Sustainable Development Strategy Egypt Vision 2030, these higher education challenges were those prioritized as the most pressing due to their significant impact. After various readings and revisions, the main policy issues identified were seven in number and included: governance, capacity building of faculty, research productivity, graduates' employability and link to industry, funding, internationalization, and infrastructure (Ministry of Higher Education and Scientfic Research, 2019 p. 63; MoPMAR, n.d., p. 207).

The next step involved utilizing the AI tool ChatGPT Version 3.5 to identify the seven main issues concerning the reform of higher education in Egypt, to align with the number of strategic issues outlined in the Ministry of Higher Education and Scientific Research (MoHESR) Strategy and the Sustainable Development Strategy 2030 for Egypt. The seven strategic goals/policy issues identified by ChatGPT 3.5 for reforming higher education in Egypt were as follows (Figure 3.): access and inclusivity, quality enhancement, research and innovation, global collaboration, employability and skills development, infrastructure and technology, and governance and accountability.



Figure 3. ChatGPT Insights on Policy Alternatives for the Reform of Higher Education in Egypt (Source: Screenshot of ChatGPT 3.5 Responses)

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There was an almost complete match between the issues identified by ChatGPT and those in official documents, which validated the AI's output. However, one key issue, "Access and Inclusivity," was missing from both ChatGPT's results and the official documents. A possible interpretation for the missing emphasis on "Access and Inclusivity" in the official government policy documents was interpreted by the authors as a reflection of the shift in the Egyptian government's overall economic and sociopolitical adopted ideology and values. Starting the mid-seventies and continuing to the present day, the Government of Egypt (GOE) has moved away gradually from the socialist ideal of free education for all prevalent in the 1960s, to a more market based liberal economic and socio-political ideology. More and more the government is now exploring revenue-generating models for public universities, such as specialized language sections with higher tuition fees and the establishment of 'Ahleya' universities, which are state-owned but run on private sector principles (Buckner, 2013; UNESCO, 2019; Sharawy, 2023). Table 1 compares between the seven ChatGPT 3.5 generated policy issues and those listed in the most relevant official policy documents related to higher education in Egypt.

Table 1.
Main Policy Issues/Challenges Facing Higher Education in Egypt: Comparison Between Different Sources

Artificial Intelligence: ChatGPT 3.5	Ministry of Higher Education and Scientific Research (MoHESR)	Sustainable Development Strategy: Egypt's Vision 2030 (SDS)
- Infrastructure	- Poor infrastructure and information access	- Deficiencies in monitoring indicators and statistics related to labor market and education
- Quality enhancement		- No binding regulations for accreditation -Weak capacity of HE institutions
- Research and innovation	- Low funding for research -Weak incentive system for faculty and low motivation for research -Research quality and lack of awareness about the role of research in solving societal problems - Poor rate of innovation	
- Global collaboration		- Limited foreign language proficiency among teachers and students affecting internationalization, research quality, and productivity
- Employment and skills development	Weak link between industry and HE institutions	- Research quality
- Governance		- Governance
- Access and inclusivity (only mentioned by ChatGPT)	- Not mentioned	- Not mentioned

(Source: National Strategy for Science Technology and Innovation (MoHESR) 2030 (2019) and the Sustainable Development Strategy Egypt Vision 2030 (n.d.).)

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AI, Public Policy, & HE in Egypt

According to Table 1, the ChatGPT3.5 seven identified policy issues covered all the main issues in the two reviewed policy documents and added the 'Access and Inclusivity' as an additional strategic goal. The policy issues in both the official documents reviewed were included within the ChatGPT3.5 generated list through being merged within the broader categories identified, such as considering 'Research & Innovation' as one strategic policy issue, while earlier these were identified as two separate issues.

The authors decided to go with the list of seven policy issues identified through ChatGPT3.5 including the issue of 'Access and Inclusivity'. The rationale being that first it is an important issue and that ChatGPT3.5 as a large language processing model must have captured it from literature and policy papers prepared by experts and scholars not necessarily expressing the latest GOE opinions. The issue of 'Access and Inclusivity' is perceived by various prominent published scholars and experts as an important challenge to the Higher Education sector in Egypt (Buckner, 2013; UNESCO, 2019).

Next, ChatGPT was prompted to suggest three alternative solutions for each of the identified challenges. Check Figure 4 for an example of the ChatGPT3.5 generated policy solutions.

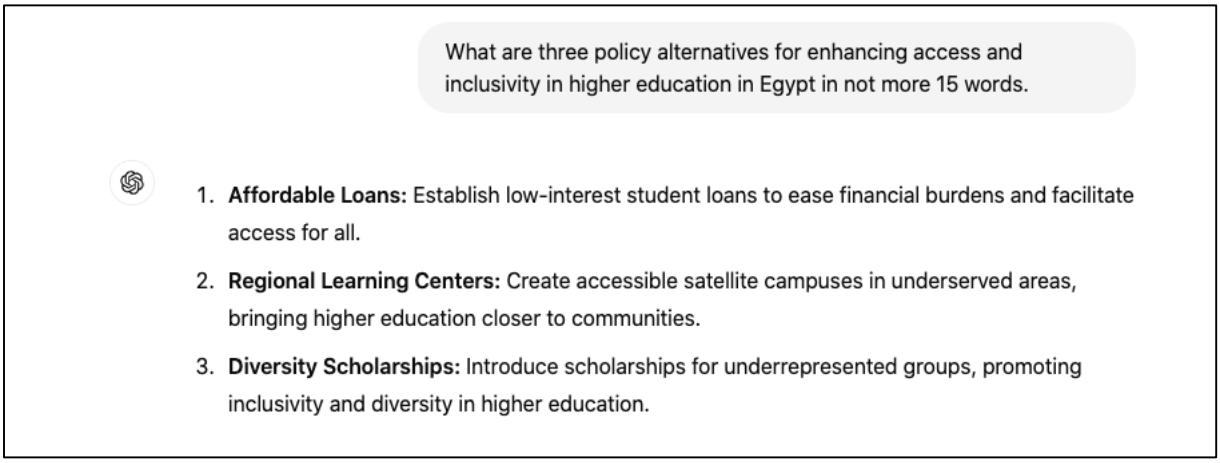


Figure 4. Policy Alternatives for Enhancing Access and Inclusivity in Egyptian Higher Education: Proposals by ChatGPT (Source: Screenshot of ChatGPT 3.5 Responses)

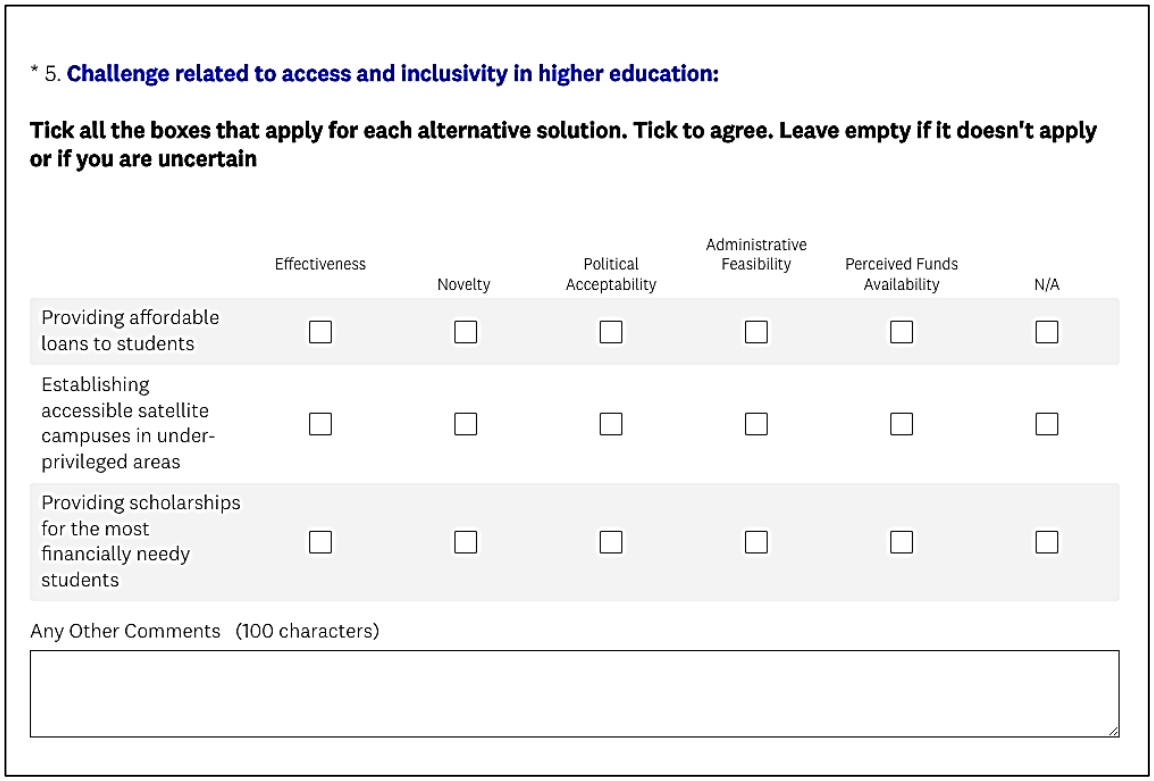
To evaluate ChatGPT's generated policy alternatives, the authors conducted an online survey of academics from public, private, and nonprofit universities, as well as higher education research institutions in Egypt. The survey design was developed to assess how higher education experts in Egypt perceive the policy alternatives generated by ChatGPT 3.5. The questions checked for the respondents' level of familiarity with AI, the perception of how AI can influence the higher education sector, and in particular in coming up with alternative policy solutions for the challenges encountered in the field. Next, questions checked for the opinion of the respondents regarding the quality of the policy alternatives generated by ChatGPT as assessed by different indicators, including perceived novelty, effectiveness, timeliness, political acceptability, administrative feasibility, and fundability. There was room for open-ended responses that captured the respondents' general expression of feelings towards the use of AI in higher education policy making.

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The sample was a non-random purposive sample. The target population consisted of academics, who possessed the expertise required to evaluate AI-generated policy alternatives. Some of the responding academics as shown in (Table 2), had held top level administrative positions and had been involved in policy making in the higher education sector. Given the need for informed opinions on policy issues, this approach was deemed appropriate for obtaining insights from a highly knowledgeable group. By focusing on participants with direct experience and knowledge of the higher education sector, the survey (Online Supplement) ensured that responses were informed by practical and contextual expertise. A link to the survey uploaded on SurveyMonkey was emailed and sent through WhatsApp and LinkedIn to a purposive sample of nearly 355 faculty in different types of universities all over Egypt. A total of 142 academics responded, with an average response rate of approximately 40%.

The survey used a variety of question formats, including eight matrix-style questions, to evaluate participants' perceptions of different policy solutions. One example of a matrix question asked respondents to assess alternative solutions to challenges related to access and inclusivity in higher education. Participants were asked to rate multiple criteria, such as effectiveness, political acceptability, administrative feasibility, and perceived funding availability for each proposed solution. Below is an example of one such matrix question presented in the survey (Figure 5).



* 5. **Challenge related to access and inclusivity in higher education:**

Tick all the boxes that apply for each alternative solution. Tick to agree. Leave empty if it doesn't apply or if you are uncertain

	Effectiveness	Novelty	Political Acceptability	Administrative Feasibility	Perceived Funds Availability	N/A
Providing affordable loans to students	☐	☐	☐	☐	☐	☐
Establishing accessible satellite campuses in under-privileged areas	☐	☐	☐	☐	☐	☐
Providing scholarships for the most financially needy students	☐	☐	☐	☐	☐	☐

Any Other Comments (100 characters)

Figure 5. A sample of matrix question about the challenge related to access and inclusivity in higher education (Source: Screenshot of matrix question as appearing on surveymonkey)

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The data collected through the online survey were analyzed using descriptive statistical methods. This approach allowed us to summarize the responses and provide insights into the overall trends and patterns in the participants' assessments of the AI-generated policy alternatives. Open-ended responses were also analyzed qualitatively to capture any additional insights or concerns raised by the participants.

The approval of the Institutional Review Board (IRB) at AUC was secured before starting the fieldwork (Case# 2023-2024-093) and informed consent forms were approved by all participants. The survey was pilot tested first on a number of faculty (n=10) holding administrative positions in their different universities to make sure that the questions were clear and understandable. Feedback received from the pilot respondents was used to further clarify the instructions for the different questions, especially the matrix questions focusing on the policy alternatives. Initially we had prepared the survey in both English and Arabic language, placing both texts side by side for each question. However, recommendations from the pilot testing phase called for having besides the English language survey link, a separate link for the survey questions in Arabic language. This ensured more clarity and facilitated wider dissemination amongst faculty in non-English speaking universities. The survey in its final form was sent out to faculty during the period from January to March 2024.

Field Study Findings

Study Sample Description

This section provides a breakdown of the characteristics and responses of participants in the study of Egyptian higher education experts. It provides a diverse set of numerical data that sheds light on the participants' origins and involvement in academia.

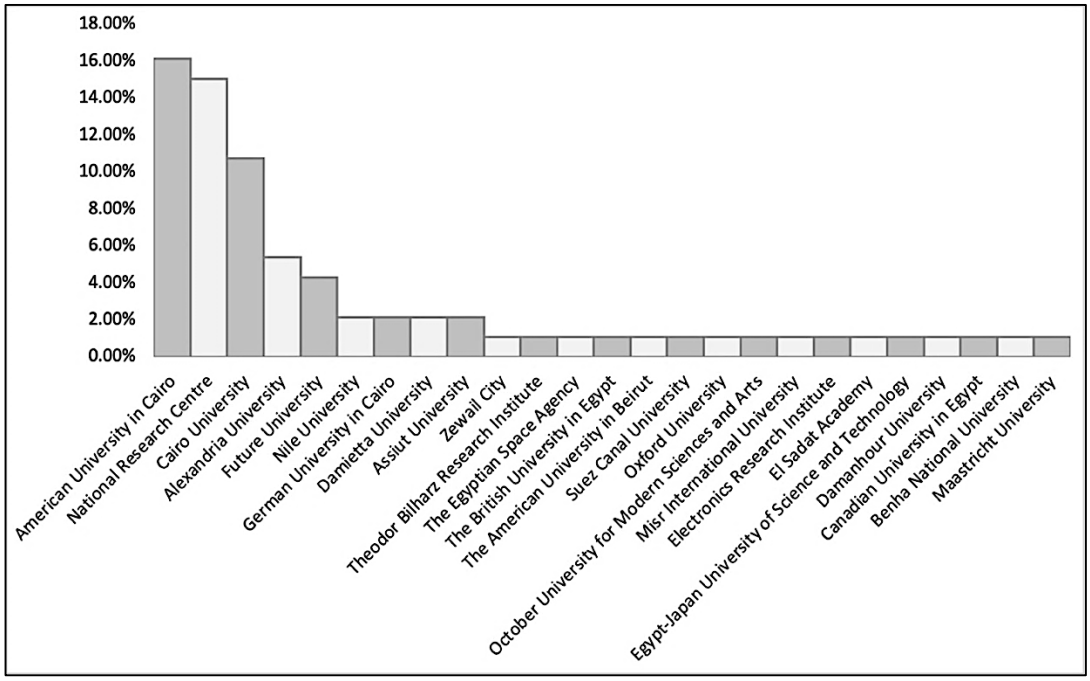


Figure 6. Distribution of survey respondents across Egyptian universities

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Figure 6 shows the distribution of contributions from 25 institutions, with a total sample size of n=93. The American University in Cairo (AUC) and National Research Centre (NRC) have the highest contributions, each exceeding 15%, followed closely by Cairo University and Alexandria University. The remaining institutions contribute progressively smaller percentages, with a long tail of institutions showing minimal contributions under 2%. The demographic characteristics of the sample are displayed in Table 2.

Table 2.
Participants' Characteristics

Demographic characteristic	Breakdown	Percentage (%)	*n*
Age Distribution (n=110)	25-34	0.90	1
	35-44	19.09	21
	45-54	33.64	37I
	55-64	33.64	37
	65+	12.73	14
Organizational Distribution (n=105)	Public organizations	57.14	60
	Private organizations	29.52	31
	Non-profit organizations	13.33	14
Academic Rank Distribution (*n*=105)	Professor	28.57	30
	Associate Professor	20	21
	Assistant Professor	21.9	23
	Associate Professor of Practice	10.48	11
	Emeritus Professor	9.52	10
	Professor of Practice	9.52	10
Years of Experience (*n*=110)	1-10 years	10	11
	11-20 years	24.55	27
	21-30 years	38.18	42
	30+ years	27.27	30
Administrative Posts (*n*=96)	Program Director	23.96	23
	Department Chair	19.79	19
	No administrative position	22.92	22
	Dean of Schools and Faculty	13.54	13
	Associate Dean of Schools and Faculty	9.38	9
	Vice President	6.25	6
	President	3.13	3
	Provost	1.04	1

Key Findings

The distribution of AI familiarity within the sample (n=142) is shown in Figure 7. Most respondents have basic information 50.70%, followed by those who are very familiar 23.94% and extremely familiar 18.31%. A smaller group 7.04% have only heard of AI.

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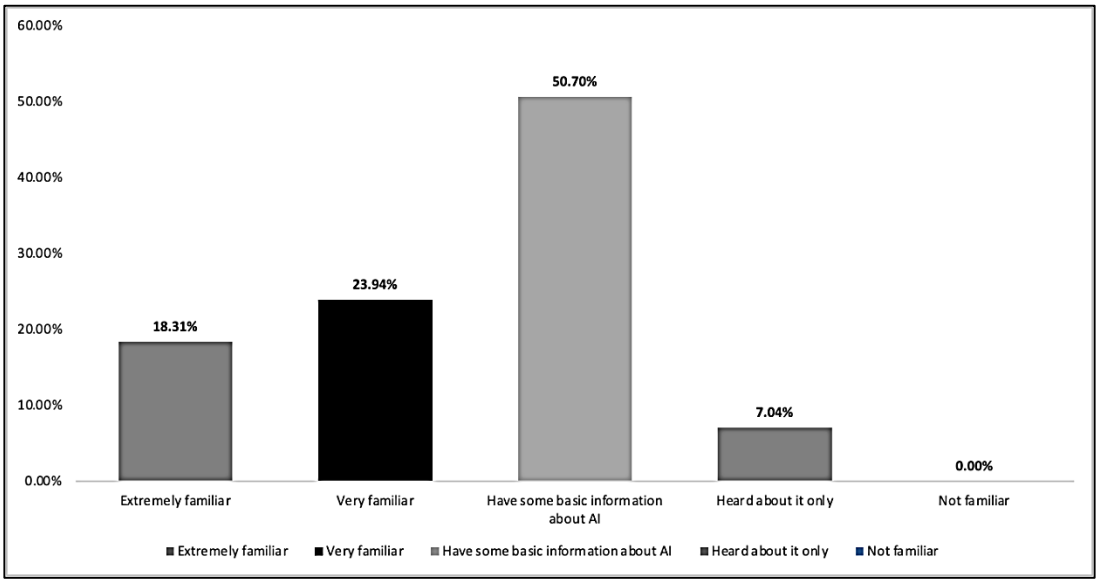


Figure 7. Participants' responses on familiarity with the concept of artificial intelligence

The distribution of AI's perceived influence on public policymaking based on the participants' feedback (n = 142) revealed that 71.13% of respondents believed AI could partially assist decision-makers, while 17.61% indicated that AI could create entire policy documents. A smaller proportion, 7.75%, perceived AI as having a limited impact, and 3.52% expressed concerns that it might confound policymakers. 35.21% of respondents believe AI can play a role ("Yes"), while 64.79% do not ("No"). Figure 8 also presents the distribution of participants' perceptions regarding the role of AI in higher education policy development in Egypt.

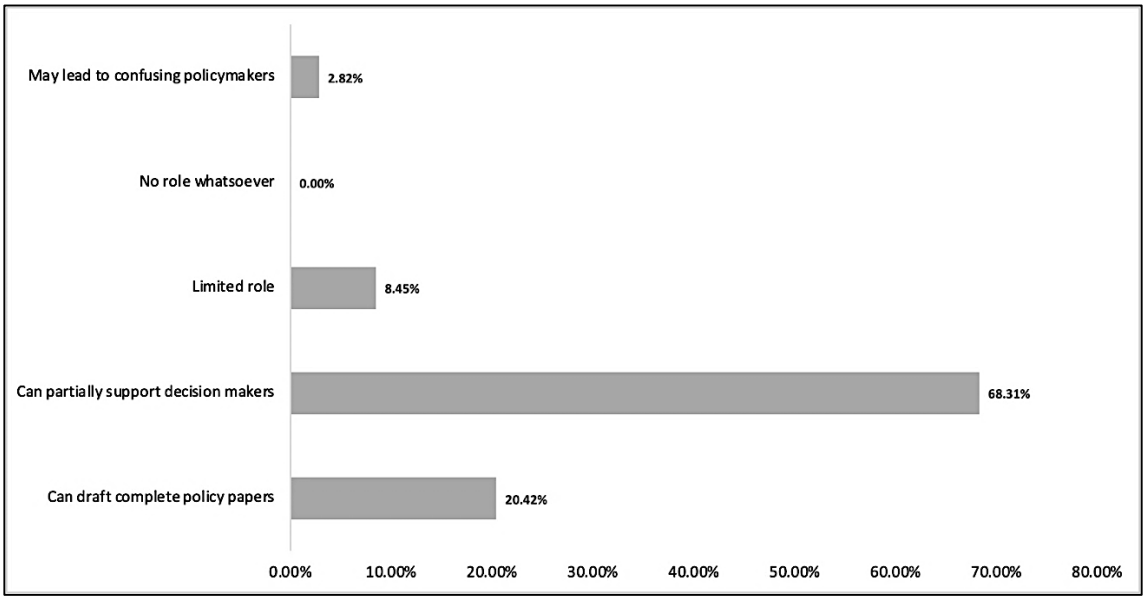


Figure 8. Participants' perspectives on AI's role in enhancing public policy decisions in the higher education sector in Egypt

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Figure 9 depicts the respondents' ranking of the policy alternatives generated by ChatGPT3.5 for the seven strategic policy issues. The highest-ranked initiative is 'Developing e-learning platforms' 269, followed by 'Encouraging joint research initiatives with international partners' 267, then "Integrating modern technology into education" 263 and next "Increasing student and faculty exchange programs" 261. These reflect a clear focus on leveraging technology to advance education and fostering international collaboration.

On the other hand, the lowest-ranked policy alternatives were: 'Providing affordable loans to students' 214, 'Providing incentives for patent filings' 219, 'Upgrading campus infrastructure' 229, and 'Increasing stakeholders' participation in decision-making 231. This ranking demonstrates the survey respondents' prioritization of technology integration and global engagement over direct financial support, patent-related activities, infrastructure and democratic practices.



Figure 9. Scoring AI-driven policy alternatives: participants' perspectives on addressing key challenges in Egyptian Higher Education

Other Insights from Open-Ended Survey Questions

Through analyzing the open-ended responses by the experts at the end of the survey, we were able to identify three main themes: many of the respondents were calling for better preparedness before fully integrating AI into the policymaking process, some were extremely anxious and only a few demonstrated a limited amount of optimism. The need for better preparedness was expressed in the following quotations:

"AI requires capacity building of human capital, data, infrastructure, and readiness; it is an ecosystem. It is not plug-and-play."

"It will be important to feed it more Arabic content"

"It should be well designed and implemented"

"Awareness campaigns must be conducted to explain the importance of AI"

"Those using AI for that purpose need to get training"

"AI has to be monitored and evaluated within our resources and context"

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AI, Public Policy, & HE in Egypt

The respondents felt obliged to remind the surveyors that before you start using AI in policymaking in higher education you have to be better prepared, do a readiness assessment, get the necessary infrastructure, invest in the human capital, study the ecosystem, have awareness campaigns, trainings, a monitoring and evaluation system, and offer more Arabic language content and interface. They covered all the prerequisites for smooth utilization. The high level of anxiety amongst respondents was detected in the following quotations:

"Giving AI the power to create policies is a dangerous practice".

"If we use an imported system, how will it fit"

"AI can be used but suggested policies need to be scrutinized and tailored to the Egyptian case"

"It is very challenging due to constant technological advancement"

"The shortage of potential candidates with the necessary skills and competencies in AI..is a great challenge"

"I don't trust AI to make decisions… the final decision should be left to humans who may consider ethical and social aspects"

"How [will] security will use the AI tool"

"AI can never replace the human mind"

Many higher education experts are worried about the use of AI, wondering how it will fit within the Egyptian context, especially if we import it from abroad, noting that it may be a 'dangerous' practice all in all, and that if used, then it should not be fully trusted. They warn that if and when used we have to always try to catch up with the rapid pace of technological developments and search for the candidates with the needed skills enabling them to work with AI, both of these aspects they perceive as very challenging. They also wonder about how secure the AI systems will be and conclude that AI will never replace the human mind, and therefore the final decisions should always be made by humans. Only in very few quotations were the authors capable of detecting some elements of optimism regarding the use of AI.

"AI will have a significant impact on enhancing public policies of HE in Egypt"

"I see AI taking a leap in policy formulation"

"[AI] will be helpful for both students and professors"

Those few experts who expressed their optimism and faith in the utility of AI in higher education policymaking envisaged benefits to both students and professors and talked about how AI may have a positive impact on policy formulation and on the overall improvement of public policies for higher education in Egypt. However, at the time of conducting the survey, these positive and optimistic views were an exception to the norm.

Discussion

The findings of this study reveal both the potential and challenges of using AI to generate policy alternatives for higher education in Egypt. The results indicate that AI-generated policies, particularly those related to developing e-learning platforms, fostering international research collaborations, and integrating technology into education, were

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highly rated by experts for their effectiveness, novelty, and feasibility. This reflects a growing acceptance of AI's role in supporting innovative and technology-driven solutions in the higher education sector.

Interestingly, policy alternatives focused on traditional areas, such as infrastructure development or providing student loans, were ranked lower. There may be several explanations behind this scoring. The experts do not perceive a need for students' support since many of them are in the public universities where fees are still affordable. The government is investing highly in construction and infrastructure, so the experts do not see it as a pressing need. However, it should be noted that still many students are not capable of accessing the internet on a continuous basis, and that many of them might not have the necessary resources to have an adequate content delivery tool (PC, Laptop, ..), therefore financial support might be an effective solution to bridge the poverty gap for a more inclusive society.

However, the study also highlights several limitations and concerns, particularly regarding the contextual relevance of AI-generated solutions. Experts were notably cautious about issues such as insufficient Arabic content, data privacy, and the alignment of AI outputs with Egypt's socio-political context. These concerns are consistent with broader apprehensions expressed in the literature regarding the ethical and operational challenges of AI in public policy (Nordström, 2022; Zech, 2021).

While AI tools like ChatGPT can quickly generate diverse policy options, the study shows that human oversight remains crucial. The human experts involved were instrumental in validating AI-generated policies, ensuring they aligned with real-world constraints like political acceptability, administrative feasibility, and fundability. This supports the argument that a hybrid approach—combining AI and human expertise—can optimize policy development, as noted by scholars such as Goyal and Shekhawat (2022).

Additionally, we are living in an autocratic environment, and it seems the education experts have been co-opted to an extent that they no longer perceive there is a need for more participation by the stakeholders in the decision-making process. Finally, the number of patents registered each year may not be perceived as sufficiently significant for them to consider giving more incentives for patent filings.

Conclusion

Our experimental study involving the attempted integration of AI into public policy decision-making in Egypt's higher education sector has provided valuable insights. This study provides valuable insights into the potential benefits and limitations of integrating AI into public policymaking for higher education in Egypt. AI-generated policy alternatives show promise, particularly in areas where technology can play a transformative role, such as e-learning and international research collaboration. However, the findings underscore the importance of human judgment in evaluating AI outputs, ensuring that policy solutions are contextually relevant and practically feasible.

The key takeaway is that AI, while a powerful tool for generating innovative policy options, should be used to complement—not replace—human expertise. Policymakers should therefore adopt a blended approach that leverages AI for its data-processing capabilities while relying on human oversight for decision-making, particularly in politically

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and culturally sensitive areas. Successful integration of AI in public policy formulation in the higher education sector in Egypt will need a balanced approach that leverages the strengths of AI while maintaining the critical role of human oversight and contextual sensitivity.

- The research proposes a blended approach using AI and human expert assessment for policymaking in higher education in Egypt.
- AI identifies key challenges and generates policy alternatives, evaluated by academics using predetermined criteria.
- Top-ranked solutions include fostering international research collaborations, integrating technology, enhancing exchange programs, and expanding online learning access.
- The study endorses combining AI-generated insights with expert evaluation for tailored, context-specific policy development.

However, the results of the survey cannot be generalized as they are based on a non-random sample of experts in the higher education sector. Additionally, as the experts themselves pointed out, the rate of change and development in the AI sector is very rapid, so the opinions voiced today may not necessarily sustain for long.

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Declaration of Conflicting Interests

There is no conflinct of interest to be cited here.

Funding

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Human Participants

The paper does not involve any human participants; however, necessary ethical guidelines for writing research papers are observed.

Originality Note

This research is original and has not been published elsewhere before. Proper citations are also included where refernces are made to others' works and where appropriate.

Use of Generative AI/ AI-assisted Technologies Statement

The authors used [AI - ChatGPT3.5]- as indicated in the article for the purpose of the research experiment. Policy issues identified in Higher Education Government Strategies were given to Chatgpt and it was asked to generate policy solutions.The policy solutions were then evaluated by human experts according to pre-determined policy evaluation criteria. No further use of AI was made in writing the research pape.

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