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REVOLUTIONISING WARFARE: THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN MILITARY EDUCATION AND TRAINING FOR THE FUTURE

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ABSTRACT

The integration of artificial intelligence (AI) into military education and training represents a pivotal change that reshapes educational and training methodologies and improves operational efficiency throughout the armed forces in the world. While military organisations are faced with increasingly complex challenges in contemporary war, the need for more adaptive, effective and reactive training paradigms becomes essential. AI, characterised by the ability to perform tasks that generally require human intelligence, including reasoning, learning and problem solving, appears as a crucial tool in this context. Its meaning does not only reside in the increase in traditional teaching methods but also in revolutionising them to approach the dynamic nature of modern combat environments. This paper addresses the question of how AI assists military cadets at the National Defence University of Malaysia (NDUM) in facing their military education and training. In so doing, this paper then answers the questions of what roles AI plays in a military learning environment and how these roles prepare future defenders of Malaysia to face the unknown. The qualitative research method was utilised for data collection through semi-structured interviews with military as well as civilian educators at the NDUM. Preliminary findings suggest that current trends illustrate the growing extent of AI applications in military education and training. For example, the simulations fuelled by AI can reproduce complex scenarios on the battlefield, offering cadets immersive environments that improve cognitive and emotional resilience. These technologies are designed to dynamically respond to the actions of military cadets, offering real-time comments that are crucial for skills development. In addition, AI-centred analyses facilitate the evaluation of cadets' performance on a much finer scale than traditional methods, allowing information based on learning results. This leads not only to better operational preparation but also promotes a culture of continuous improvement within military education and training.

KEYWORDS: Adaptive Learning Systems, Artificial Intelligence, Defence University, Malaysian Armed Forces, Military Cadets, Military Education And Training, Military Learning Environment, Simulations.

1. INTRODUCTION

The integration of artificial intelligence (AI) into military education and training represents a pivotal change that reshapes educational and training methodologies and improves operational efficiency throughout the armed forces in the world. While military organisations are faced with increasingly complex challenges in contemporary war, the need for more adaptive, effective and reactive training paradigms becomes essential. AI, characterised by the ability to perform tasks that generally require human intelligence, including reasoning, learning and problem solving, appears as a crucial tool in this context (Rashid et al., 2023). Its meaning does not only reside in the increase in traditional teaching methods but also in revolutionising them to approach the dynamic nature of modern combat environments.

Historically, military education and training relied on hierarchical structures and static programmes, often leading to a gap between training results and operational requests from the real world. In this paper, military education and training refers to the activities that military cadets must go through to become military officers, which include theoretical exposures in classes and practical activities in the fields for defending the nation. The introduction of AI transforms this educational landscape by facilitating personalised learning experiences adapted to individual needs and performance measures. Automatic learning algorithms can analyse large amounts of data, identify skills gaps and adapt the educational content accordingly. As such, AI is increasingly considered a catalyst for more reactive and adaptable training frameworks, where the main objective moves to the development of critical thinking, decision making and technological skills.

1.1. International Military and AI

Countries around the world have adopted AI in their military education and training. For example, the EAU military education, which encompasses the academic and training programmes provided by institutions associated with the United Arab Emirates (UAE) Armed Forces, including the Zayed II Military Academy, Khalifa Air College, and other specialised institutions, offers instruction in military science, leadership, and technical disciplines to equip individuals for service in the UAE. These EAU military education initiatives illustrate a proactive measure of AI technology, firmly rooted in the country's vision 2021 strategy, which emphasises innovation and economic growth based on knowledge. The EAU Armed Forces have made extensive efforts to weave the training systems, focusing on real-time data analysis, simulations and adaptive learning environments. By using tools promoted by AI, the EAU Armed Forces are not only improving the personalisation of training programmes but also improving the efficiency of decision making. As observed by Alnaqbi and Yassin (2021), these innovations position the EAU at the forefront of the military educational and training reform, building an armed force that is well-versed in taking advantage of technology to improve operational preparation and agility.

In contrast, the Chinese approach for military education and training and the integration of AI is characterised by a mass mobilisation strategy that seeks to take advantage of data and technology at all levels of military education and training. The Chinese Army has invested significantly in research and development initiatives that focus on AI applications. Kania (2022a) points out that China is focusing on developing smart systems capable of simulating battlefield scenarios to better prepare their armed forces for complex operating environments. The emphasis of the Chinese Army in the simulations driven by AI allows a rapid and scalable training approach, which reflects a deep understanding of the technology's potential to revolutionise traditional war paradigms. This strategy not only aims to improve the tactical competition of Chinese military personnel but also instils a culture of continuous learning and adaptation to evolving technological landscapes.

While both the EAU and China are taking advantage of AI to improve military education and training, their methodologies differ substantially due to their strategic orientations and historical contexts. The EAU approach in niche applications and strategic associations with technology industries reflects the desire to create a uniquely innovative military culture, promoting agility and resistance to a quick evolution security environment. On the contrary, the integration of large-scale AI in Chinese military education and training underlines a commitment to comprehensive technological superiority, with the aim of creating an expansive training infrastructure that combines human intelligence with artificial abilities.

These international perspectives on the integration of AI provide valuable information about pedagogical innovations that shape modern military education and training. The integration of AI into military education and training environments indicates a change towards more dynamic, adaptable

and data-based methodologies that can significantly improve individual and collective operational effectiveness. The differences in the approach underline the central role of national priorities in the formation of military education and training strategies, presenting opportunities for collaborative learning as nations face similar challenges in this AI era.

A greater exploration of these international perspectives highlights the potential for cross-pollination of ideas and strategies, which allows the military to share the best practices and innovative approaches for the integration of AI. As nations try to make sense of the complexities of modern war and military commitment and examine the advances of each one in military education and training promoted by AI, this could stimulate a shared understanding of effective educational and training methodologies that respond to both technological advances and the change of geopolitical dynamics. Now, the main question is what about Malaysia and its Defence University in terms of military education and training and the adoption of AI? To understand the context, the only Defence University in Malaysia will be the basis of discussions in this paper.

This paper aims to address the question of how AI assists military cadets at the National Defence University of Malaysia (NDUM) in facing their military education and training. In so doing, this paper has two research questions.

1. What are the roles of AI in a military learning environment?
2. How do these roles prepare future defenders of Malaysia?

A military learning environment in this paper suggests that military cadets receive academic and military education and training concurrently; upon graduation with undergraduate degrees, they will be commissioned as lieutenants in the Malaysian Army and the equivalent in the Royal Malaysian Navy and Royal Malaysian Air Force. This is the situation at the NDUM. To understand the Defence University, the next subsection discusses it further.

1.2. The National Defence University of Malaysia (NDUM)

A brief introduction to the NDUM is a must to provide a better outlook of the arguments in this paper. The Defence University plays a fundamental role in modelling national security policies, in improving military education and training and in regional security dynamics within Southeast Asia. As an institution engaged in the development of strategic leaders and in the promotion of academic research in the fields related to defence, the NDUM contributes significantly to the National Safety Framework of Malaysia (Hamzah, Leong & Forbes, 2020).

In terms of the formulation of national security policy, the NDUM acts as a critical think tank that analyses and deals with various security challenges for the nation. The research conducted by its educators and students led to innovative intuitions regarding the defence strategies of Malaysia and collaboration with the international parties (Balakrishnan & Johar, 2023). In addition, the NDUM's initiatives, such as the service programmes to the community, play a crucial role in promoting leadership skills among students, thus preparing them to face the safety problems of the real world (Ismail et al., 2020).

In pursuit of military education and training, the NDUM adopts an approach focused on the students, which not only improves the learning experience but also ensures that graduates are equipped with the skills necessary to effectively operate within complex defence environments (Yusof et al., 2022). It should be highlighted that the student population at the NDUM includes military cadets for three services (the Malaysian Army, Royal Malaysian Navy and Royal Malaysian Air Force), ROTU students (students who are trained under the Reserve Officers' Training Unit (ROTU)) and civilian students. At present, there are about 14 per cent military cadets and 66 per cent ROTU and civilian students. The institution's curriculum is continuously updated to align with contemporary military needs, incorporating advanced technologies and methodologies. The tailor-made assessments for different learning styles further strengthen the academic readiness of students for the challenges that they will have to face in military contexts (Reddy & Ahmed, 2021; Ahmed & Reddy, 2020).

In short, the multifaceted approach of the NDUM includes significant contributions to national security policy, military education and training, and regional security dynamics. With a commitment to innovation and collaboration, the university is ready to model a safe and stable future for Malaysia and its neighbours (Alim et al., 2024; Abd Razak et al., 2020). Through these concerted efforts, the NDUM not only strengthens national defence but also positions Malaysia as a key player to ensure peace and stability in Southeast Asia.

This paper is organised into five main sections, including this introduction that sets the overview of the overall paper. The next section discusses selected literature that contributes to the framework of the

findings, followed by the third section that describes the methodology adopted in this paper. The fourth section presents the findings and further argues about the findings. The last section concludes the paper with two suggestions.

2. SELECTED LITERATURE

This section is divided into three subsections; they include adaptive learning systems, simulation-based training and challenges in the integration of AI in a military learning environment.

2.1. Adaptive Learning Systems

Adaptive learning systems use algorithms that analyse the performance of students in real time, adjusting the delivery of content based on their strengths, weaknesses and learning styles. This personalised approach contrasts strongly with traditional education models for all, which often fall short of addressing the various requirements of military apprentices. By incorporating AI-promoted analytics, these systems can identify knowledge gaps and provide personalised resources to address them, improving both commitment and retention of critical skills. For example, when an apprentice fights with specific tactical concepts, the adaptive system can automatically offer supplementary modules or simulations adapted to that area, facilitating the domain at an individualised pace (Ali et al., 2021).

In addition, the efficiency of adaptive learning systems extends beyond mere customisation. When rationalising the educational process, these systems can reduce training time while improving understanding and acquisition of skills. The simulations promoted by AI allow students to practise their decision-making skills in dynamic environments that reflect the conditions of the real world. This commitment not only increases trust but also prepares military personnel for the unpredictable nature of operational tasks. Such high-fidelity training environments have become possible through advances in virtual reality (VR) and augmented reality (AR), where AI plays a crucial role in the adaptation of scenarios to ensure the relevance and appropriate difficulty for the progress of each student (Szabadföldi, 2021).

The current tendency towards the integration of AI in military education and training also reflects a broader recognition of the changing nature of war and the skills required to navigate it. The growing complexity of military operations, particularly in areas such as cyber war, asymmetric conflict and joint operations, requires a training approach that can quickly respond to evolved demands. Adaptive learning technologies offer a means to achieve this adaptability, which allows military education and training programmes to be aligned with contemporary operating contexts and future challenges. For example, by taking advantage of data from several training exercises, AI algorithms can continually refine instruction methods and materials, ensuring that the training provided is not only current but also anticipatory of the future landscape of the battlefield.

Moreover, the inclusion of AI in military education and training promotes a culture of permanent learning, essential in an era characterised by rapid technological advance. As the abilities of AI evolve, educators must integrate these innovations into their curricula to ensure that the cadets remain experts in taking advantage of the latest tools and technologies in operational environments. The fusion of current professional development with educational frameworks promoted by AI underlines the commitment of military organisations to promote a more capable and agile force, equipped to respond to existing and emerging challenges (Ali et al., 2021).

In summary, the incorporation of AI technologies in military education and training exemplifies a critical change towards adaptive learning systems that remodel training methodologies. By customising educational experience, improving commitment and allowing a proactive response to changing operational landscapes, AI technologies are prepared to redefine the future of military education and training and, ultimately, operational effectiveness.

2.2. Simulation-Based Training

The integration of AI into military education and training has considerably transformed educational approaches through innovations such as training environments based on simulations and VR. This progress improves experiential learning by offering immersive, adaptive and realistic training scenarios that have proven to increase students' commitment and operational preparation (Wang et al., 2020).

Simulation-based training has become a central innovation in military education and training, allowing military cadets (all students too, but as this paper focuses on revolutionising military education and training, the term 'military cadets' or 'cadets' takes centre stage) to engage in realistic battlefield scenarios without the risks associated with live training exercises. AI algorithms can analyse the actions of cadets in real time, modifying scenarios based on individual performance, thus promoting a more personalised learning experience. For example, AI can adjust the complexity of the challenges

presented to military cadets according to their skills and the processes of decision making demonstrated, promoting more in-depth learning and retention (Szabadföldi, 2021). This responsiveness is at the heart of the theory of experiential learning, which postulates that knowledge is built by direct experience (Kolb, 1984). By simulating dynamic environments which reproduce combat situations in the real world, military education systems create opportunities for critical thinking and 'pressure on pressure,' reflecting the complexities of real operations.

The implementation of VR environments, fuelled by AI technologies, further improves the potential of the training based on simulation by offering extensive immersive experiences that engage several senses. These virtual platforms allow military cadets to practise manoeuvres in a safe but realistic setting, promoting skills directly transferable to real operations. The sensory commitment offered by VR has been linked to the improvement of cognitive retention and emotional commitment, which are crucial components of effective learning (Kania, 2022b). In addition, VR scenarios can be designed to include unforeseen variables, forcing students to adapt and develop dynamic strategies, reflecting the unpredictable nature of modern war. Such approaches not only improve tactical preparation but also cultivate resilience and adaptability, essential features for military personnel operating in conditions of uncertainty.

The impact of these educational innovations on students' commitment cannot be overestimated. Research indicates that active participation in the simulations considerably improves motivation, as they can see their skills applied in real time while receiving immediate feedback (Kania, 2022a). This feedback turns into the learning process, allowing military cadets to make critical adjustments to their techniques and strategies, thus promoting a state of growth. In addition, as the commitment deepens thanks to the use of environments facilitated by AI, students are more likely to feel invested in their training and to appropriate their development. This level of engagement is crucial not only to improve individual performance but also to promote a culture of continuous improvement within military units.

Further, as AI continues to progress, the scope and sophistication of VR simulations and environments will likely evolve with it. The future iterations of these technologies could integrate more elaborate decision-making scenarios that require ethical considerations, multi-domain operational strategies and intercultural skills. The ability of AI to analyse large sets of data could lead to the development of scenarios which reflect geopolitical changes in real time, allowing military education and training to remain relevant in an operational landscape constantly evolving. In this way, the integration of AI into military education and training through simulations and VR represents not only a current trend but also a basis on which future training methodologies can be constructed, guaranteeing continuous improvements in operational efficiency and preparation in military contexts.

2.3. ChallengesiIn Integrating AI

By adopting AI into military education and training, there are some formidable challenges which must be resolved to maximise its potential advantages. One of the most urgent concerns is the question of cybersecurity. While military institutions are increasingly adopting AI technologies for training and operation, they are becoming more vulnerable to cyber-attacks. The sophistication of modern hacking techniques constitutes a significant threat, given the sensitive nature of military operations and the data involved. Cybersecurity violations can lead to the exposure of classified information, the mishandling of training modules or the compromising of operational capacities. Consequently, military and civilian educators must prioritise the robustness of their cybersecurity measures while implementing AI systems, ensuring not only the functionality of these innovative tools but also the safeguard of vital national security interests (Morgan et al., 2020).

In addition to cybersecurity challenges, there is a significant resistance to change in traditional military learning environments. The army is often characterised by rigid membership of established protocols and methodologies, which may hinder innovation and adoption of new technologies such as AI. Many military and civilian educators can be sceptical about AI, considering these tools as an additional layer of complexity rather than an improvement in the efficiency of education and training. This scepticism is aggravated by the different levels of technological literacy present in both military and civilian educators at different ranks and levels of experience. Without a concerted effort to promote a culture of acceptance towards technological progress, military institutions are likely to be delayed in the constantly evolving landscape of war and military preparation (Saputra et al., 2023).

Moreover, the potential for AI-focused systems to strengthen military education and training poses another challenge. The training data sets used by AI

algorithms, which often reflect historical data, can perpetuate existing biases in decision-making processes. In a military context, this could lead to the development of training programmes which do not adequately prepare military cadets for the various challenges they can face in contemporary operations. It is essential to promote an environment of diversity and inclusion in the AI design and training programme to mitigate these biases and ensure that the resulting education improves operational efficiency. Consequently, future educational frameworks must respond rigorously to these concerns while simultaneously integrating the capabilities of AI.

The financial implications for the adoption of AI technologies also become a challenge. Significant investments are necessary not only to obtain AI tools but also to develop the underlying infrastructure, provide continuous maintenance and allow continuous updates to reflect the rapid pace of technological progress. Budget constraints can suffocate innovation, especially in the defence sectors, where financing is generally allocated to more immediate and tangible needs such as the capacities and equipment of the military personnel. This financial dilemma complicates the AI integration process into military education and training programmes, and military institutions must carefully resolve these budgetary challenges to ensure that they do not hinder the transformation of educational and training methodologies.

In summary, while the integration of AI into military education and training is considerable to improve training efficiency and operational preparation, many challenges must be met. The risks of cybersecurity, resistance to change, potential biases and financial constraints are all factors that can hinder the successful incorporation of AI technologies. Addressing these challenges proactively will be essential to exploit the full potential of AI in military education and training and guarantee its alignment with the evolutionary needs of defence organisations.

3. METHODOLOGY

The military is on the verge of a significant transformation since AI is integrated into its education and training systems. To innovate military education and training, it is essential to explore qualitative research methods that facilitate an integral understanding of armed forces, perceptions and the broader implications of AI in war strategies. By focusing on qualitative approaches, this paper underlines the transformative impacts of AI on the effectiveness of the armed forces in future conflicts.

In the context of emerging technologies, qualitative research provides an invaluable lens to understand the adaptive military training systems necessary to incorporate AI effectively. For example, Sottilare (2024) emphasises the importance of knowledge management in promoting these adaptive systems. Qualitative ideas about this area can reveal how military personnel acquire, process and apply knowledge in improved environments with AI, thus configuring their future war strategies. The incorporation of qualitative research encourages dialogue and reflection on how AI influences military educational and training methodologies.

In addition, the qualitative exploration of attitudes towards AI among military and civilian educators as well as military cadets is critical. Lushenko and Sparrow (2024) present findings that show a significant change in these attitudes influenced by the integration of AI in military learning environments. By using qualitative methods, researchers can capture the nuance of educator and cadet perspectives, revealing concerns, aspirations and an understanding of their role in future conflicts. This deep understanding helps military institutions in the elaboration of training programmes that not only adopt technological advances but also encourage the sense of agency of a military personnel member within those frames (Chmyr & Bhinder, 2023).

When analysing current applications in military pedagogy, qualitative research illustrates the various methodologies by which military institutions can take advantage of these technologies. Military pedagogy is conceptually defined as teaching and learning in a military learning environment for the purposes of defending the country (see Falk, 2008). Caso (2024) points out that the qualitative evaluations of AI applications in military space operations reveal existing and potential gaps for future investigations. This evaluation is vital to structure educational programmes that are aligned with the current and future war needs, which ensures that the armed forces are not only trained in the tactical use of AI but also critically participate in the ethical dilemmas it presents (Hadlington et al., 2025).

3.1. Semi-Structured Interviews

The effectiveness of interview protocols in semi-structured interviews is essential to improve data analysis and extract significant ideas from participants' responses. Semi-structured interviews are characterised by their flexible nature, which allows researchers to adapt the questions as the

conversation takes place while a general framework is followed (Karatsareas, 2022). This approach provides a balance between consistency and spontaneity, which allows the collection of richer data that often reveals nuanced perspectives.

The deliberate structure of interview protocols facilitates the comparison with different interviews, improving the rigour of qualitative analysis. By creating a road map for the discussion, researchers can ensure that the key issues are covered, while the flexibility inherent in the semi-structured formats encourages participants to prepare or divert outside the script, thus providing a deeper understanding of their experiences and views. In addition, the design of these interviews effectively is a continuous process that implies continuous refinement (Rabionet, 2022). As researchers obtain information from initial interviews, they can adjust protocols to more effectively investigate emerging issues. This iterative flexibility encourages a receptive interview environment, which is essential to capture complex human experiences.

In summary, the structured flexibility of interview protocols in semi-structured interviews significantly improves data analysis and the wealth of ideas derived from participants' responses, which underlines their importance in qualitative research methodologies.

3.2. Population, Sampling and Procedures

Given the above arguments, this paper seeks qualitative data through semi-structured interviews from the educators' population at the NDUM. Currently, there are 381 active educators, and out of these, four military and two civilian educators became the participants of the semi-structured interviews. They were conveniently selected based on their ease of access to the author. As this is just a preliminary work to gauge initial insights into utilising AI for military education and training, this sampling is argued to be sufficient at this stage. Three main questions were asked to all of them, and in between, sub-questions were asked depending on the main responses. The three main questions include,

1. What will be the roles of AI in military education and training at the NDUM?
2. How do these roles develop future effective military officers?
3. Why is AI becoming an important aspect for military education and training at the NDUM?

The questions were adopted from Khan et al. (2024). Moreover, each of the participants spent about 10 to 15 minutes to offer their perspectives on the roles of AI in a military learning environment and the ways these roles assist cadets to face the unknown challenges of the 21st century.

3.3. Data Analysis

The author adopted a manual thematic analysis for the findings from the semi-structured interviews. Thematic analysis is a vital qualitative research approach that allows researchers to identify, analyse and report the themes within the data. Following a systematic procedure is crucial to obtain robust results. Each step is an integral part to ensure that the analysis remains coherent and complete. The data coding techniques act as the spine of thematic analysis. The initial codes are developed through a detailed data examination, which allows the emergence of models relating to research applications (Dawadi, 2020). The researchers must interact with the data in an iterative way, since this promotes a deeper understanding and reveals unique insights that may not be easily evident.

In addition, the context plays an essential role in the interpretation of the themes. The meaning derived from qualitative data may vary significantly based on the social, cultural and situational contexts in which the data were collected (Christou, 2022). By incorporating the context into thematic analysis, researchers improve the validity and richness of their discoveries, which eventually contribute to a more nuanced understanding of the phenomena studied. This global approach ensures that thematic analysis not only reveals significant models but also transmits the complexities inherent in qualitative research.

4. FINDINGS AND DISCUSSIONS

4.1. Demographic Information

Table 1: Participants' Details (In No Particular Order).

Labels	Gender	Years of Teaching	Familiarity with AI tools	Type of Educators
R1	Male	6	Yes	Military
R2	Female	10	Yes	Military
R3	Female	12	Yes	Civilian
R4	Male	13	Yes	Military
R5	Male	8	Yes	Military
R6	Male	10	Yes	Civilian

Table 1 presents the demographic information of the participants. All of them have two main similarities: they are familiar with AI tools, and they have been teaching for more than five years. These could be critical indicators to ensure solid and sound responses during the semi-structured interviews.

4.2. Answering The Research Questions

Two research questions posed earlier will be answered in this subsection. The findings will be discussed and analysed accordingly.

1. What are the roles of AI in a military learning environment?

Based on the analysis of data, four main themes emerge. The author interprets these themes as the roles of AI in military learning environments. These themes are presented in Table 2 below.

Table 2. Emerging Themes.

Labels / Themes	Military Education and Training	Simulations	Decision Making	Readiness
R1	/	/	/	/
R2	/	/		/
R3	/	/	/	/
R4	/	/	/	/
R5	/	/	/	/
R6	/	/	/	

According to R1, R3, R4 and R5, the integration of AI in military education and training, simulations, decision making, and operational readiness is transforming how modern armed forces prepare and engage in operations. AI technologies provide exclusive resources that improve learning environments, thus preparing military cadets for complex scenarios through advanced training methods. The paragraphs below further explore these various roles, emphasising their potential to optimise military education and training and operational efficiency.

One of AI's main roles in military education and training is the improvement of e-learning platforms. R1 and R2 discussed how AI techniques can be used to improve e-learning processes in military learning environments (see also Alnaqbi, 2020). By customising learning experiences, these technologies ensure that training is adapted to the individual needs of cadets, thus promoting the acquisition of more effective skills. For example, adaptive learning systems can evaluate the performance of a military cadet, adjust the content of the agreement and provide immediate feedback, making the learning process more efficient and engaging.

In addition, AI significantly increases simulation training, which is critical to the preparation of troops for real-world scenarios. All participants opined that advanced AI-powered simulations can create realistic environments that mimic the complexities of tactical situations. R4 put forth that these simulations may replicate a wide range of unexpected variables and challenges that the armed forces can face in the field. The immersive nature of AI-orientated simulations not only allows military cadets to practise their skills in a safe environment but also develops their decision-making capabilities under pressure. This level of preparation is essential for operational readiness, as it helps personnel create confidence and competence.

Consequently, apart from improving educational and training systems, AI contributes to enhancing decision-making processes in military operations. Five participants agreed on this, and they argued that due to the challenges and perspectives around AI in military engineering training, data-orientated ideas facilitate quick and informed decision making. As AI algorithms can analyse vast amounts of data, ranging from battlefield intelligence to logistical considerations, R5 further commented that these provide the commanders with actionable insights. This capacity allows more agile and well-informed strategic planning, which is increasingly vital in modern war.

The participants also commented on the readiness of military personnel when AI is utilised. According to R2, operational readiness is reinforced by AI tools that optimise resource management and logistics. This is then supported by R4 and R5. They argued that the ability to predict equipment needs, manage maintenance schedules and efficiently allocate is critical to ensure that military units are always prepared for action. Alnaqbi and Yassin (2021), in their work, also emphasise that AI's role in logistics processes in military education systems shows its potential to improve overall operational efficiency. By simplifying these processes, military organisations can ensure that resources are allocated properly, thus increasing the readiness for implementation.

In short, the various AI roles in military education and training, simulations, decision making and operational readiness highlight their transforming potential in modern learning environments. By improving personalised learning, creating realistic simulations, facilitating informed decision making, optimising logistics and supporting adaptive training methodologies, AI technologies serve as catalysts to improve military performance. As military organisations such as the NDUM continue to adopt these advances, the future of military education and training and operational strategy will probably be shaped by AI capabilities, positioning the Malaysian Armed Forces (MAF) to meet the complexities of modern war more efficiently.

2. How do these roles prepare future defenders of Malaysia?

AI is increasingly transforming military education and training, simulations, decision-making processes and operational readiness. R1, R2 and R5 suggested that the integration of AI in these sectors is essential to improve national security and operational effectiveness. By exploring the multifaceted roles of AI, they argued that its application significantly elevates the abilities of the future defenders of Malaysia.

The influence of AI on military education and training is profound, in particular in the development of cognitive readiness between military cadets. Cognitive readiness refers to the mental state that allows military personnel to function effectively in variable conditions. R3 opined that enhancing future military personnel of Malaysia through cognitive readiness does not only concern physical training but also includes mental agility, adaptability and decision-making processes in complex environments. Further, R5 put forth that the training modules guided by AI can simulate tactical scenarios of real life that challenge the military cadets to think critically and respond promptly, thus improving their cognitive readiness.

Further, AI is argued to improve the refinement and realism of military simulations. As suggested by R5 and R6, challenges in training and simulation for improving civil-military coordination during the response to catastrophes can be mitigated through AI technologies. Using simulations, Malaysia can create highly engaging training experiences that prepare military cadets for various challenges, including complex response scenarios for catastrophes. The ability to recreate realistic environments promotes better preparation and coordination between military units and civil agencies.

The decision-making process is another critical area in which AI acts as a force multiplier. According to R3, AI systems can analyse large quantities of data in real time, providing the commanders with critical insights and predictive analyses that inform strategic decisions. R4 further added that the concept of cognitive readiness is intrinsically linked to an effective decision-making process, and AI could facilitate this to ensure that military leaders have access to the impossible intelligence when it matters more. This ability is essential for Malaysia, as it must maintain situational awareness in increasingly dynamic and complex safety environments.

Furthermore, the impact of AI on operational readiness cannot be overrated. By advancing the cognitive tactical readiness, R5 claimed that military personnel are translating their training experiences into practical applications in the field. He further discussed how the transfer of training can be significantly improved through AI technologies, since cadets can practise and perfect their skills in variable simulated conditions. This coherence in training leads to a better operational efficacy, essential to guarantee national security.

Nonetheless, three respondents were concerned about a few risks. According to R2, R3 and R6, the integration of AI places some challenges, including cyber threats, expensive systems, dependence on the systems, and continuous evaluation of their effectiveness and potential prejudices in decision-making processes. It is essential for military leadership then to manage these risks, in particular as they implement initiatives based on the training and operational purposes. All participants further claimed that the NDUM must be equipped with sufficient AI technologies to support these cadets' needs and ultimately the MAF's needs.

In short, the roles of AI in military education and training, in simulations, in the decision-making process and in readiness offer a paradigm change for the future defenders of Malaysia. By improving cognitive readiness, providing realistic training simulations and facilitating the informed decision-making process, the operational capabilities of the MAF are improved. As indicated by various studies, including those of Alim (2023) and Nordin et al. (2024), the future of Malaysian National Security will undoubtedly be defined by how much these tools are integrated into military operations.

4.3. Discussion

The integration of AI in military education and training represents not only technological progress but a strategic pivot that could redefine the way the armed forces train the military personnel. In an era characterised by a rapid technological evolution, it is essential for military institutions to embrace AI to improve educational and training methods and operational readiness. AI can provide tools for personalised learning experiences, simulate complex combat scenarios and collect insights from large quantities of data quickly and efficiently. The improved educational and training platforms powered by automatic learning algorithms can adapt to individual learning styles and stimulation, thus allowing a more rigorous and tailor-made educational and training framework. This aligns with the need for the adaptability forces in an increasingly unpredictable combat environment.

However, the deployment of AI in military education and training is not without complexity and intrinsic challenges. The double-edged nature of AI

implies that, although it can optimise training and improve the decision-making process, it simultaneously introduces vulnerability that needs careful management. One of the predominant risks associated with AI technologies is the threat to computer security. The integrated systems with AI are not only precious resources but also main objectives for hostile entities that try to exploit the weak points. Cyber-attacks on military education and training programmes can compromise sensitive information and degrade operational readiness, placing existential threats to national security (Smith et al., 2023). Given the significant branches of these violations, it is essential for military institutions to adopt solid computer security measures together with the integration of AI to ensure the integrity and confidentiality of their educational systems.

Another critical risk is manifested in the form of algorithmic prejudices, a concern that has aroused growing attention in recent years. The effectiveness of AI systems depends on the data on which they are trained. If the training sets are distorted or reflect existing prejudices, the resulting algorithms can perpetuate discrimination, leading to unjust and potentially imperfect formation results (Johnson, 2023). The prejudice in AI could compromise the fundamental values of the military of fairness and equity and ultimately influence staff decisions that could have consequences of vast scope on the cohesion and effectiveness of the unit. Therefore, the identification and mitigation of the distortion must be fundamental in the operation of AI in military educational settings.

Given these deep opportunities and challenges, military and civilian educators at the NDUM must adopt maximisation strategies that allow the benefits of AI, contrasting its associated risks. To this end, political recommendations should be explored. Firstly, military institutions must prioritise investments in information technology (IT) security infrastructures that use advanced processing techniques for predictive analysis relating to potential attacks. The NDUM receives its annual budget from the Ministry of Higher Education, Malaysia, and not the Ministry of Defence, Malaysia. Hence, the Defence University relies on its Department of Information Technology and Communication (DITC) to ensure security of the infrastructures. Furthermore, audits of AI systems must be done regularly by the DITC, which ensures the current conformity with the safety protocols and the actual identification of vulnerabilities.

Secondly, it is essential to implement rigorous training protocols that not only educate top management, educators, administrative staff and students at the Defence University on the functionality of AI tools but will also affect a critical awareness regarding algorithmic distortion. Comprehensive training for all on ethical implications and the operational use of AI technologies must address specific areas, such as recognising algorithmic bias, understanding data privacy laws and navigating ethical dilemmas associated with the application of AI in military contexts. This training encourages a culture of responsibility and a critical evaluation with respect to AI systems, which can ultimately contribute to the effective and ethical application of these technologies in military education and training. This educational component could include seminars, training on diversity and simulations that prepare all layers and groups at the NDUM to recognise and face potential prejudices in AI results.

Finally, it is essential to establish a transparent picture for the ethical application of AI in military education and training. This framework should involve guidelines for data collection, the development of the algorithm and the evaluation metrics to ensure responsibility and consistency in educational and training practices based on AI. It would be prudent to advocate the transparent development of AI and acquisition processes within the armed forces. Policy formulators must demand that industries' selections be based on both technological competition and ethical standards, thus ensuring that any tool introduced into military education and training systems adheres to the reference points of high responsibility and operational integrity. This level of transparency will not only improve confidence in AI applications among military personnel but also ensure continuous alignment with national security objectives and democratic principles.

In summary, while AI presents a promising road to improve military education and training, all are required to give priority to IT security, mitigate prejudice and include complete training and ethical supervision. Through these arguments, military institutions such as the NDUM can cultivate a culture that embraces the progress offered by the interval that safeguards its potential risks. Establishing a collaboration between agencies can improve the exchange of information about the best practices and lessons learnt about the deployment of AI in military institutions. When creating networks between military branches and civil experts in the ethics of AI, cybersecurity and education, a more holistic approach can be developed. These collaborations will

allow a better understanding of the limitations and capacities of AI, ensuring that evolutionary threats are met with informed and coordinated responses. By strategically implementing these policy requirements, military educational institutions can not only take advantage of the potential of AI technologies but also safeguard against the inherent risks they present, creating a more resilient and ethical approach to military education and training in the era of advanced technology.

5. CONCLUSION

Two suggestions could be proposed based on the findings and discussions in the previous section. First, the Defence University must be quick to adapt AI in its military education and training because AI has become a significant tendency that is remodelling traditional educational and training methodologies. Current curricula at the NDUM must take advantage of AI technologies to improve operational effectiveness and personal development of the cadets.

In the heart of this transformation is the adoption of adaptive learning systems, which personalise education and training experiences to meet the unique needs of individual military cadets, thus promoting a more efficient and directed military learning environment.

Second, following this, the NDUM must be prepared to allocate massive financial commitments for the best possible AI tools and technologies for the student population. Without these, the military cadets may miss the opportunities to explore simulated military training, fast and accurate decision-making practices and cognitive and operational readiness. Preparing for the future defenders of Malaysia is a huge responsibility, and it is high time that these AI tools and technologies become of the utmost importance at the NDUM.

Prospectively, current trends illustrate the growing extent of AI applications in military education and training. For example, the simulations fuelled by AI can reproduce complex scenarios on the battlefield, offering cadets immersive environments that improve cognitive and emotional resilience. These technologies are designed to dynamically respond to the actions of military cadets, offering real-time comments that are crucial for skills development.

In addition, AI-centred analyses facilitate the evaluation of cadets' performance on a much finer scale than traditional methods, allowing information based on learning results. This leads not only to better operational preparation but also promotes a culture of continuous improvement within military education and training.

In addition, the educational innovations introduced by the integration of AI extend beyond simple improvements in existing systems. They question the rooted notions of hierarchy and control in military training environments. AI's ability to facilitate learning and collaboration scenarios between peers illustrates this change. By taking advantage of AI technologies, military education and training can promote environments that encourage experimentation and adaptive learning, questioning the traditional dynamics of power which often suffocate creativity and initiative among the military.

Looking towards the future, the trajectory of integration of AI into military education and training at the NDUM indicates an increasingly sophisticated and intertwined relationship between technology and human operators.

As AI technologies evolve, especially in fields such as autonomous systems and predictive analysis, military educational and training methodologies will have to adapt accordingly. This development raises critical questions about the implications for decision-making processes in the field and the necessary ethical considerations that accompany this progress. The potential of AI to act as a multiplier of force in military operations highlights the importance of understanding not only its technological capacities but also its impact on human operators.

Given this, future work should include more participants for the semi-structured interviews, and the student population too should be part of the future research. It is also pertinent to investigate the stance of the MAF on utilising AI for its armed forces, especially at the training centres, including the Defence University. Lastly, a comparative study on how Southeast Asia's countries adopt AI in their military education and training could also be conducted, especially in trying to understand the geopolitical constraints and security of the region.

To conclude, the integration of AI into military education and training means a transformative moment in which traditional educational and training methodologies are redefined. While the armed forces embrace this technological wave, the implications for operational efficiency are deep.

The synergy of human intelligence and the capacity of AI promise to increase agility in military operations, ultimately reshaping how military cadets are educated and equipped to deal with the complexities of contemporary war. The continuous exploration of the role of AI in this context is not only to improve the efficiency of training but also to

prepare military personnel for an uncertain future, where technological adaptability will be vital.

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