



Current Status, Challenges and Strategies of Artificial Intelligence and E-learning the UAE Military Education System

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Abstract: Recently, UAE has adopted Artificial Intelligence (AI) and e-learning system in several fields including education. Together with the institutions running on conventional educational system, military colleges have also embraced this new technology. This study assessed the current status of adoption, challenges and strategies of using AI based e-learning system in the UAE military based colleges. The study was carried out based on the perception of the teachers and students of Joint Command and Staff College (JCSC). A set of the questions was presented to the 50 teachers and 157 students for highlighting the level of agreement for each question. The questions were divided into three sections as level of adoption, challenges, and strategies in using AI based e-learning education system. The study found that for current status, AI and e-learning have got significant popularity in the education system due to high level of flexibility. While the challenges, the lack of human relations between teacher and student is reported as the major challenge faced in adoption of AI based e-learning system. Finally, for the strategies, the respondents indicated that the UAE is trying to develop plans and alternatives to address the discrepancy between traditional teaching and artificial intelligence methods adapted in the military college. This study provides a valuable source of information for devising strategies to promote the uses of these modern tools and also motivate the students to get the maximum benefits of AI and e-learning technologies.

Keywords: Challenges and strategy of artificial intelligence, e-learning, military colleges, UAE

1. Introduction

Military education is primarily concerned with preparing students for specialized skills required in future combat. The goals, motivations, and applications sought by the students are different in civilian and military education. In traditional civic education, success is measured by the amount of knowledge gained through the lecture program. So the range of educational attainment is generally unrestricted. The purpose of military education is to prepare military personnel for specialised jobs and missions. In military education systems, learning is measured by the student's ability to master predetermined doctrines and standards. Military education aims to transform the cadet officer from a junior officer to a military specialist (Tung et al., 2009).

Military education encompasses various training programs, ranging from the primary curriculum to in-service education and advanced educational programs. In addition to completing the primary curriculum, military officers should receive specialized short-term training in schools of various military branches, such as infantry schools and armor schools and artillery schools, and so on (Seow et al., 2005). It is not easy for the officers in military colleges to leave their training and pursue an education on a traditional campus. This dilemma has been addressed in recent years by introducing distance learning and e-learning systems, which have grown in popularity due to the growing need to

train noncommissioned officers in rapidly changing international conflict scenarios (TRADOC, 2001). The use of e-learning in conjunction with computer-based training is effective in improving officers' combat educational abilities (Roffe, 2002; Urdan & Weggen, 2000). DUSD (1999) of the United States Department of Defense conducted the first studies on e-learning applications in military education, followed by Bonk and Wisher (2000) of the same department. An investigation into the integration of online learning technologies with traditional military education programs proved that the use of online learning systems improves military education efficiency (Sentz, 2006; USGA, 2004). Military education is the training of military officers to lead their troops effectively in both peace and war. Recruit training is followed by military-specific education and training and may require additional training during an army career (Sen, 2013). Military academies and institutes have to consider several factors which affect the operational and combat performance of the military, such as the use of advanced combat weapons or the training of the national workforce

Given that student officers frequently find it difficult to leave their on-campus programs, online learning is essential in the field. More importantly, with the advancement of computing and internet technologies, the e-learning approach can effectively provide distance learning through artificial intelligence systems comparable to learning efficiency to on-campus programs (Tung et al., 2009). In a similar vein, the government of the United Arab Emirates places a high priority on military education and training. It aims to meet the urgent needs of military colleges and institutes by enhancing learning through new technology (Revolvy, 2018). Consequently, they will avoid the situation where they are forced to use the old traditional method and outdated educational methodologies in a country that has established the world's first ministry of artificial intelligence at some point in the future.

Military education students in the United Arab Emirates also face the same difficulties. Besides these, the Emirati military students realize the need for modern educational technologies such as Artificial Intelligence (AI) that make it easier and more flexible to balance their education with their daily military responsibilities (Revolvy, 2018). Increasing interest in e-learning and artificial intelligence techniques has resulted in several universities and colleges adopting this technology as a solution. It has made it easy for students to acquire knowledge while exerting the least effort and reaping the greatest possible benefit. A variety of e-learning tools have become a part of the learning process. Artificial intelligence systems are among the software tools that can improve the effectiveness of learning management systems to improve the learning process (Salloum et al., 2019).

But various factors influence the success of such environments, and it is essential to consider all of these factors when developing a successful and effective e-learning system. Salloum et al. (2019) reported that most learners do not continue their e-learning courses and prefer traditional learning methods. As a result, it is critical to comprehend the factors at play to prevent the learner from having a "negative experience that results in superficial learning" (Alkandari, 2015). These considerations may influence learners' acceptance, willingness to participate, and decision-making regarding the long-term adoption of e-learning. Hence, when a new e-learning environment or artificial intelligence tool is introduced into the learning process, institutions and teachers must demonstrate their willingness to use these systems to encourage students to accept and fully utilize them. It is essential to consider with the degree to which learners accept e-learning and artificial intelligence systems (Kanwal & Rehman, 2017) and the extent to which systems are implemented will ultimately determine the success of these initiatives (Van Raaij & Schepers, 2008). Therefore, this study aims to examine the acceptance of e-learning in the military educational environment in the United Arab Emirates and determine the strategies and budget that the government has established. In addition, this study considers the challenges that students face in accepting and spreading this learning and the importance of student acceptance and spread.

2. Artificial Intelligence (AI) and E-learning

Artificial intelligence (AI) is a program written in a logical programming language that simulates human intelligence and performs tasks based on previously collected data. As a result, artificial intelligence (AI) technologies provide more remarkable ability to see (computer vision), hear (speech recognition), and understand (natural language processing) than has ever been possible before, as illustrated Figure 1 (Rouhiainen, 2018).

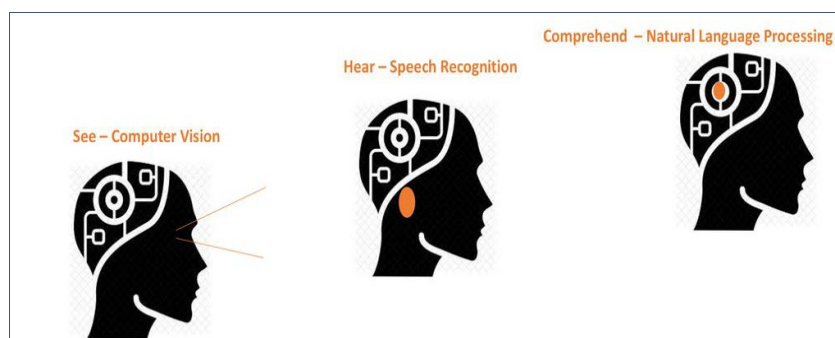


Fig. 1 - Function of AI (Rouhiainen, 2018)

Artificial Intelligence (AI) includes Machine Learning (ML) and Deep Learning (DL). AI encompasses a wide range of industries such as finance and legal, manufacturing and advertising technology, and medical and oil and gas. Artificial intelligence technology has the potential to transform a wide range of industries. The applications of artificial intelligence are depicted in Figure 2.

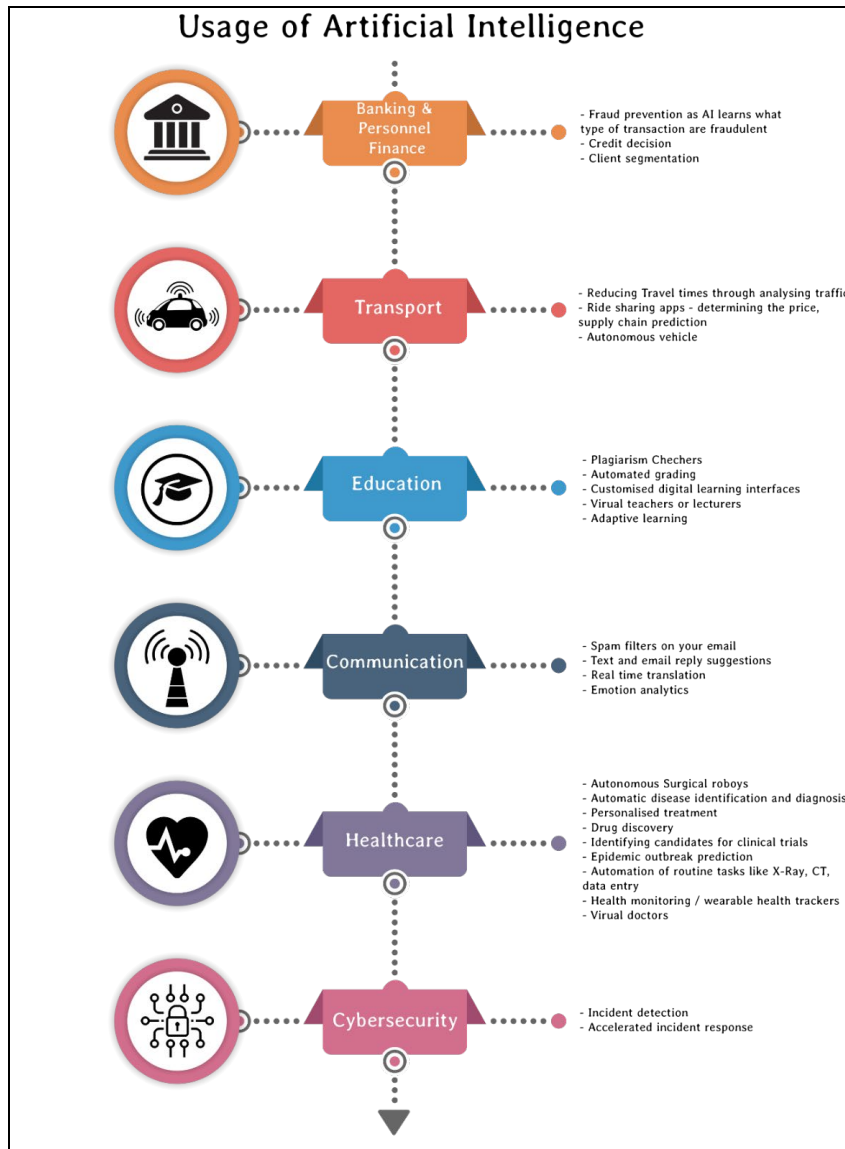


Fig. 2 - Uses of AI (OneRageTime, 2018)

Rouhiainen (2018) depicted that AI has a tendency to change the future of education by providing personalized education platforms, individualized AI coaches, individualized artificial intelligence tutors, and making the learning experience more enjoyable.

E-learning is a modern method of learning that has become an essential component of the Emirati educational system and has altered people's perceptions of education as a whole (Ischebeck, 2017). E-learning refers to the use of data and communication technologies to provide online learning or teaching resources. E-learning has the advantage of referring to any knowledge that can be accessed electronically. Individual researchers define this term to include web-enabled or web-based learning (Arkorful & Abaidoo, 2015). E-learning can be teacher-led, facilitated, or student-led. It can be synchronous or nonconcurrent, and class sizes can range from one to thousands of students. E-learning can exist independently or as part of an online record, user interfaces for a computer program, or a business procedure (Horton, 2018). E-learning encompasses a wide range of activities classified in three categories: text-based, participatory, and simulation (Ferriman, 2008). In text-based learning the contents are primary and consist of graphics, text, audio, videos, and basic test questions. Compliance courses are a better example of text-driven e-learning, which generally has one goal. The text-based course contains few interactive elements, no gamification, and images are used sparingly. Powerpoint files that have been converted to e-learning are frequently included in this category. Participatory learning

is interactive e-learning system. It uses visuals such as graphics, charts, diagrams to interact. Unlike text-based courses, interactive courses make use of additional media types such as videos.

Similarly, custom simulations that may include 3D components will aid in learning acquisition. New programming training is an example of a course that frequently includes interactivity and simulations. Simulation in e-learning emphasizes depicting concepts through various mediums, typically beginning with text and graphics and progressing to audio and video examples. E-learning is regarded as one of the best educational strategies. Several studies have discussed the advantages of adopting e-learning in schools.

Several researchers (Arkorful & Abaidoo, 2015; Baleni, 2015; Goyal, 2012; and Hoková-Mayerová & Rosická, 2015) have discussed the benefits of implementing e-learning in education such as follow;

- a) E-learning is an adaptable approach where each student can choose a location and time at his convenience. It is also high flexibility in terms of time and the conveyance or receipt of learning data.
- b) E-learning improves the viability of information and capabilities by providing easy access to a large amount of data.
- c) It provides opportunities for students to form relationships through dialogue discussions. E-learning removes barriers to participation, such as the fear of conversing with other students. It encourages students to collaborate with others and improves relationships through continuous learning and communication ease.
- d) E-learning is inexpensive; students do not need to travel. Similarly, it is cost-effective because it provides open doors for learning for the most significant number of students while not necessitating the construction of numerous buildings.
- e) E-learning considers the differences of individual students. For example, some students want to concentrate on specific aspects of the course, whereas others want to go over the entire session, e-learning is suitable for both types of the students.
- f) E-learning compensates for the shortcomings of academic staff, including teachers or instructors, facilitators, lab professionals, and so on.
- g) E-Learning allows for self-paced learning. For example, the nonconcurrent method allows all students to learn at their own pace and pace, whether slow or fast. As a result, it increases fulfillment while decreasing pressure.

Besides the advantages, the e-learning system has some limitations and negatively impacts (Arkorful & Abaidoo, 2015; Baleni, 2015; Goyal, 2012; Hoková-Mayerová & Rosická, 2015). Common limitations and disadvantages of e-learning are:

- i. E-learning as a teaching technique has the effect of causing students to feel contemplation and distance as well as a lack of communication or connection with others.
- ii. E-learning technique is less persuasive than traditional learning strategies in terms of explanations, clarifications, and understandings in the long run.
- iii. The use of e-learning methods may hamper students' communication skills. As a result, the students with excellent academic knowledge may lack of the necessary communication skills.
- iv. It is difficult to control or manage activities such as cheating in an e-learning system.
- v. E-learning environments may create plagiarism, poor decision-making abilities, cheating, and inappropriate copy-and-paste amongst students.
- vi. Not all specializations can benefit from the use of e-learning in educational settings. Certain fields require hands-on practical experience, which is difficult to achieve through e-learning means. In the field of sociology and the humanities, it seems suited to e-learning compared to science and engineering disciplines that require practical skills.

3. E-learning Using AI Technology

The UAE government is using Artificial intelligence to improve government performance, accelerate achievement, and foster innovative work environments (UAE Government, 2018). The UAE Cabinet has established a new body, the Emirates Artificial Intelligence Council, which will monitor and oversee the integration of artificial intelligence technologies within government agencies and the education sector. The council is in charge of developing policies, constructing an artificial intelligence-friendly infrastructure, and encouraging advanced research in artificial intelligence. It promotes collaboration between the public and private sectors and international organizations to accelerate the adoption of artificial intelligence technology. The Emirates Council for Artificial Intelligence is responsible for putting the UAE's artificial intelligence strategy into action. They established an artificial intelligence training programme to close the skills gap in the technology sector, assist youth, and improve their chances of overcoming challenges in the rapidly changing information technology industry. With the assistance of Dell, a leading technology company, students can play a critical role in increasing the efficiency of government institutions by up to 80% while also achieving cost savings of up to 45%, resulting in millions of dollars in cost savings (UAE Government, 2018).

Civil and military institutions in the United Arab Emirates were encouraged to adopt cutting-edge technologies such as artificial intelligence and electronic learning. As a result, the United Arab Emirates dedicates a portion of its budget to the fields of technology and digitalization. Furthermore, its universities and military colleges allocate a portion of their budget to support e-learning and introduce assistive mechanisms to implement artificial intelligence; military colleges in particular are currently working on developing military education strategies (in terms of training assistance) that are compatible with AI education systems, as well as developing plans and alternatives to bridge the gap between traditional teaching methods and AI-assisted education systems. When used to stimulate the digital transformation, Artificial intelligence can provide solutions to many of the labor market's challenges in a variety of sectors, most notably education. It accelerates the creation of job opportunities required by the knowledge economy. It emphasizes investing in the educational system to keep up with the Fourth Industrial Revolution (fourth industrial revolution) (Salloum et al., 2019). In addition, the promotion of innovation and the provision of advanced education enhanced by artificial intelligence and in line with labor market demands are required in the present and the future. Several of these challenges revolve around the main trends of the digital education era, which forces educational institutions to change their policies and rely on hybrid curricula that are far removed from traditional education in terms of skill development, motivation innovation in students, and motivational innovation in teachers (AlHamad, 2020).

Recently, there has been a significant increase in artificial intelligence and online learning in the United Arab Emirates, and there are some encouraging signs. Because of the importance and flexibility of artificial intelligence-based systems compared to traditional education, they have seen a significant increase in their adoption in military education over the past few years. The use of technology, particularly e-learning techniques, is becoming a more widely recognized strategy for developing students' independent, critical, and strategic thinking abilities, among other things. Taking advantage of current information and technology trends has become essential and beneficial for military personnel as well as civilian personnel. Soldiers must receive training in a technologically supported environment to be prepared for the challenges they will face once they enter the workforce (Halaweh, 2018). As a result of these digital technologies, communication is facilitated by the ability for students to present their points of view to a variety of audiences and the exposure of students to the perspectives of others (Arghode et al., 2017). Understanding is more important than memorizing facts, and it is this understanding that military officers require the most in combat and war training situations (Reid-Martinez & Grooms, 2021).

4. Research Method

This study adopted quantitative approach where the data was collected through structured questionnaire and the collected data was then analysed statistically. Literature review which is the secondary source of information has identified the associated factors or items of this study. From these items/factors, it was converted into questionnaire to gathered the primary source of data for this study (Saunders et al., 2007; Plessis et al., 2015). The primary information for this study was collected through a questionnaire survey from the teachers and students of Joint Command and Staff College (JCSC). The questionnaire comprises of several information that regard from the respondents, including the demographic data, the level of adoption of the AI and E-learning system, and the strategies & the challenges in using AI and E-learning systems. The assessment was done based on a 5-point Likert scale to for recording the importance level of the attributes investigated. The scale was adopted from (Gamil et.al. 2020; Nasaruddin and Rahman, 2019) where 1 for “unimportant”, 2 for “of little importance”, 3 for “important”, 4 for “moderately important,” and 5 for “very important”. Collected data was analyzed with the help of the Statistical Packages for the Social Sciences (SPSS) software.

5. Results and Discussions

This research studied artificial intelligence (AI) and e-learning in the UAE military education system. The assessment was based on students' and teachers' perceptions of the military education system. A structured questionnaire was used to record the participants' perceptions. A total of 207 questionnaire forms were collected and analyzed. The findings obtained from the analysis of the questionnaire are discussed in the following sub-section.

5.1 Respondents Demography

Demographic information describes the characteristics of the respondents participating in the data collection process. This plays a vital role in deciding the reliability of the respondents by confirming their practical expertise level. The demographic information of the respondents participating in the data collection for this study is presented in **table 1** below.

Table 1 - Respondents demographic information

Category	Items	Teachers/instructors		Students	
		Frequency	Percent %	Frequency	Percent %
Gender	Male	50	100.0	157	100.0
	Female	-	-	-	-
Educational level	Diploma	5	10.0	9	5.7
	Bachelor's Degree	20	40.0	111	70.7
	Master's Degree	10	20.0	23	14.6
	Ph.D. Degree	15	30.0	14	8.9
Years of Experience	Less than 5 years	-	-	2	1.3%
	5 to 10 years	-	-	7	4.5%
	10 to 15 years	-	-	6	3.8%
	More than 15 years	50	100.0%	142	90.4%

Table 1 reveals that all the participants contributing to data collection in this study are male participants, including 50 teachers and 157 students. Among these participants, 14 respondents are diploma holders, which comprise of 5 teachers and 9 students. A significant number of students with 131 respondents have completed bachelor level of education while 33 respondents are masters’ degree holders and 29 respondents are Ph.D. holders. Among these participants, 50 respondents are teachers and affiliated with teaching for more than 15 years.

5.2 Current Status of AI and E-learning in the UAE Military Education System

The status of the adoption of AI and E-learning adoption in the UAE Military education system was assessed based on the perception of the teachers and students affiliated with the military education system. The results of the analysis are presented in **table 2**.

Table 2 - Current status of the application

No.	Current status	Mean	Rank
1	Artificial Intelligence (AI) and e-learning applications are widely used and applied in universities or institutes of the United Arab Emirates.	3.92	3
2	There is a significant dependence on AI technology in military education due to its importance in improving education quality, better understanding of educational courses, and enhancing human thinking.	3.94	1
3	It is essential to adopt Artificial Intelligence and e-learning applications in the military education process.	3.87	4
4	Artificial Intelligence (AI) method in learning will be more advantageous than the traditional way.	3.93	2
5	There is an expansion in intelligent education systems and a human trainer in various ministries and sectors in the Emirates.	3.83	5

Table 2 indicates that the mean value for the attributes measuring the status of the AI and E-learning is 3.90. From this value, it can be interpreted that the adoption of AI and E-learning in military-based colleges is at a high level. This means that the military educational colleges are adopting advanced technology rapidly to experience the maximum of its benefits. Overall, smart technologies are widely applied in Emirati universities and institutes. The military education system is also grabbing these because of their importance and flexibility. These results are consistent with studies (Almekhlafi, 2009; Salloum et al., 2019; AlHamad, 2020), pointing out that in UAE, contemporary learning technologies are being adopted widely. Further, among the attributes, the attribute “*There is a significant dependence on AI technology in military education due to its importance in improving education quality, better understanding of educational courses, and enhancing human thinking*” has been acknowledged as the highest-ranked attribute by the student and teachers defining the adoption of AI and E-learning in the military colleges of the UAE.

5.3 Challenges of AI and E-learning Application in the UAE Military Education System

Commonly, adopting any new tool technology faces several challenges before it is popularized and implemented successfully. These studies investigate the challenges faced in using AI and E-learning in the educational system the recording the perception of the teachers and the students, as summarized in **table 3**.

Table 3 - Rank of the challenges

No.	Challenges	Mean	Rank
1	Curriculum pressure.	3.60	4
2	Difficulty tracking student progress.	3.54	6
3	Development of grades via e-learning is more complex	3.55	5
4	Correcting assignments and examinations	3.61	3
5	Difficulty organizing the time allotted for each session	3.48	7
6	Rigidity of curricula in keeping pace with developments and innovations	3.66	2
7	Lack of human relations between teacher and student	3.67	1

From **table 3**, it is clear that the major challenge in the adoption of AI and E-learning is “*Lack of human relations between teacher and student*”. The success of the AI and E-learning depends on the strong coordination and communication between the stakeholders or beneficiaries to apply the newly developed system. Further, often there is a gap between the teachers and students. This gap needs to be reduced within the boundary of educational developments by enhancing human relations. On the contrary, the participants mentioned that “*Difficulty organizing the time allotted for each session*” is the least important challenge in adopting AI and E-learning systems in the military educational system.

5.4 Strategies of AI and E-learning in the UAE Military Education System

Realizing the importance of AI and E-learning in the educational system, the practitioners and the policymakers have proposed several strategies. However, seven common strategies identified from the literature review were examined in the context of the UAE's military colleges and analyzed with the mean value for ranking these strategies. The results obtained from the analysis are presented in table 4.

Table 4 - Rank of the strategies

No.	Strategies	Mean	Rank
1	Military institutions need to change regulations when using artificial intelligence in the educational process in an appropriate manner.	3.88	5
2	The UAE allocates an appropriate annual budget to implement artificial intelligence and digital transformation for future education in the armed forces.	3.90	3
3	The Military College in the Emirates allocates a specific budget from its income to modern technical mechanisms that support artificial intelligence and e-learning.	3.93	2
4	The state is developing military education strategies (in terms of assistance in training) to be compatible with AI education systems.	3.87	6
5	The UAE is trying to develop plans and alternatives to address the discrepancy between traditional teaching and artificial intelligence methods adapted in the military college.	3.94	1
6	The UAE's Artificial Intelligence strategy states that using Artificial Intelligence and e-learning in the education sector reduces education costs and increases the desire to learn.	3.86	7
7	The Emirates Military College leadership sets strategic goals to develop new teaching methods and apply new strategies to enhance the educational process, including artificial intelligence.	3.89	4

From table 4, it is observed that the attributes “*The UAE is trying to develop plans and alternatives to address the discrepancy between traditional teaching and artificial intelligence methods adapted in the military college*” are placed at first rank by the respondents. This clarifies that the teachers and students agreed that the UAE government is very interested in implementing modern AI and e-learning in its civil and military institutions. The UAE government devotes a portion of its budget to the sector of technology and digitization. The universities and military colleges also devote a portion of their budgets for e-learning and the implementation of AI. This result is consistent with the findings of (Halaweh 2018; and Alhashmi, Salloum & Abdallah, 2019), who confirmed the UAE's strategy for adopting artificial intelligence. This demonstrates the UAE's strong trend toward incorporating AI into all sectors and businesses, including education.

6. Conclusion

Military education encompasses various training programs, from the primary curriculum to in-service education and advanced education. Officers in military colleges rarely have time to leave their training to receive an education on a traditional campus due to the officers' and military personnel's job responsibilities. To address this issue, distance e-learning systems and AI have been introduced in recent years in response to the growing need to train non-commissioned officers in rapidly changing international conflict scenarios. Hence, this study assessed the adoption and challenges in implementing AI and E-learning in the military college of the UAE. The study involved a survey in recording the perception of the students and teachers of military education, Joint Command and Staff College (JCSC). Based on the analysis of the 207 data samples, it was concluded that the use of AI and e-learning in the UAE has grown significantly in recent years. There are signs that it will be widely successful in the UAE's civil and military educational sectors. It was also revealed that the UAE government is very interested in implementing contemporary AI and e-learning in its civil and military institutions. Nonetheless, several challenges are experienced for implementing these modern technologies that need to be addressed to successfully implement AI and E-learning in military colleges of the UAE.

This study is a valuable source of information and a scientific addition to knowledge in AI in general and e-learning in military education in the UAE. It also serves as a useful reference for future studies because it provides subsequent researchers and scholars interested in AI. This research will motivate the students to use AI and e-learning technologies to improve access to resources and new learning methods. The scope of the study was limited to one military college in the UAE i.e., Joint Command and Staff College. The scope of the study can be enhanced, and also, the attributes investigated in this study can be quantified to develop practical strategies for the successful implementation of AI and E-learning.

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