Artificial Intelligence Maturity Assessment in Leadership at Higher Education: A Case Study

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Abstract

There is a growing interest in artificial Intelligence (AI) as a research topic. Adapting to AI technologies has become essential for educational institutions, specifically educational leaderships in order to embrace AI trends in enhancing leadership practices. This study comes in response to the increased discussions of AI implementing in education, which has created the need for AI Maturity Model in education to help educational institutions assess their progress in AI adaptation. This paper investigated how are the leaderships at college of Arts and Social Sciences Departments in Sultan Qaboos University (SQU) in Oman, as a case study, has adapted AI technologies throughout AI Maturity lens. The study aims to assess the college AI Maturity level and the qualitative approach was used to collect the data via semi-structured interviews with the college's heads and decision makers. The results showed that the leaderships at the college are updated with the AI developments, however, the academic departments are still in their early stages of using AI technologies as AI is still an emerging topic. The leaderships have good awareness of the importance of integrating AI in teaching-learning process at higher education institutions' level and the effects of adapting such technologies. Through in-depth interviews and the qualitative data analysis, one key finding was that College of Arts and Social Science at SQU is establishing good infrastructure for AI revolution at higher education according to the AI 5Ds cycle as there are some significant efforts to raise the awareness of the importance and role of AI in higher education and some individual AI implementations. However, more clear plans and work are needed for the move to the next phases of applying AI technologies in HE.

1. Introduction

Humans have been creating and developing technologies over years all over the world to facilitate life and solve problems and the latest technological revolution is called digital technologies (Russo, 2018) which include Internet of things (IOT), Cloud Computing, Artificial Intelligence (AI) etc. Recently, many organizations try to adapt new emerging technologies to achieve their goals (Ab Latif et al., 2017) and one of the top leading technologies in Industry 4.0 is Artificial Intelligence (AI). Moreover, various aspects of life including education have been rapidly affected by AI as an emerging field. AI has the potential to play a significant role in educational leadership. This paper highlights the relation between AI and leadership, identify the progress of Maturity Models (MMs) and specifically explain AI Maturity Model (AIMM).

2. Artificial Intelligence (AI)

AI is one of the key technologies that is driving the development of Industry 4.0. Previously, AI was divided into several distinct fields such as automatic programming, natural language processing (NLP), robotics, computer vision, and other terms. With the rapid evolution of technology, each of these fields has developed into its own separate branch of AI. Today, AI is more accurately identified as a set of interconnected components, each with its own distinct purpose (Siegel, 2018). For example, NLP and robotics are individual elements of AI which create a more powerful and unified whole. Some of the commonly used terms associated with AI include machine learning, big data, (IOT), 3 D printing and automation. They are now being used across a wide array of industries, such as, education, healthcare, marketing, logistics, agriculture and finance (Titareva, 2021) and people get more used with some AI technologies because they have become part of life style. Over time, certain AI technologies have become more common, like, machine learning in Google search, NLP in Apple and Google voice, spam filter in email and face identification in Facebook (Ayed, 2022). Internationally, AI field has been supported as the US former president, Barak Obama, released 'National AI Research and Development Strategic Plan' in 2016 (AI Committee, 2019). In general, AI is part of computer science which has recently spread worldwide in various sectors.

3. AI in leadership

Over about 100 years, the concept 'leadership' has been researched, however, AI technologies have been integrated into the field of leadership (Titareva, 2021) which is a relatively recent development in both fields. The leadership style of an organization has a great impact on the work efficiency enhancement. For example, an effective leadership can lead to better organizational performance as the leadership drives the way things are done by the employees (Rosete and Ciarrochi, 2005). Thus, training leaders and developing their leadership skills is getting worldwide interest. Petrie (2014) claimed that organizational leaderships have to create new leadership strategies that can face the world new challenges including emerging technologies. Agility has become essential for any organization leadership to be unique and able to deal with all the changes in the surrounded environment (Salmon-powell & Scarlata, 2021). Moreover, with the world technological revolution, the field of 'leadership' has become more connected with 'technology.' There is an interchangeable relation between the two fields. Technology is one key dynamic tool for leadership in the digital transformation age and the use of technology has become essential in most organizations' leadership, however, the leadership needs to guide the process carefully. As a result, a new style of leadership emerged called ' digital leadership.' It refers to the use of the updated technological trends to enhance the role of leadership in an organization. Westerman et al. (2014) defined digital leadership as the use of the digitalized tools to lead the work in an organization. It is also defined as the process of leading digital transformation in the organization in a surrounded digital environment (Damayanti & Mirfani, 2021). There are two key notions of the term digital leadership. First, the primary importance of embracing technology because of its great impact in most life aspects. Second, there is a need to balance technology adaption with human perspective (Jong, 2020). This paper link the two terms 'leadership' and 'AI' by highlighting some perspectives in the fourth industrial revolution. The building relation between the two terms is changeable according to the leaders' intention. The leaders' actions determine the positive and negative impact of AI in the organization's leadership (Moldenhauer & Londt, n.d.). Some researchers believe that AI can be part of digital leadership (Smith and Green, 2018; Wang, 2021), but Titareva (2021) suggestion goes beyond and predict that AI could form a new style of leadership called 'AI leadership' which reflect the significant role of AI in future leadership.

Furthermore, there are different perspectives of using AI in digital leadership. Titareva (2021) reported three perspectives that were dominated by AI based technology. The first perspective is the enhancement. This one considers AI technologies as tools of leadership development. The second perspective is the replacement in which AI can take human roles, as a leader or a follower. The third perspective is skeptical which believes that AI is an oversold idea. This paper looks at AI from the first perspective as an enhancement tool because AI can do some tasks which requires energy and time of the employees and even the leaders. For instance, AI can help human analysing a huge amount of data (Titareva, 2021). Additionally, AI can help reducing the service cost, improving the quality of goods and services via combining the virtual and physical world (Siegel, 2018). AI is considered as an enhancement tool because technology can work aside with leaders for the sake of achieving the organization's goals. Based on the enhancement perspective, AI is a revolutionizing technology which can help leaders make better decisions via using and analysing the provided data. In addition, it gives more chances for creative outputs as it frees the employees from routine repetitive tasks (Titareva, 2021). In addition, an equation of Sustainable Future Leadership (SFL) was proposed by Jong (2020) as follow:

$$SFL = AI \text{ (appreciative inquiry)} + AI \text{ (Artificial Intelligence)}$$

The equation explains how AI as an appreciative inquiry can collaborate with AI technologies to find practical solutions for complex problems and achieve sustainable future leadership. To illustrate, appreciative inquiry is a

way of understanding people interaction inside and outside an organization. It helps people to work together in the organization and with the communities using the existing knowledge and experience, which add values to data, to find out practical solutions. Using this equation can help creating balance in the future leadership especially with quick technological changes (Jong, 2020).

In digital leadership, a leader has two choices to select weather to ignore and repel the use of AI technologies, which is called negative link to AL, or get the advantage of using AI technologies. In the second choice, the leader and the whole organization consider AI as a chance for development not a challenge. The leader can use AI to create new opportunities of development (Moldenhauer & Londt, n.d.). In case the leader selected the second choice, which is embracing AI, all the organizational levels should be prepared. Human resources and the organization's equipment and infrastructure need to be ready to use of AI in order to be able to work in the same line to achieve the organization's vision. Moreover, as there are many challenges of using AI in leadership, there are a number of benefits as well, but the digital leader has to offer good management dealing with the challenges and using the suitable AI technologies to achieve effective leadership in coherence with the appropriate AI technologies (Moldenhauer & Londt, n.d.). Hacking and phishing are example of cyber-attacks which is one of the top challenges that organizations may face today. Moreover, AI is used to keep the workplace safe as AI advanced algorithms are used to prevent similar common attacks (Salmon-powell & Scarlata, 2021).

4. AI Maturity Model

As this study main objective is to assess AI Maturity level, at college of Arts and Social Sciences Departments in Sultan Qaboos University, Oman. AI Maturity Model is used to construct the interviews questions, however, explanations of the maturity models in general and specifically AI Maturity Model (AIMM) are provided for better understanding of the topic.

4.1 Maturity Models (MMs)

The concept 'maturity' refers to the level of development of something. Maturity Models (MMs) are commonly used to assess an organization's abilities and identify areas of improvement (Alsheiabni et al., 2019; Vakkuri et al., 2021). MMs requires regular development as they are not a final product. Moreover, MMs have been studied and developed by researchers for several decades. Nolan and Gibson were the first who proposed MMS in 1970s (Fukas et al., 2021). Then, MMs were more well known by the Software Engineering Institutes' Capability Maturity Model (CMM). Various versions of MMs have been developed and have been applied to different areas, such as, Capability Maturity Model Integration (CMMI) and Scaled Agile Framework (SAF) (Vakkuri et al., 2021). Due to the spread of MMs, many related areas have been studied based on MMs, like, software development, supply chain management and online learning. Over the last four decades, a number of MMs types have been developed by the researchers who have analysed the positive and negative aspects of MMs (Alsheiabni et al., 2019). Cardoso & Su (2022) identified MMs as a process that reveales ways of how to use something. Moreover, MMs can be generatic or specific. The generatic model are being useful for benckmarking across industries. Convently, in the case of AI MM, it is a specific domain (Cardoso & Su, 2022) where AI is desingned to help organizations measure and develop their AI abilities (Alsheiabni et al., 2019). As this paper focues on AIMM on the educational field, certain educational roles should be considered. Cardoso & Su (2022) suggested five criteria for designing AIMM for higher education institutions(HEIs). First, AIMM for HEI should help conducting selfassessment exercises. Second, AIMM should be a domain-specific model. It must include specific educational terms that are related to HE and easy to be understood. Third, AIMM should adapt a lean approach which can use limited resources, like people and time, in order to achieve good level of assessment. Fourth, AIMM should be updated frequently and capture new technological aspects. Fifth, the model should be developed based on a research methodology that follows rigorous scientific methods.

4.2 AIMM Dimensions

AIMM dimensions refers to the different pillars or aspects that are considered in the implementation of AI to achieve comprehensive development. These dimensions can be used to evaluate the organizations' capabilities and maturity. They include strategy, organization and technology (Noymanee et al., 2022), moreover, Fukas et al. (2021) added some more dimensions which are people, ethics and regulations, budget, products and services, data and competencies. Among the nine mentioned dimensions, Vakkuri et al. (2021) agreed on four which are called AI functions, data structure, people, organization and technology.

Furthermore, for each dimension, there are different maturity levels. Noymanee et al. (2022) divided the dimensions into four general levels: new entry level, elementary entry level, operational level and proficiency level, while some researchers **consider** five level which are initial, assess, determine, manage and optimized (Fukas et al., 2021; Pringle & Zoller, 2018). It is important to note that the specific number and categories of levels can vary according to the specific maturity model being used.

4.3 AIMM Road Map Steps

Although there are a number of AIMMs that have been developed, such as, a five-step 'stairway to heaven' AI model, Microsoft nine-step pipeline, and a maturity framework for AI process (Vakkuri et al., 2021), there isn't a fully developed model yet (Alsheiabni et al., 2019). AIMM can vary based on the organization's type, however, there are some typical stages which are shared in most general frameworks. Some AIMMs are designed to be industry-specific such as the AIMM for education. It is designed to help educational institutions to assess their AI capabilities and identify areas for development.

Titareva (2021) presented a model that consists five stages for implementing AI technologies, which can be applied for any type of organizations. Each stage on the model depends on the successful completion of the previous one. The stages are explained as follow:

- Planning and analysing stage which involves defining the goals, timeline, budget and resources required for the project
- Designing and specifying the structure and requirements of the software. This includes identifying the structure of the selected system with it functional non-functional requirements, which are the goals, data collection methods and ways of data analysis.
- Implementing the model which includes crating source code and configuring the program to check its readiness to be used.
- Testing and evaluation, which is used to ensure the software meets the specifications and how can it be free of errors.
- Monitoring and support which involves assessing the software's performance and providing assistance to users who may encounter problems

AIMM has been described by different researchers in various ways. Cardoso & Su (2022) agreed with Titareva (2021) on the same five stages context but using different terms. However, Noymanee et al. (2022) concluded with four stages of AIMM only because step three and four were merged in one stage. Pringle & Zoller (2018) also proposed four core developmental phases of AIMM. First, AI Novice when the organization still assess its use of AI, but has not started with AI journey. Second, AI ready phase in which the organization moves a step forward. Third, AI Proficient phase when the organization would have practical experience understanding and using AI and reached a reasonable level of the process, however, fulfilling some gaps is still required to achieve AI maturity. AI advanced is the last phase in the AIMM which is the most mature level an organization would reach.

In general, AIMM is a guide which helps the organization navigate their level in adapting AI technologies. It outlines the needed steps, from basic to advanced, to realize the maximum benefits of investing in AI. Various designs of AI have been researched and proposed, but most follow a similar progression. At the basic level, organization starts to explore the potential use of AI, while, at the advanced level, the organization have fully integrated into business process and decision making.

5. AIMM in Omani HEIs

Another AIMM was proposed by Krcil (2020) titled 5 Ds cycle steps of AI, which this study applies. The first step is to Define the area of work. This step involves identifying the specific problem or opportunity where AI can be utilized. The second is to Discover the best aspect of the discovered element from step 1. It should service the organization's goals. The third step is Dream, which involves imagining the future of using AI to address the identifies problem or opportunity. The fourth step is Design, which connects the gaps between the second and the third steps and decides things to be done. The last step is Deliver, which is implementing the decision from step 4 and applies the necessary changes on the organization.

The researchers found that there is lack of research on the topic applied in Oman, but based on a recent study about utilizing AI in Oman HEIs, there are a number of challenges in applying AI in HEIs. The challenges include lack of awareness of the importance of AI for the future, lack of knowledge and skilled staff in AI specialization. Another challenge is weak IT structure because the organization needs to have big data before applying AI (Ayed, 2022). The researchers have made some observations by analyzing Ayed's (2020) study. First, most HEIs in Oman are still in step 1 of the AI 5 Ds model. Second, some participants of the study have shown interest on utilizing AI technologies in HEIs, however, their organizations don't provide technical support. This indicates that these organizations have moved from phase one to phase two, Discover. There are some HEIs in Oman which have reported that they planned language programming course for Computer Science Department students. It could be observed that these HEIs are in the third step, Dream, because they plan for the future of AI. In addition, there are some other HEIs which have already started teaching AI language program courses to keep updated with the quick technological race development. Overall, the study concluded that most HEIs in Oman are still in the first phases of applying AI technologies.

6. Method

As this study aims to assess AI maturity level of college of Arts and Social Sciences in Sultan Qaboos University, qualitative approach was used to collect data from the college's leaders and decision makers. The interview participants were the top decision makers at the college and heads of academic departments. The final sample size consisted of eight participants in one-to-one interview setting. Based on the participants' preferences and geographical constrain, seven face-to-face interviews were conducted and one more interview was conducted online using video conference tool.

Semi-structured interviews conducted as the primary data method. The researchers developed an interview guide which consists of open-ended questions that aimed to explore participants' perceptions, experiences and challenges related to adapting AI in their leadership tasks and roles. The interview guide was mainly designed to provide flexibility for the participants to share their unique perspectives and explore deeper understanding of the current state of AI adaption in the college. Data collection tool was designed based on Krcil's (2020) 5 Ds cycle steps of AI as figure 1 shows.
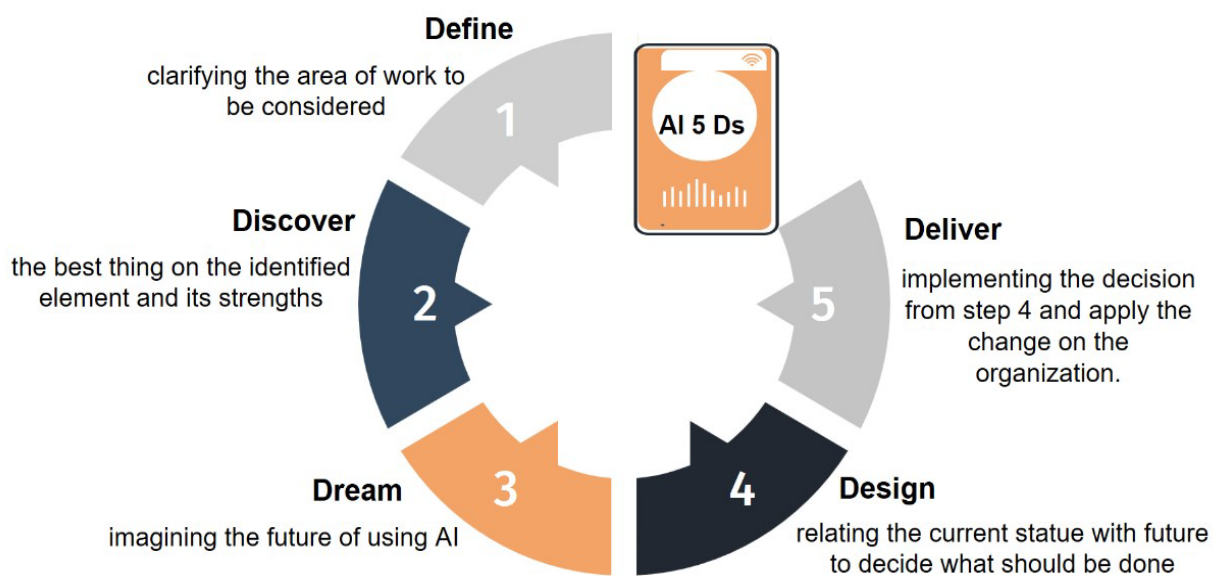

Fig. 1 *AI 5 Ds cycle*

7. Data Analysis

Thematic analysis was employed as data analysis approach in order to identify codes, themes and meanings within the interview data. A systematic process was followed starting with the recoded audios transcription. Second, by repeatedly reading or re-listening to the transcript, the researcher immersed themselves in the interview data and become more familiar with the content and gain deeper understanding of the data. This process is called familiarization. Third, codes related to AI maturity in leaderships were generated inductively. Coding was performed using NVIVO. Fourth, the identified codes were allocated and grouped into themes which represents the key concepts within the data. Fifth, the themes are reviewed to verify their consistency and appropriateness with the data. Finally, each theme was named and defined to ensure their transparency and interpretability.

7.1 Research Trustworthiness

The participants were all experienced in the selected college leadership and get access to practice or know about the AI application in their specific specialization.

7.2 Research Ethical Consideration

Informed consent was provided by email to all participant which clearly stated their anonymity and confidentiality.

8. Results

Based on the shared experience and perspectives from the participants, some prominent themes related to AI utilization were revealed. After coding the data, the researchers concluded with six main themes through which the level of the selected college has been assessed based on the 5 Ds cycle.

8.1 Awareness of AI Importance and Roles

The interviews revealed that there is a clear understanding of the meaning of AI machines among the participants as the machine that is able to imitate humans' work. AI machine can perform as or better than human. Although all the respondents interviewed acknowledged the importance of considering the use of AI applications and other advanced technologies in HEIs' strategic plans, they admit that more work need to be done to spread the awareness of the importance of emerging such technologies in social science colleges. Efforts are needed to move the concept of AI from the black box to 'explainable AI.'

However, the university administration supports and welcome the use of technology in a way that serve the organization' objectives, AI and advanced technologies are mostly discussed theoretically among the faculty. Most of the respondents agreed that some faculty members in the departments are lacking enough knowledge and skills to use AI technologies in academia. All participants admit that there are a number of the faculties in each department who are eager to apply new technologies in delivering the course content to the students and most of them are from younger generation. Interestingly, all the respondents from the college leadership admitted that using AI in HEIs is not optional any more it has become a need as it is taking part of the academic work. Students can't be prohibited from using it, but it need to be organized.

Moreover, raising the awareness of the importance and the role of AI at HEIs is essential. Although there are a number of workshops and discussions have been hold inside and with other universities' members to exchange experience of using AI in higher education, as the college administration reported, still more work is needed to spread enough awareness of the topic. Respondents ensured the necessity of self-learning and training as well. Thus, according to some of the college leaderships, the college is still identifying the role of AI in academic leadership and teaching process at HEIs. One of the respondents suggested holding 'philosophical discussion' in order to determine the role of AI in the organization weather to be used as assistant tool or give it the full potential to take decision. The level of AI integration in the leadership and teaching at HEIs needs to be decided first officially. This indicates that the college has started in the way of defining its path in AI journey.

8.2 The Role of AI in Leadership at HEIs

As all respondents considered utilizing AI in their leadership roles as vital, they have shared some examples of using AI technologies at various levels in social sciences specializations. Respondents suggested that AI technologies can benefit teaching process, research production and administrative work as well.

AI can take role in administrative tasks at HEIs. It could serve students' affairs department because it can take the role of the academic advisor by suggesting the course to be registered or dropped and follow up the students' academic performance automatically. Some of the respondents pointed that AI should not be used to take decision in academic field rather it can be used to do some repetitive tasks. AI can also be useful in documenting, data management and meeting scheduling as the respondents suggested. AI can manage large volumes of data automatically, for example, documents, e-mails and files can be easily categorized to facilitate and retrieve research. Duplicated data and redundant data can also be identified by AI-powered tools. Moreover, AI can analyze data and suggest optimal meeting times and location by checking the availability and preferences based on entered data on the calendar. As AI-powered tools can schedule meetings, it can send invitations and handle rescheduling conflicts, simplifying the administrative tasks related with coordinating schedules. Additionally, faculty can use some AI-powered tools to assess students' work electronically. This reflects how AIpowered tools can be used as assistant in administrative tasks in HEIs. Consequently, faculty can be freed from some administrative and assessment work to focus more on their teaching. Interestingly, some of the AI tools that are used in organizing administrative tasks can also be used in research data management.

Some of the respondents noted that as AI technologies have two sides effects, academic leadership and faculty must focus on using them to enhance students critical and thinking skills. Students may use AI tools for translating, paraphrasing and dictation purpose, but they must be guided in the way of using these technologies as they are meant to assess students not to prepare their tasks. Moreover, all the respondents agreed that it is the academic faculty role to guide students to the good use of AI technologies. It is important to note that while AI can provide valuable assistant in social sciences studies, human expertise and interpretation are still needed to control, monitor and evaluate the use of AI in higher education.

8.3 Past and Current Applications

The respondents indicated that using AI applications is not restricted to specific fields. It can be applied is different ways to achieve each department contents and objectives. One of the participants presented an example of one of the pioneer AI machines which do some thinking process, Excel. The program was first restricted to mathematician and static specialized people, but over time it has been used in most fields. Moreover, the participants categorized AI uses in HEIs as administrative and academic tasks. Interestingly, most of the provided examples are related to the use of AI in teaching.

One example is the role of using AI in Geography studies. The respondents pointed that some programs and software systems which imitate humans' tasks have been used since the 1990s, but the term artificial intelligence was not commonly used at that time. Deep learning technique can be used nowadays to find out the correlation between different parameters. The software can resend the information in different iterations to find out new correlations that were not found in previous iteration. AI tools can benefit studies as it uses neural data analysis which is also known as neuro mapping. In addition, Global Positioning System (GPS) technology has revolutionized Geography studies by providing precise and accurate positioning information as it is used in geolocation and spatial data collection and environmental monitoring and research. GPS can be used in environmental studies as well to track various phenomena. The respondent pointed an example of a student research using GPS to develop data based on real-time using mobiles to collect data. The researcher attached a number of mobile located in different places in the Capital City, Muscat, to evaluate the level of noise in different locations around the city. As Geography and Archaeology studies are closely intertwined disciplines which complement and inform each other because both work with some shared points, like, spatial, environmental and site selection analysis, some AI tools would benefit the two field. Moreover, the respondents pointed their use of AutoCAD (Computer-Aid Design) which provides a comprehensive set of tools and features that allow users to create detailed digital representation of data. Earth map, total stations. Using such software prepare the users to better use some AI machines and software.

Furthermore, AI technologies can be used in Musical studies as it can generate new music notes, but the correspondent from Music and Musicology department expressed that AI generated music will lack the author's spirit as the author is a machine. However, AI technologies can be helpful in learning music online as it happened during COVID 19 pandemic, but most musical skills can't be thought by distance learning because it required motor skills training. Some more examples of applying AI tools during the pandemic were presented. For example, a ticketing program that tourism students were trained to use during the pandemic because of its free access availability at that time. This indicates the willingness to use AI tools if the resources are available. There are some other current shared uses of AI tools such as Mendeley as a reference tool and Chat GPT. Important to note that all the current applied AI applications are at the individual level as there is still no official regulation of how to use AI-powered tools in the university.

8.4 Challenges of Applying AI Technologies in Leadership

As AI technologies provides numerous benefits for leaderships, there are several challenges that HEIs leaderships may face when planning or applying AI tools in leadership roles. Most respondents listed human mindset at the top of the challenges. Some respondents added human capabilities while others consider faculty's technological abilities can be learnt if the person's mindset has changed in align with the worldwide technological revolution.

The participants agreed that the recent global pandemic revealed that all leaders and faculty are able to be good users of the new emerging technologies. One of the respondents clarifies that the faculty is not supposed to be professional in technology as academics are supposed to be specialized in their field, but they still need to be updated to avoid digital gap with the students who are technology generation. Implementing AI technologies in leadership, specifically in academic setting, requires upskilling or reskilling leaders, faculties and all organization members.

Moreover, utilizing AI in any organization requires human-AI collaboration. Effective collaboration between human and AI system is required to integrate AI technologies into leadership. Thus, enough awareness of the importance and the roles of AI in the field is essential to better prepare human mindsets. The good relationship between human and AI tool could be build easier if it is based on the balance between both parties, human and technology.

The second challenge is financial. Some of the respondents believe that utilizing AI technologies at HEIs level requires high amount of money which should be considered in the annual financial report of the university. The third challenge which is connected with the previous one is lack of resources. Departments are in need to provide technological resources to be used after raising the awareness of using AI tools. Some respondents reported a fourth challenge which could solve many of the mentioned challenges if it is managed well which is lack of research on the topic in HEIs context. The fifth challenge is that AI technologies rely on the entered data which gives bigger chance for being bias because of the lack of accuracy or poor quality of the data. As this study concerns about social science specializations, the sixth challenge that were highlighted by the respondents is losing the sense and

spirit of human products, such as, music, story, novel and poetry. The seventh challenge is more related to student who depends on AI tools to do their academic tasks rather than using AI as assistant only. The eighth challenge was raised by one respondent and it is critical as it refers to long term effect of using AI tools in HEIs. The trust of the machine outcomes is always better as the responses are based on analyzing large amount of data. Overtime when the lecturer gets used to read AI generated responses, their expectation of the students' work may increase. Thus, unintended shift of the lecturer role may take place. The lecturer is supposed to train the students to be knowledge producer not to use technology to produce knowledge. The relation between the lecturer and students might be affected overtime as the trust on AI machine from both parties will increase. The ninth serious challenge is that AI is leading the world to be more materialistic. A respondent clarified that countries will develop based on their open access data. For example, if there is less or no entered data online in the tourism sector of a certain country, the country will not be developed in the sector however it has better resources. All the sectors need to work on open access data marketing to be developed globally. Respondents indicated the importance of private sector collaboration in funding for the purpose of Research and Development System. The last challenge raised by the respondents was that AI production are above human imagination and expectation which may affect the users' privacy. While AI has witness remarkable progress in recent years, concerns arise according the potential effect on the user's privacy. Thus, some respondents believe on the importance of AI regulation to organize AI utilizations process.

Some very important points were raised by the respondents as there is kind of confusion among community who may consider them as challenges and obstacles while there are facts. First, the nature of social sciences colleges requires understanding and using AI technologies not producing or even developing AI algorithms. Second, leaders and faculties in these colleges are not prepared technically neither required to deal with high level of advanced technologies. Thus, technical support from the information technology department is expected to achieve good use of these technologies. For example, the use of Virtual Reality (VR) in delivering the course content should not be the lecturer work alone. A team of scenario developer and VR program developer should work with the lecturer who provides the content at the beginning and check the product at the end of the process. It should be a collaborative work. In general, AI in HEIs will create benefits and challenges based on human uses.

8.5 Future Visions

Due to the clear high level of awareness among the academic and administrative leaderships in the college of Arts and Social Science at Sulatn Qaboos University, drawing a future vision of the use of AI in the college has the potential to transform education by improving efficiency, supporting students, enhancing learning outcomes and enabling data-driven decision making.

Some respondents anticipated some AI implementations in the department for the future. To corroborate this, as History is one of the college departments, AI technologies can take a vital role in History Studies, for instance, in data analysis and pattern recognition. AI algorithms is able to analyze large amount of historical data, such as, documents, texts and manuscripts in order to identify patterns, trends and correlations. Moreover, language process and translation can be used in the historical field. AI technologies can help making historical texts more accessible by translating to different languages and making the manuscripts more understandable. These applications can provide good services with less human errors. Virtual simulation is another magical touch can be done by AI technologies in which the student can live the historical event at the moment. Another respondent mentioned that there will be updates on the department academic plan soon as four to five courses related to AI technologies will be added (e.g. using drones to collect data for research). Another respondent expected that they will be using AI technologies to generate a model from a taken picture of a location and relate it with another one from different part of the world to analyzed the shared features. The productive modeling feature can be utilized to allow archaeologists to identify areas with higher possibilities of containing archaeological sites. AI can also help in automating feature detection which the department look forward to use. AI can automate the detection and identification of archaeological features via AI algorithms analysis process which work in relation with computer vision and machine learning techniques to recognize and categorize the archaeological sites features. The respondent from the Theatre Arts Department expected to use AI tools in theatre work in the future as in designing and applying the decoration and even writing the scripts. AI tool can facilitate writing, collecting ideas and providing huge amount of data.

The respondent stressed that although using AI tools will save a lot of time, human still need to re-check after the machine to reach good level of information rigor. In general, most respondents expected to foster development in AI field. One of the respondents analyzed that there are two factors for the expected speed of AI improvement; availability of the resources and the fast profits that are gained from AI business. Overall, most responded mentioned some AI applications at the college, but they are all at an individual level and they are looking to form official teams at the organizational level. Important to mention that there is an official new AI team at the university level which considers the effects of using AI tools in education process.

8.6 AI Ethical Regulations

Some respondents highlighted the absent of official policy to organize the use of AI in the educational organization. Some indicated that it is an emerging topic, so it is early to state an official regulation while other respondents believe that stating clear regulation may guide the process of AI technologies from the beginning and may avoid some negative effects. Some respondents suggested designing AI strategy and the priority should be given to doing research. However, the college administration respondent stated that HEIs has to follow two clear directions. First, setting the regulation for using AI to ensure better use of this technology considering ethical issues and investing in AI field to overcome the digital gap between the students and lectures. Second, encouraging innovation is one main key point in the process. According to the university, the use of AI in HEIs has been discussed in the academic council meeting and it has been stated that illegal actions is not accepted by whatever means. For instance, cheating is not accepted by any mean weather copying from chat GPT or any other traditional mean as it ends with illegal action. It is a matter of individual perception more than stating regulation. However, stated regulation should be limited to encourage students to think and enhance critical thinking process and AI applications should be filtered to be used by students in a way that fits their academic journey. It could be concluded that most participants indicated the importance of the availability of AI policies and regulation at HEIs

9. Discussion

Using AI in universities is a worldwide issue around the international universities. There is no option to escape from using AI tools rather HEIs have to deal with. AI has entered the game in HEIs and the role of AI in HEIs is yet to be discovered.

Based on the 5Ds cycle, the researchers critically analyzed and assessed AI maturity level at the college. The assessment provided insights into the college's plans, past and current AI applications considering the challenges and understanding future vision taking in account the importance of AI regulations. The researchers found that AI five Ds cycle are in sequence and as much the organization is strong in a previous phase, performance in the next phase would be better. College of Arts and Social Sciences at SQU is going in the right track to build the infrastructure for AI transformation. At the individual level, the college is doing well in the Define phase as AI tools have stated integrating the departments' plans and strategies and there is good awareness among the leaders about AI importance and roles in HEIs, but it needs to be officially stated with some shared AI objectives aligned with the college's overall mission and values. This paper recommends stating the role of AI tools in the education process at the college level. According to the respondents, there is a move towards the second phase, Discover, at individual level again. By assessing the college's current AI applications, individuals are using AI tools, but it is recommended to better plan the availability of AI resources and expertise for AI development. The interesting point is that with limited organizational move compared to individual, the respondents showed aspiration and potential applications of AI which involve identifying new areas where AI can be applied academically, such as, enhancing students' learning experience and support research filed, and administratively, like, doing some repetitive work and tasks that require high thinking abilities to connect huge amount of data. Because the college is currently establishing good infrastructure for AI revolution, the researcher expected good moves soon to the next two phases, Design and Deliver.

10. Conclusion

AI can be seen as a story of data in the sense that data plays a fundamental role in AI system development and functioning. To what extent AI has been integrated in HEIs, human touch will be always needed to control, monitor and evaluate all processes. Overall, this critical assessment of the college's AI maturity using AI 5Ds cycle provided valuable insights into AI current applications, plan alignment and issues to be considered in AI process implementation. The findings and recommendation of this study is of importance for future research. As the study was geographically limited to one college, further studies can be done the other colleges at the university. Practically, this paper may help the selected college to place its position in AI journey and can drive on for the next step in AI maturity journey based on some findings.

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Conflict of Interest

Authors declare that no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm their contribution to the paper

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