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Exploring AI and Islam in Indonesian Education: An Anthropological Inquiry

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Abstract—Indonesia, as the world’s most populous Muslim nation, finds itself at a pivotal juncture in the realm of technological advancement. Recognizing the profound impact of emerging technologies, especially Artificial Intelligence (AI), on its trajectory is of utmost importance. While AI and Islamic beliefs may initially seem distinct, they share a common theme: an orientation toward envisioning future possibilities. Employing a blend of multimodal and mixed research methods, our objective is to scrutinize and draw comparisons between narratives and visual representations of AI’s influence on religious prospects, particularly within the higher education landscape of Indonesia. We propose to investigate the curriculum, teaching practices and careers of young AI-professionals at Indonesia’s oldest secular state university, namely *Institut Teknologi Bandung* (ITB), as well as Indonesia’s first Islamic state university, namely *Universitas Islam Negeri Syarif Hidayatullah Jakarta* (UIN-JKT). Notably, both institutions have recently introduced AI programs, making them rare in this regard. In this STEM-focused context, shedding light on the societal implications of AI education within Islam takes on heightened significance, with a focus on challenging Western-centric perspectives and contributing to a decolonization-centered research narrative. As this project is still in its early stages, this short paper will discuss related work and propose future directions to study Indonesia’s AI-Islamic-educational future(s).

Index Terms—AI Future Imaginations, Islamic Ethics, Alternative Futures, Indonesian Education, Muslim Perspectives, AI and Islam

I. INTRODUCTION

The rapid rise of Artificial Intelligence (AI) has ushered in a new era of technological advancement and has the potential to transform the future of Indonesia’s workforce, welfare, and even its education. As every nation’s backbone, **education** has a significant impact on a nation’s politics, economics, and welfare [1]–[3], or in other words, to ensure a better **future** in the world of digitization [4]. As emergent technologies like **Artificial Intelligence (AI)** are continuously transforming the world at an unprecedented pace, education and training in this field is imperative and without it, luddites will get left behind. However, many developing nations are still economically challenged and therefor lack good quality education [5], [6]. Facing similar issues is Southeast Asia’s (SEA) top emerging and developing country, **Indonesia**. And

while it is, constitutionally, a secular democratic state, religiosity is important in all aspects in the daily lives of its citizens. A clear reflection of this can be observed as religious education is integrated into the national curriculum across the country [7], for example. The dominant narrative is that AI technology is non-religious with a future deeply rooted in the ideals of Western progress [8], [9]. Therefore, this research is concerned with what possible alternative AI-futures can exist from Islamic values, as Indonesia is the largest **Muslim** nation. But, is there even such a thing as (multiple) ‘*Indonesian AI-Islamic-future(s)*’, and if so, how will AI education help shape that/those reality/ies?

Further, as this study cannot qualitatively encompass the whole of Indonesia, the focus is narrowed down on the dynamic cities of **Jakarta** and **Bandung**, where the pulse of Southeast Asian AI innovation beats strong [10]–[12]. In particular, this study will be looking at Indonesia’s oldest secular state university, namely *Institut Teknologi Bandung* (ITB) located in Bandung, as well as Indonesia’s first Islamic state university, namely *Universitas Islam Negeri Syarif Hidayatullah Jakarta* (UIN-JKT) located in Jakarta, who have both recently implemented one of the few AI programs. As such, these cities offer fertile, yet very distinctive, ground to investigate the role of AI education in shaping the future of Indonesia and beyond.

Therefore, this paper proposes an ethnographic study that investigates the anthropological impact of AI on Indonesian Muslim society, specifically focusing on its influence on higher education in Indonesia. The primary aim of this study is to contribute to the development of inclusive AI, especially in a time when existing AI paradigms and models tend to exhibit biases towards particular cultural perspectives or groups. To achieve this, a combination of participant observation, semi-structured interviews, and innovative non-textual techniques such as role-playing and drawing sessions is proposed. This triangulation of methods seeks to provide a comprehensive and visual understanding of the dynamic and ever-evolving realm of AI’s role in education in, for, and by the Indonesian society. As this project is in its initial stages, this paper provides an overview of related desk-research, presents preliminary fieldwork results that informed our proposed methods, and outlines potential directions for exploring the intersection of

II. LITERATURE STUDY

A. *The Social Anthropology of AI*

The prediction of potential impacts arising from future technologies is a challenging task, if not an impossible one. Nevertheless, it is essential to recognize that AI has already become an integral part of our daily lives and should not be solely regarded as a futuristic concept [13]. However, there is a cultural fixation on the future within communities, which often leads to the devaluation of the present [14]. Such fixation often leads to under-appreciation of current advancements if they don't align with future visions [13]. Research by Cave et al. [15] demonstrates the divergence between people's perceptions of technology and its actual state, often influenced by exaggerated utopian and dystopian narratives from AI-centric movies. This gap between reality and understanding leads to unrealistic expectations, overconfidence, or undue fears — an ongoing theme in AI imaginary research [13]–[15].

However, existing scholarly investigations commonly center on user perceptions regarding the impact of content curation AI algorithms, and while recommender systems focus on mainstream social media platforms [16]. For example, Rader and Gray [17] found that a significant portion of survey respondents believed that AI prioritizes posts in their Facebook News Feeds based on their public personal knowledge. Eslami et al. [18] further explored the rationale behind these speculations and identified that Facebook users perceived personal interactions with others as positively influencing the visibility of their content. Additionally, users believed that receiving a higher number of likes and comments increased visibility, and certain formats of social media contributions were more likely to appear. Bucher [16] also echoed some of these findings, suggesting that Facebook users perceive the AI algorithms as driving a "popularity game" that can potentially harm friendships. However, these studies often overlook the future outlook and aspirations of users, which are vital for shaping a more promising AI future. This proposal paper aims to address this gap.

B. *AI Divergence within Indonesia*

In the intricate tapestry of global perspectives, the perception, education, and utilization of AI are threads interwoven with distinct cultural nuances. Nowhere is this diversity more pronounced than in a culturally rich and multi-faceted nation like Indonesia. The perception of AI varies from one community to another, shaped by local beliefs, historical context, and socio-economic factors [19]. Similarly, the education of AI diverges, with curricula reflecting unique societal values and priorities. The use of AI, too, would then take on multifaceted forms, adapting to cater to specific needs and traditions. In Indonesia's multicultural landscape, these aspects attain an added layer of complexity, as the nation's rich tapestry of cultures interplays with the rapid advancements of AI. Recognizing and understanding these intricate differentiations

is essential for fostering a balanced AI narrative that respects cultural identity, promotes inclusive education, and harnesses AI's potential to harmonize with Indonesia's diverse societal fabric.

Considering this, our proposed study views AI as a "socio-technical system," encompassing social and non-social elements, which has the potential to foster social solidarity and facilitate individual and societal modernization [20], [21]. To illustrate, the construction of the 'Palapa' project by Indonesian engineers created a sense of intense solidarity amongst nationalist despite the government's authoritarian rule at the time [11]. Furthermore and more recently, the success of 'Gojek' (Indonesia's unicorn startup) contributed to the development and utilization of AI technologies while generating employment opportunities [22]. Additionally, when examining historical contexts, the presence of intricate socio-technical systems within pre-industrial societies in Indonesia, for example the Balinese water temples, shows how such systems can facilitate collaboration, manage resources, and effectively tackle diverse challenges [23]. As such, the utilization and impact of AI are shaped by the interests and values of developers and funders, as well as legal frameworks, ethical norms, and cultural practices. But also different stakeholders, including workers, consumers, and marginalized groups, are influenced. Thus, by adopting this socio-technical perspective, our research aims to promote a socially responsible approach to AI development and utilization by considering the social contexts, diverse stakeholders, and cultural practices involved.

C. *AI & Islam*

Yet, amid this complexity, Indonesia's cultural landscape is notably even more intricate. The nation is officially secular, but the influence of religion, particularly Islam, pervades daily life and societal norms [7]. Religion plays an integral role, contributing a significant layer of virtue-based ethics that guide behavior, interactions, and decision-making. This fusion of cultural and religious values underscores the need for a comprehensive approach when considering AI's impact within Indonesia. The ethical dimensions, deeply rooted in Islamic principles, intertwine with technological advancements, urging us to acknowledge and harmonize these elements to ensure responsible AI development and deployment.

In the global Islamic world, the *Syariah* (Islamic law) seeks to promote the common good and prevent acts that are detrimental to people and society in every facet of human life [24]. As such, it would also apply to the use or creation of AI applications. In some Muslim populations, there exists a rejection of scientific principles in favor of strict adherence to religious teachings, characterized by a literal interpretation of religious texts and an outright dismissal of any contradictory knowledge, regardless of its evidential support [25]. According to Zafar [26], these perspectives do not align with the standards of an exemplary Muslim, as the Islamic faith is one that actively seeks knowledge and places a significant emphasis on education.

Nonetheless, Islamic scholars have expressed reservations regarding the potential risks of AI, such as the spread of Islamophobic misinformation, as well as the technology’s potential to undermine traditional Islamic values and practices. An example of such a concern is the perception that AI may undermine the long-standing Islamic tradition of memorizing and reciting the *Quran* [27], [28]. Additionally, as argued by Dahlan [29], it is inevitable that issues related to Islamic jurisprudence (*fiqh*) and ethical considerations (*tabayyun*) will emerge in relation to AI, including the replacement of companionship for deceased loved ones with companion robots and the readiness of Muslims to consume *halal* (permissible) food prepared by AI robots. Furthermore, AI’s current capabilities, such as stem cell research, human cloning, and the development of humanoid robots, may pose challenges to conservative Islamic values, including the belief in God as the creator [30]. Moreover, privacy holds significant value in Islam (akin to many other societies), as evidenced by verse 12 of *surah al-Hujurat* and verse 27 of *surah an-Nur* in the *Quran* [31]. The implementation of the General Data Protection Regulation (GDPR) by the European Union (EU), for example, closely resonates with these principles. Therefore, taking Islamic values into consideration when deciding on global AI ethics is essential.

However, a recent study by Nawi [31] illustrates that many global Muslim leaders still lack comprehensive awareness regarding the implications of AI on Muslim consumers. Thus, the extent to which AI will impact Indonesia and the necessary precautions or guidance to be imparted to AI students, educators, creators, and users in the country remain uncertain. However, it is important to note that the interpretation and implementation of Islam in daily life can vary greatly from person to person and community to community, even within the archipelago of Indonesia. In light of this, it becomes pertinent to explore whether these various Islamic perspectives can offer alternative or decolonizing approaches for shaping a future that incorporates, benefits, and empowers AI in line with Islamic principles.

This paper marks the beginning of such an exploration, and we call for further research and dialogue in this important intersection of AI, Islam, and ethics. By delving deeper into these intricate dynamics, we can work towards a more informed and inclusive AI future that respects the values and principles held dear by diverse communities, both in Indonesia and across the globe.

III. PROBLEM STATEMENT

Much of the discourse on technologically progressive cultures [20] is shaped by Western perspectives [8], [9], Christianity [32], or else a contemporary Middle East view [33], which may not fully account for the cultural and religious nuances of Indonesia. To address this gap, this research draws on postcolonial- and decolonization theory to reevaluate the established colonial power dynamics and investigate how AI education in Indonesia can be made more inclusive and responsive to the cultural and religious values of the country’s

Muslim-majority population. By starting from a religious perspective we center Indonesian Muslims “to imagine what has hitherto been impossible to imagine” [34].

IV. PRELIMINARY FIELDWORK EXPLORATION

To refine our selection of case studies and research methodologies, we conducted a preliminary fieldwork phase spanning Jakarta, Bandung, and Yogyakarta. This four-week exploration took place in August 2022, during which we engaged with 71 interlocutors in discussions centered around AI. Our aim was to understand whether these Indonesian individuals favored, opposed, or remained indifferent to AI, regardless of their gender, age, or religious affiliation. These preliminary findings served as the foundation for a more comprehensive exploration of the intricate ways in which AI is perceived and integrated within this specific cultural and religious context.

For example, one individual in the field expressed skepticism about the existence of AI technologies in Indonesia until encountering a vending machine, which she described as a remarkable manifestation of AI’s ability to perform tasks traditionally carried out by humans. Another participant emphasized the cultural preference for human interaction and the importance of drama and opinions, suggesting that Indonesian society may resist AI due to its perceived lack of human-like qualities. This perspective aligns with the interpretative expression of ideas and educational techniques seen in the *Qur’an*, highlighting the potential value of imbuing (social) robots with a more dramatic and theatrical character in Indonesian contexts. The diverse range of responses and the depth of insight gathered from these interactions underscore the importance of adopting a flexible and culturally sensitive approach in the study of AI in Indonesian society.

Our participants represented a diverse cross-section of society, including street vendors, taxi drivers, language teachers, and others. Due to linguistic limitations on both sides, conversations occurred in English, Bahasa Indonesia, or a blend of both, sometimes complemented by non-verbal communication, such as hand gestures. The unorthodox nature of these discussions prompted the development of non-textual methods, such as visual drawings and role-playing sessions. This unique experience significantly influenced our choice of case studies and research methodologies, which will be discussed in the subsequent section.

V. METHODOLOGY

Exploring the potential futures of AI and determining which ones to strive for or avoid is a complex issue that requires diverse perspectives. Thus, by incorporating multi-modal, unconventional, and interactive methods, our proposed study aims to provide a more holistic understanding of the issues at play, as well as make the abstract concepts of the ongoing project more tangible. In addition to using the traditional anthropologist’s toolkit for collecting qualitative data through participant observation and (semi-)structured interviews, this study will also employ experimental role-playing and quantifiable drawing methods. Consequently, we will shed light on

the rationale behind the selection of these methods and why they hold the promise of success.

A. Data Collection

The ethnographic researcher will establish rapport, observe, and interview a select few Indonesian Muslim representatives at AI education institutions (including AI-students, -teachers, -makers, -users, Islamic-leaders, -believers, and artists). The initial focus will be on two case studies at ITB and UIN-JKT, both of which recently launched (one of) the first AI programs in Indonesia as previously explained. To expand the sample, a "snowballing sampling approach" will be employed, ensuring that decisions regarding whom to engage with, where to go, and what activities to undertake are part of the ongoing ethnographic practice [35]. Efforts will be made to recruit participants from other public and Islamic universities in Indonesia, as well as *pesantren* (Islamic boarding school) and *madrasahs* (Islamic institution).

While conducting fieldwork, our intent is to meticulously **observe** the dynamics of staff meetings, in-class behavior, campus life, and the ambiance of student cafes in the vicinity. These observations will guide our questioning during **(semi-)structured interviews**, adding depth to the information acquired and fostering greater trust among the interview subjects. In the context of both educational case studies, our primary focus is to explore potential dilemmas, conflicts, or areas of convergence between artificial intelligence and religious beliefs within the student and teacher community. In the event such overlaps or discrepancies exist, we will further explore how these individuals engage with local imams or student associations to address these concerns.

The data collection will also incorporate physical **role-playing**, inspired by the digital game "Intelligence Rising" developed by Cambridge and Oxford researchers [36]. In the domain of AI strategy, such role-play sessions can illuminate plausible futures, identify critical decision points, educate, raise awareness, highlight gaps in research knowledge and promote shared visions for beneficial AI. During each session, a group of six participants will engage in the exploration of various AI-related futures by assuming the roles of key stakeholders, including representatives from the Indonesian government, students and academics, AI start-up entrepreneurs, ulama or imams, and laymen. Subsequently, a debriefing session will be conducted to reflect on performance and assess the outcomes of these role-play scenarios. These sessions will serve as valuable tools for testing assumptions, gaining a more profound understanding of AI's potential impacts, and collectively envisioning alternative futures that extend beyond the narrative of the Indonesian government.

Moreover, as evident from the preliminary study, effective communication can be challenging in a foreign language, especially when engaging in discussions about an abstract notion like "AI-Islamic-futures" in Indonesia. Thus, in addition to employing more traditional textual methods, we will introduce an experimental approach where we will invite Muslim interlocutors in the field to create **visual drawings** that

help concretize their envisioned scenarios for AI in Indonesia. Collecting drawings will provide a collective understanding altogether and serve as a qualitative and more tangible outcome.

In summary, our proposed research employs a triangulation of methods, enabling cross-verification of findings and a more comprehensive understanding. As exemplified in Fig. 1, these methods are intricately interconnected, indicating that observation informs (semi-)structured interviews and interview findings shape the stakeholders' personas for the role-play scenarios and so on. The dotted arrow signifies systematic analysis of visual drawings, providing a new lens for subsequent observations, demonstrating the continual interplay of insights and creative feedback, fostering a holistic and adaptive research approach. This methodological synergy aims for a comprehensive exploration of AI and Islam in Indonesian education, guiding decisions and nurturing an inclusive AI future within the cultural and religious context of the country.

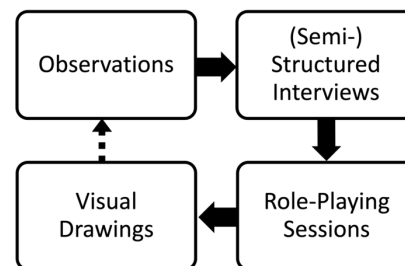


Fig. 1. Triangulation of Proposed Research Methods

B. Data Analysis

The data analysis will encompass a synergistic blend of qualitative content analysis and thematic analysis, and also methodologies adept at uncovering data patterns, themes, and relationships. These procedures will be guided by the outcomes of the data collection alongside an up-to-date iteration of the theoretical framework.

For the collection of drawings, a complementary quantitative analysis will be undertaken, leveraging AI recognition pattern tools or crowd-sourcing techniques to systematically scrutinize the hand-drawn illustrations. We plan to make use of existing API's and open-sourced databases like the world's largest doodling data set by Google¹, alongside a few existing AI image similarity online tools like SentiSight.ai², super.ai³, and DeepAI's Image Similarity⁴. As an example, DeepAI's Image Similarity tool generates a score reflecting visual similarity between two images or drawings, with a

¹<https://github.com/googlecreativelab/quickdraw-dataset> (last accessed June 10, 2023).

²<https://www.sentisight.ai/image-similarity-search-using-sentisight-ai/> (last accessed June 10, 2023).

³<https://super.ai/store/templates/image-similarity> (last accessed June 10, 2023).

⁴<https://deepai.org/machine-learning-model/image-similarity> (last accessed June 10, 2023).

lower score indicating greater contextual resemblance - with a score of '0' (zero) meaning that they are identical. The objective is to leverage such a tool to evaluate how visually comparable the concept of a "Muslim robot" is between AI students at a secular university (e.g., ITB) vs. an Islamic university (e.g., UIN-JKT). This approach of utilizing AI as a technique can offer an additional layer of understanding on how individuals and society perceive the social construction of AI. This dual approach seeks to ensure comprehensive and unbiased insights while fostering an integrated visual representation of the findings.

VI. FUTURE DIRECTIONS

In essence, this proposal serves as preliminary review (start) and introduces an ethnographic study delving into the anthropological impact of AI on society at large, particularly within higher education in a Muslim nation. This research contributes to the development of inclusive AI at a time when prevalent AI paradigms can be biased towards specific cultural viewpoints. Central to this study is the exploration of how AI education in Indonesia can be made more inclusive by accommodating the country's cultural and religious nuances.

Currently, we are recruiting interlocutors and plan to conduct the in-depth interviews, observations, role-play sessions, and drawing collection by the end of 2023. As this is an ongoing PhD research part of the larger NWO-funded project 'One Among Zeroes' —0100—, it might be necessary to conduct a subsequent fieldwork period for follow-up ethnographies. Altogether, drawing on the presented theory and evidence (to be collected and analyzed), this study aspires to stimulate further research and inform policy-making in the field of 'Indonesian-AI-Islamic futures'.

In conclusion, within the context of this STEM-focused realm, our aim is to foster awareness about the societal impacts of AI education within the Islamic faith. Furthermore, we aspire to offer fresh insights that challenge prevailing Western-centric perspectives, aligning with a research narrative centered on decolonization. As such, this research holds timely relevance, emphasizing the importance of diverse AI education and its far-reaching implications for Indonesian society. It lays the groundwork for future research in this crucial domain.

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