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Abstract

This study explores the perceptions and usage of Artificial Intelligence (AI) among students in Afghanistan. The world is witnessing the culmination of AI and its integration in various fields - from education to the economy and beyond - and it can surpass human intelligence and capabilities, where most of the work will be done by machines and robots equipped with AI. For war-ravaged countries like Afghanistan, the emergence of AI brings opportunities but also significant social, economic, political and security challenges if not addressed properly. The study employs a mixed-method approach to understand the issue comprehensively. Findings show that a significant majority of the students from public and private universities and high schools in Afghanistan use AI to ease work and study burdens, retrieve information and learn new concepts. Based on the study's findings, AI should be encouraged in education and other fields with appropriate training and resources to enhance human capabilities. However, it is equally important to establish legal, ethical and regulatory frameworks to mitigate the risk of over-reliance on AI; in addition to that, it is also important to continuously monitor and observe the developments in AI so that its potential benefits can be realized and related risks and threats could be effectively addressed.

Keywords: *Artificial Intelligence (AI), Education, Perception, AI Usage, AI tools, Students, Afghanistan*

1. Introduction

Artificial Intelligence (AI) has become one of the most significant topics for scientists, economists, social scientists, policymakers and the general public, as it is a rapidly advancing technology that transcends every limit. Unlike industry-specific innovations, AI has permeated almost every sector and field at some level, so policymakers are concerned about how to respond and deal with this, whether to encourage its development or regulate its spread.

Education is not an exception; AI has not left it unaffected; in fact, the education sector is one of the sectors most affected by AI since students are the most exposed and updated to new technological advancements. AI has been integrated from basic learning to syllabus-making and policymaking for pedagogy.

In developed countries, AI has been adopted to a level where it offers more effective and interactive learning experiences, such as customized/personalized learning and Intelligence Tutoring System (ITS), where students can learn most comfortably. AI is still in the stages of development; it has not reached its full potential. However, once it reaches its most advanced level, it will cause disruptions in education. In contrast, in developing and poor countries with inadequate infrastructure and knowledge, AI is limited for information retrieval. AI can revolutionize education globally with better teaching methodologies and learning experiences and could bridge the educational gap between the privileged and the less privileged.

2. Literature Review

2.1 Defining Intelligence and Artificial Intelligence

Before defining the term artificial intelligence, it is important to understand intelligence first. Cambridge Dictionary defines intelligence as "the ability to learn, understand, and make judgments or have opinions based on reason". The American Psychological Association has defined it as "the ability to derive information, learn from experience, adapt to the environment, understand, and correctly utilize thought and reason." Binet and Théodore Simons (1905) view intelligence as "the ability to perform tasks that involve reasoning, problem-solving and understanding" [1]."

These definitions highlight that reason is the most important part of intelligence; therefore, human beings are also considered intelligent; they think, imagine and use their brains to process the available information and create new ideas, understand their surroundings, make judgments based on reason and behave and act accordingly. According to Anderson (2007), humans are intelligent because their intelligence involves complex cognitive processes that enable them to think, imagine and judge, which are crucial to understanding the environment [2].

The source of artificial intelligence is human intelligence; there is a connection between human intelligence and artificial intelligence. Machines, robots, AI tools, and applications are not intelligent by themselves, but the human mind develops this intelligence in machines. It is important to understand human intelligence and divide it into simplified parts so that they can be replicated in artificial intelligence systems (Minsky, 1986). He has emphasized that replicating human-like reasoning, thinking, and problem-solving abilities is crucial for artificial intelligence in machines. He aimed to develop an AI system that could mimic complex cognitive functions such as learning, understanding and decision-making. He believed those approaches that use symbolic reasoning were limited in their ability to develop comprehensive artificial intelligence replicating human intelligence. He felt it necessary to incorporate human intelligence to advance artificial intelligence [3].

2.2 Evolution and Foundations of Artificial Intelligence

John McCarthy first termed Artificial Intelligence or shortly AI in 1955, was an American mathematician and computer scientist. He is considered as the pioneer of artificial intelligence. Initially, he worked on the formalization of commonsense knowledge in AI. Later, he worked on time-sharing systems at the Massachusetts Institute of Technology from 1958 to 1962. At Stanford University, he founded a research centre for AI called the Stanford Artificial Intelligence Lab (SAIL), one of the field's leading research centres. Moreover, he created the computer programming language LISP, used by the AI

community. Hence, it founded the foundations of artificial intelligence, culminating recently [4].

McCarthy, 2004 defines artificial intelligence as "the science and engineering of making intelligent machines, especially intelligent computer programs." He further states, "It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable" [4].

While Alan Turing, one of the fathers of computing in 1950, looked at AI in the context of machine behaviour. From his point of view, "a machine is considered intelligent if it could exhibit behaviour indistinguishable from that of a human being." Stuart Russell and Peter Norvig, 2020) provided a more contemporary definition: "AI is the capability of machines to perform tasks that typically require human intelligence [5].

In a nutshell, artificial intelligence is a machine's intelligence similar to that of humans. However, it is much faster and more comprehensive, works to a much greater extent, and can process so much more information and generate and regenerate new ideas.

Artificial Intelligence is not a new phenomenon; it dates back to the 1940s when the first electronic computer was made. Unlike popular belief, previous technological discoveries like the electronic computer, merely hardware and software, are examples of early AI technologies, which can still be AI. The 21st century is the culmination of AI technology that is being witnessed [6].

2.3 Handcrafted Knowledge vs. Machine Learning Approaches

Artificial intelligence systems are developed using different approaches, each with strengths and weaknesses. However, the approaches have been divided into two general categories: Handcrafted Knowledge and Machine Learning (ML). Machine learning is comparatively new to handcrafted knowledge but still decades old. It is through machine learning that we can witness the recent developments in AI [6].

Handcrafted knowledge AI systems are the older approaches to AI; they could be called mere software developed with the cooperation of a computer programmer and a specific field human expert. They were developed by programming a set of rules, processing information, and regenerating human knowledge. These machines were smart because they could be programmed with hundreds, thousands and even millions of domain-specific rules and process large datasets to replicate human intelligence. Tax preparation software, which software engineers and accountants developed during the 1980s in the US, could be a good example of Handcrafted Knowledge systems to find out a company or individual's due tax payment; it required the use to input their tax information, instructed by pre-specified data formats, it was good enough to pass an IRS audit. This was AI in the 1980s and remains so [6].

The key difference between Handcrafted Knowledge AI systems and Machine Learning AI systems is that Handcrafted AI systems have to be provided with data and knowledge by humans. On the other hand, ML AI systems do it on their own, and they program their own rules. It does not mean it is entirely independent of human programmers; they have to be provided with the system training data and human-generated algorithm, meaning that they learn from examples (training data); they do not need to be explicitly programmed, unlike Handcrafted Knowledge AI systems. This makes data the most important raw material in the context of artificial intelligence, and it is the outcome of

large data that makes such high-performing AI systems. The data must be of good quality, large quantity, representative and diverse because the machine learning system is directly dependent on data. It will determine the impact and performance of the machine learning system. Moreover, algorithms and computing hardware are the second important raw materials that make machine learning systems work [6].

As it has been argued that artificial intelligence has been there for decades, why is it getting so much attention now, and why was it not as widely used as it is now? There are four reasons for this. The first is the availability of large datasets that do not exist as they do now. Machine learning could not be developed at the current level without a large and relevant dataset. The second reason is the increased computing power; computers are much more powerful than a decade ago, and computing powers enable the system to process large amounts of data. The third reason is the improvement in algorithms; newly discovered algorithms are more flexible, robust, and capable of programming the system. The fourth and last reason for the current importance and widespread use of AI is the availability of open-source code libraries and previously unavailable frameworks. A decade ago, developing machine learning systems required much expertise. Even non-experts and beginners can create AI tools using open-source codes and frameworks. These developments led more organizations to adopt AI widely [6].

2.4 Economic Implications of Artificial Intelligence

With the widespread use of artificial intelligence in every field and industry, it is imperative to see its effects on the economy. There is evidence that AI has a significant effect on the economy. There is evidence that AI has positively affected the economy and contributed to productivity growth in AI in robotics, AI startups, and patent counts. Economists welcome it when the US and other advanced economies experience slow economic growth rates. However, they are concerned about the big disruptions in the labour market in the short term, which is already marked by large unemployment of the male labour force. They argue that empirical evidence is needed. Economists have suggested several policy solutions to address the current and future problems in the labour market, such as establishing an AI-specific commission, data portability and universal basic income. However, it is important to see how rapidly AI affects the economy [7].

2.5 Artificial Intelligence in Education: Paradigms and Applications

Before computers were made, teachers and students did everything related to teaching and learning with pure human effort. As computers were introduced and developed enough in the 1990s, the education sector witnessed increased use of computers and related technologies in various departments of educational institutions; for example, Computer Aided Instruction and Learning (CAI/L) was designed for instructions, learning and interaction between the teacher and students. With later developments in computing technologies such as networking, the internet, the World Wide Web or www, and other improvements in increased processing, increased computing capabilities and new software packages were widely adopted for teaching, learning and administrative work in educational institutions [8].

There are three paradigms for Artificial Intelligence in Education (AIEd); the first is the AI-directed paradigm, in which the learner is the recipient of the knowledge while the AI is the director of the entire learning process. This paradigm is based on behaviourism,

which focuses on arranging learning materials to improve learning performance [9]. In this reinforcement way of acquiring knowledge with predefined learning goals, concepts are instructed in a logical way through programming in which the learner gets immediate feedback [10], [11], [12]. It is implemented in Adaptive Control of Thought (ACT) Programming Tutor and is designed to teach programming skills.

AI-supported paradigm is the second paradigm in AIEd. In this paradigm, the learner is a collaborator, while the AI system plays a supporting role by focusing on improving the individual's learning process. It is based on cognitive and social constructivism, which states that learners learn well when interacting with people, information, and technology. [13], [14], [15]. Learning occurs with mutual interaction between AI systems and the learner; unlike in paradigm one, this learner-centred AIEd paradigm, AI systems collect the learner's data to offer adaptive and individualized collaboration to optimize learning. It is implemented in Dialogue-Based Tutoring Systems (DBTSs) and Exploratory Learning Environments (ELEs).

In the third AIEd paradigm, AI is empowered to augment human intelligence, where the learner is considered a leader of the learning process. It is based on the complexity theory, which emphasizes that human intelligence is augmented by complex and synergic collaboration among the learner, instructor, information, and technology. This system works when the human condition, expectations and contexts are considered [9]. This system offers transparency, accuracy and effectiveness to achieve the goal of human intelligence augmentation [16], [17]. It is implemented in the Massive Open Online Course (MOOC). This deep learning model predicts the learner's behaviour and outcomes and provides real-time and personalized communication between the instructor and learner [18].

Artificial intelligence is primarily used in predictive modelling, intelligent analytics, assistive technology, automatic content analysis, and image analytics. AI is useful in identifying the risk of drop-out that students could face. On the part of chatbots they have proven to be effective for learning purposes, and they are more effective for students in higher education than for elementary or secondary education [19].

In an analysis of 200,000 English language AI chatbot conversations, it was found that students, along with general users, used the AI-powered chatbots for creative writing and role-play, homework help, search for inquiries, drafting related to work and business, coding, image generation, health advice, jailbreaks, greetings, translation and English, drafting of cover letters for job applications. In more than 1 or 6 conversations, students asked chatbots for homework help; some asked for help to understand a concept and get clarity, while others copied-pasted questions from online sources to get the right answers [20].

These concerns are valid by educators and policy analysts; however, there is evidence that the use of artificial intelligence has major impacts on the education outcomes of students and teachers, such as "improved efficiency, global learning, personalized/customized learning, smarter content, and improved effectiveness and efficiency in the educational departments. These are major impacts; nonetheless, AI is developing to a more developed level. It is also argued that AI-embedded robots help teachers with basic childhood education, such as spelling and pronunciation corrections [21].

Improvements are observed in online education, which used to be a mere record of lectures, study and student assessment materials and their results. Now, AI has been developed to understand the behaviour of instructors and students and provide a personalized education that can address each student's weaknesses and strengths [22]. Rus et al. (2013) have argued that AI has contributed to the education sector by providing "intelligent education, innovative visual learning, and data analysis and prediction" [23].

TABLE I

Techniques for Scenarios of Artificial Intelligence Education

Scenarios of AI Education	AI-related Techniques
Assessment of students and schools	Adaptive learning method and personalized learning approach, academic analytics
Grading and evaluation of papers and exams	Image recognition, computer vision, prediction system
Personalized intelligent teaching	Data mining or Bayesin knowledge interference, intelligent teaching systems, learning analytics
Smart school	Face and speech recognition, virtual labs, A/R, V/R, hearing sensing technologies
Online and mobile remote education	Edge computing, virtual personalized assistants, real-time analysis

Source: Adapted from Rus, D'Mello, Hu, and Graesser 2013 [23].

Table 1, adopted from Rus, D'Mello, Hu, and Graesser 2013, depicts specific scenarios in AI education and offers a suitable AI technique for a solution. For example, to assess students and their abilities, AI offers an adaptive learning method and personalized learning approach by instructors understanding their student's weaknesses and strengths, hence offering learning and assessment materials accordingly. Similarly, the concerned parents could assure themselves about the school where their children study with academic analytics if they can access it. Moreover, instructors may evaluate their students' performance and grade them accordingly with AI-powered image recognition, computer vision and prediction systems. As evident in the previous section, college instructors have increasingly used AI tools to check and grade students' essays. Likewise, for every scenario of AI education, the system has incorporated a related AI technique [23].

In the learning part of the system, the learner model is important in improving its capabilities for personalized learning based on the analyzed data of students' behaviour, thinking, abilities, strengths and weaknesses. The model then prepares the teaching material, resources and behaviour accordingly [24]. Similarly, according to the Global Development of AI-Based Education report by Deloitte (2019), the knowledge or teaching part of the model of the systems creates content, determines the rules of making mistakes, and rules of access to knowledge field which the instructor to customize the teaching strategies and actions accordingly [25].

The most important tasks of machine learning are to discover knowledge, parse data on samplings, train data and generate meaningful patterns. For example, machine learning helps students get recommendations based on their individual learning, thinking abilities, and preference data when selecting universities and programs. It helps teachers understand their students' learning capabilities, guiding them in preparing teaching

methods and student assessments so that students can comfortably digest the lessons and be tested accordingly [26].

According to Deloitte's Global Development of AI-Based Education report (2019), data mining " generates systematic and automated responses to learners." It makes association rules and prepares personalized knowledge content for students. It can recognize a student's characteristics if their assignments, tests, and grades are provided. It then could be used to show the student's future performance. It is effective since it discovers patterns and offers predictive modelling, which can be used in education to customize, improve and develop curriculum. This makes AI more accurate and reliable [25], [27].

Chen et al. (2020) analyzed research papers regarding AI in education. They found that AI has been adopted in higher educational institutions for automation, administration, curriculum, content development, instruction, and learning purposes. Consequently, efficiency and effectiveness have been observed in administrative tasks, instruction and learning with "virtual reality, web-based platforms, robotics, video conferencing, audiovisual files, and 3-D technology" [28].

Chen et al. (2020) have also argued that using AI in education has removed the distance and language barriers for students in distant areas who understand a different language. Since study materials, resources, and lectures are available on the internet and are accessible from any part of the world, they can be translated into dozens of languages, thus making education easy in terms of time and money [28].

AI in education has brought together professionals such as system "designers, data scientists, product designers, statisticians, linguists, cognitive scientists, psychologists, educators and others" to design and implement AI in education [29]. This diverse professional cooperation makes the AI-integrated educational system innovative, user-friendly, accurate, and adaptable, brings a holistic approach, offers comprehensive solutions and addresses the special needs of learners and educators.

Chassignol et al. (2018) have also found evidence regarding the use of AI "in curriculum development and content personalization, teaching and pedagogical methods, assessment, and communication exchanges between teachers and students" through various platforms such as "Interactive Learning Environments (ILEs), ACTIVEMath, MATHia, Why2Atlas, Comet and Viper." These platforms are used for different subjects at different levels of education [30].

In a general review of scholarly papers, Chen (2020) highlighted and listed the use of Artificial Intelligence in education as stated: administrators use AI for grading students' assignments and tests, providing feedback, identifying students' learning styles and preferences and helping teachers in providing the necessary help to each student. AI uses these tasks to complete efficiently and effectively, in the absence of which would take much time and effort. Similarly, teachers use AI to evaluate students' performance in the assigned projects and tests, check for plagiarism, provide customized syllabi and course content according to the student's strengths and weaknesses, tailor teachers' teaching approaches and methods accordingly, and help teachers teach beyond classrooms with space and time flexibility. Students, likewise, use AI to help them choose the right program and the right school, and university, to self-evaluate their learning capabilities and performances in assignments and tests, to help them make necessary intelligent adaptive interventions and help them choose their careers in the early stage of their studies and their way for success. As a result, it is evident that AI has brought efficiency

and effectiveness, improved learning and teaching experiences, and fostered a better environment for teachers and students [28].

AI has permeated modern life worldwide, and education is no exception. In developed countries, it is found that "education is changing in tandem with changes in employment", which makes the incorporation of AI not a choice but a necessity of the time. The use of AI has been witnessed in medical studies where students are exposed to AI technologies for medical education [31].

3. Research Objectives

3.1 Research problem

As artificial intelligence has permeated modern life in many ways, from early childhood education to advanced-level industrial work, it can either direct individuals and societies to innovation, development and prosperity or, with overreliance and irresponsible use, AI will cause unknown political and economic social disruptions and cause huge job displacements. Though it is new to developing and poor countries, a large portion of the population remains unaware of AI; however, thanks to the internet, physical distances are no longer any barrier to connecting. This study explores how students in Afghanistan understand and use AI in their education. Examining their awareness and engagement with this technology aims to bridge the growing gap between the rapid global advancements in AI and the local context.

3.2 Research Questions

- Are students in Afghanistan aware of Artificial Intelligence?

- How frequently do they use AI for learning?

- What role does AI play in enhancing learning?

3.3 Research Objectives

- To determine the level of AI awareness among students in Afghanistan.

- To assess the frequency and extent of AI usage by Afghan students.

- To explore the role of AI in enhancing learning.

Overall, the study aims to determine whether students are aware of artificial intelligence, how much they know about it, and how frequently and to what extent they use it for learning purposes. Additionally, it seeks to explore the role of AI in enhancing student learning and its broader applications in education. A secondary objective is to examine whether students use AI responsibly to learn new concepts, generate ideas, and review their work for errors rather than solely relying on it to complete assignments.

4. Research Methodology

4.1 Research Design

This study employs a mixed-method approach to explore the usage of Artificial Intelligence among students in Afghanistan. For the quantitative part, a cross-sectional

survey was designed to collect data from university and high school students regarding their awareness, knowledge, use, and effects of using AI for learning purposes.

For the qualitative part of the study, semi-structured telephonic interviews were employed to gain an in-depth understanding of students' perspectives on using AI in education. Ten students from remote provinces and ten university students from Kabul were interviewed, ensuring a diverse representation. These interviews were conducted using an interview guide to maintain consistency across conversations while allowing flexibility for participants to share their experiences in detail.

The interviews were recorded, transcribed, and analyzed using thematic analysis. This approach enabled the identification of recurring patterns and themes within the responses, which provided valuable insights into the purposes of AI use in education. Thematic analysis helped organize the data into meaningful categories, which ensures that the findings accurately reflect the students' views and experiences with AI in their educational context.

4.2 Population and Sample

Students are the targeted population for this research study since they are the first actors to be updated about the technological advancements in Afghanistan. Therefore, they have been selected as the targeted population. The survey was distributed among this population from various universities to maintain diversity in the data. The sample consisted of 150 respondents.

Population: Current and newly graduated university students in Afghanistan from public and private institutions have been selected as the target population for the study.

Sample Size: A total of 90 participants comprise the sample size; 71% are from private institutes and 29%, 4 from public ones.

Sampling Technique: Purposive sampling was employed to select universities and high schools; universities and high schools were selected from Nangarhar, Kabul, Balkh, Herat, and Paktiya provinces for the diversity and representativeness of the data. Random sampling was used to avoid biases in students' selection. Because students are most likely to stay updated with new advancements in artificial intelligence, the current scenario regarding AI knowledge, use, effects, and opinions is expected to be presented.

4.3 Data Collection

Data has been collected online on Google Forms through a cross-sectional survey questionnaire. The questionnaire includes several multiple-choice, short, and two open-ended questions to capture their experiences and opinions about AI use for education in Afghanistan.

4.4 Summary Instruments

Primary data has been collected from the targeted population through an online cross-sectional questionnaire. The online survey on Google Forms has five major components:

- Demographics: The demographic section includes the age, level of education, university type, public or private and faculty.

- Awareness about AI: This section includes several multiple-choice questions and one answer question to know about the general awareness of AI and its use

- Knowledge about AI: This section includes several multiple-choice and few short answer questions regarding familiarity with AI concepts and technologies

- Use of AI: This section includes several multiple-choice and few short-answer questions regarding the frequency and extent of the use of AI education

- Effects of AI: This section includes several multiple-choice and short-answer questions regarding AI's help in learning.

5. Data Analysis

Data was collected through an online survey questionnaire on Google Forms to explore the awareness, knowledge, use and effects of Artificial Intelligence among students for learning purposes.

5.1 Demographics

TABLE II

Variable Frequency Percentage

Variable		Frequency	Percentage
Age Group	18-25	84	81.90
	26-35	4	13.33
	Total	90	100
Level of Education	High School Graduates	42	41.90
	Technical/Vocational Training	1	0.95
	Bachelor's Degree	44	47.62
	Master's Degree	2	8.57
	Doctorate	1	0.95
	Total	90	100
Type of Institute	Private	64	66.67
	Public	26	33.33
	Total	90	100
Faculty	Faculty of Computer Science	34	34.29
	Faculty of Science	17	19.05
	Faculty of Economics	15	14.29
	Faculty of Medicine	9	5.71
	Faculty of Engineering	6	
	Faculty of Social Science	5	5.71
	Others	4	1.90
	Total	90	100

Source: Created by the authors

Table 2 shows the demographic data of our respondents within the age group; most respondents are young, between 18 and 25 years old. For their level of education, those with bachelor's degrees make up the majority, followed by high school graduates.

It is also important to know whether there is a difference in the magnitude of exposure to Artificial Intelligence between public institutes and private ones since our research found that the majority of our respondents belong to private institutes, with the largest

among all are from the faculty of Computer Science, then Facultes of Economics, Science, Engineering, Social Science and so on.

5.2 Knowledge of Artificial Intelligence

Fig. 1. Familiarity with AI

Before knowing about the perception and usage of AI among students in the education sector, it is imperative to know how familiar they are with AI. The above figure shows our respondents' encouraging state of familiarity with AI. 97.8% of the respondents have some level of familiarity with AI; 18.9% are excellent, 27.8% are very good, 28.9% are good, and 4.4% are poor. Only 2.2% of the respondents reported not knowing about AI.
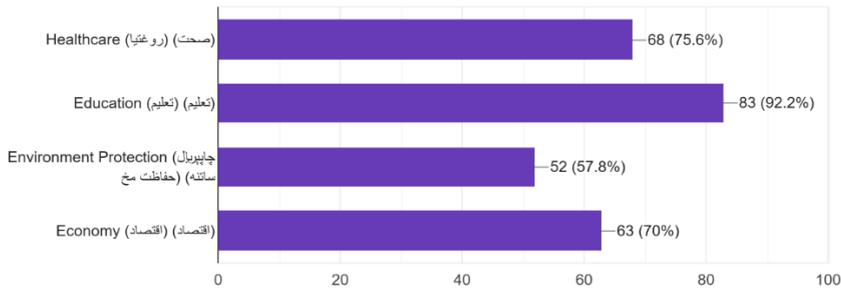

Fig. 2. AI beyond writing

As it has been reviewed in the literature section and observed in the thematic analysis below, there are concerns that most students are over-relying on AI for their daily tasks, including doing assignments. This paper explores what our respondents think AI is used for beyond writing. It is encouraging that they know that AI is used for healthcare services, education, environmental protection, and the economy. However, this does not reflect the use of AI in these areas because AI has been developed to this level in Afghanistan, where it can be used in these areas. These are the areas where our respondents think AI is used.

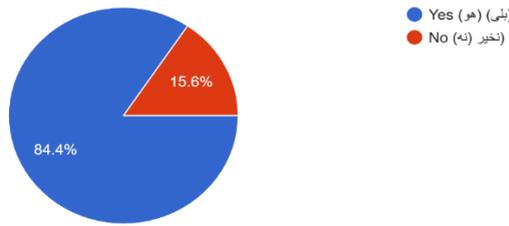## 5.2 Use of Artificial Intelligence

Fig. 3. AI Usage for Learning

Considering the research objective, this is one of the main questions that can answer our research questions. As the figure illustrates, 82.9% of the respondents reported using AI for study and work purposes, and 17.1% reported not using it for the above purposes. It reflects that the majority of them get help from AI for learning, teaching, and administrative work.
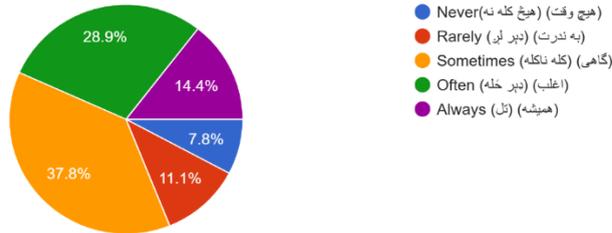

Fig. 4. Frequency of AI Usage

To capture a better picture of the reality of the use of AI, we asked our respondents how much they use it or, in other words, how much they rely on AI for their daily tasks in their respective roles. As expected, 13.3% reported Always, 29.5 reported Often, 37.1 reported Sometimes, 10.6% reported Rarely, and 9.5% reported Never. With the spread of AI and advancements, students increasingly rely on AI for their studies and work.
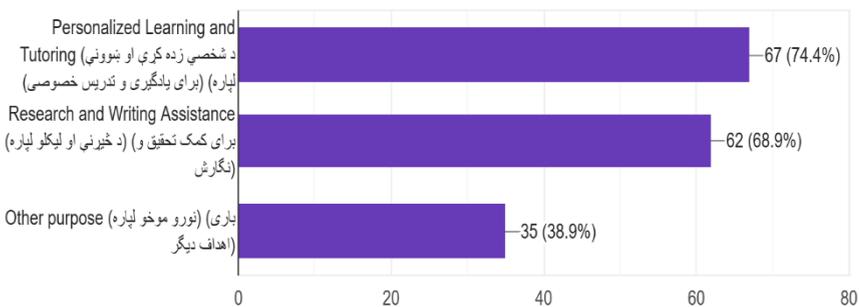

Fig. 5. Purpose of AI Usage

In response to the question about what they use AI for among the four options listed above, 74.4% have chosen Personalized Learning and Tutoring, 68.9% have chosen Research and Writing Assistance, and 33.9% have chosen Other purposes beyond those listed above. AI has been greatly incorporated in the education sector without a formally introduced system that is applied in developed countries such as Interactive Learning Environments (ILEs), ACTIVEMath, MATHia, Why2Atlas, Comet and Viper.

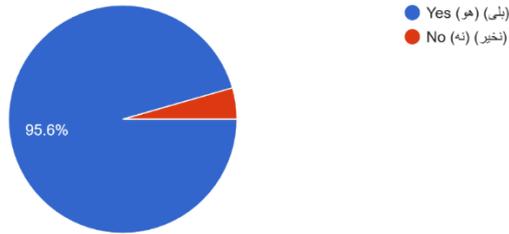*5.3 Effects of Artificial Intelligence*

Fig. 6. Help of AI in learning

The above figure answers questions such as: What are the effects of AI on education in Afghanistan, and how strong are they? 93.3% reported that AI had helped them with their studies and/or work, and the remaining 6.7% reported that it did not help them. AI is effective in education because it helps students learn, teach, and do administrative work faster and better.
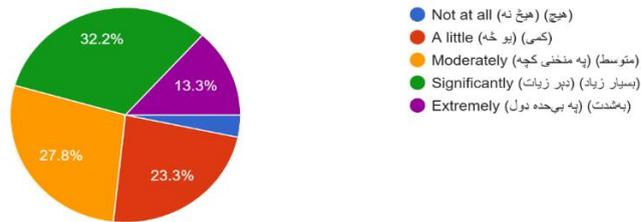

Fig. 7. Magnitude of AI help

As expected in the research, 96.7% of the respondents reported that AI has helped them to some extent with their studies and work, with 13.3% being extreme, 32.2% being significant, and 27.8% being moderate. While 23.3% reported that AI helped them little, 3.3% reported that AI did not help them. This, again, proves that AI has permeated Afghanistan's education sector. Students use it or perhaps rely on it a lot.

5.4 Perceptions about AI

In response to the question of what should be done with AI, 66.7% suggested encouraging the use of AI, 65.7% said training and resources should be provided, and 53.3% said that AI should be regulated and monitored. Interestingly, 7.6% suggested banning AI entirely. It shows that most respondents favour adopting AI formally in education but with regulations for productive and responsible use.

5.4.1 Support for AI

As the majority of the respondents support the use of AI in education, the study explored what they think should be done for its productive and responsible use. 77.1% of the respondents reported that training should be provided to students and teachers, 71.4% reported that access to better internet is important, 58.1% reported that they need to have access to AI tools and applications, and 48.6% reported that they should be provided with technical support so that AI can be integrated and adopted in education in Afghanistan.

5.4.2 Concerns about AI

Artificial Intelligence is too new to be incorporated into education because people do not understand its full potential. People have concerns about it, and they are valid; they are concerned that AI will cause great job displacement for teachers and many other professionals, as it was also reviewed in the literature. Secondly, they are concerned that people will start over-relying on AI and related technologies, making human labour obsolete and causing more unemployment and economic inequality. Thirdly, they are concerned that there will be issues related to data privacy. The more technology we use, the less private life becomes. Lastly, they are concerned that the less-privileged will not know AI technologies and access to them, which will further increase the already increasing economic inequality within the countries and worldwide.

In the final question of the survey, we asked participants what challenges exist for Artificial Intelligence in the education sector in Afghanistan; four major challenges have been added weight; the biggest challenge, according to them, is Limited Access to Technology with 75.2%, followed by Lack of Awareness with 74.3%, then Lack of Infrastructure 60% and lastly, Resistance to Change with 41.9%. According to the respondents, these challenges slow down AI integration in Afghanistan's education sector. Addressing them will pave the way for the wide integration of artificial intelligence in Afghanistan, but it will not be limited to education. Every industry will use AI sooner or later if provided with the necessary resources.

6. Thematic Analysis

An online survey was distributed among university students in Afghanistan to explore the broad effects of artificial intelligence (AI) on education, learning, instruction, and administrative work. The survey was distributed among various universities, including all zones: North, East, West and the Centre, so that the data be diverse and representative. The questionnaire was developed in English and the national languages Pashto and Dari, for better comprehension of the questionnaire questions. The following themes have been developed.

6.1 Ease

Various answers have been received in response to the open-ended question in which the respondents were asked about their opinion on what AI is used for. The majority of the respondents think that artificial intelligence is used to ease the work burden. For example, one respondent has reported, "*Well, I personally use AI to make my tasks easier.* Another has a general opinion about it; he has said, "*To solve many problems in life and make it easier*". Similarly, another has said ", *To make our approach easy to get information about something quickly*". Another respondent sees from the economic and futuristic perspective and says that "*To make work easier, to do more work in less time*". While many of them use and think

is used for making work easy and to get information quickly and easily, another respondent uses it for advice and says that "*Artificial Intelligence is an excellent advisor, it makes it easy to access information from which people can learn about every aspect of life.*"

Another respondent cites the example of AI in healthcare and says, "*AI is used in many areas to make life easier. AI chatbots answer customer questions anytime, and self-driving cars use AI to navigate and manage traffic. It also provides.* Out of 90 respondents, 25 mentioned ease, easy and easier. It shows they have a very good understanding of AI and its use for easing daily tasks, automation, disease detection and more.

6.2 Information

The second theme of the research from the same question as what opinions about the use of AI are is information. 16 out of 90 respondents mentioned the word "*information*" in their responses. For example, one said, "I usually use it for writing various emails, content writing, homework, *and getting information about various things. Many application tools also cooperate in video editing, photo editing, etc.*" Another respondent who might use AI as a search engine for information says, "*In my opinion, it is used for acquiring information from one place instead of just searching and looking in different sources; it is used to access information in one place.*"

Similarly, another respondent using AI for study purposes says, "*To solve version problems, to study and teach, to find new or old information*". Another concerned student uses it for getting information but has some worries about the misuse of AI says, "*From my perspective, we can get help and find information in any field, but it has a bad impact on self-learning and solving problems as well some people misuse it so it needs to be managed*". This shows that students use AI to get information about their studies, work, and everything else.

6.3 Automation

The third most mentioned word in the responses is automation or automating. It is evident now that most respondents know that artificial intelligence helps develop automation to an advanced level, which will require fewer human interventions. One of the respondents, who has a general knowledge of AI, says, "AI is used for d*ata analysis, healthcare, robotics and automation*". Another general response is that "*We use AI in every field of life that is healthcare, automation, education, agriculture and transportation.*" Another more focused response is that "AI is used for doing things automatically and with less time." The respondents are not only aware of the advancement of automation through AI, they also know that it can be used in every field such as healthcare, education and agriculture.

6.4 Education

To find out the answers to the question of whether the respondents use artificial intelligence (AI) for their studies, several students have confirmed that they use AI for learning. They have generally said that AI helps them in studies; however, they did not provide details on how it helps them. For example, a respondent said, "*AI helped me a lot in my studies*". Another said, "Artificial Intelligence is almost *more useful in studies and tasks for students and people in different areas.*"

6.5 Economy

In the multiple-choice questions section, respondents were asked what artificial intelligence is mainly used for; 81 out of 90 respondents chose economy, showing their general knowledge about AI and its potential to improve the economy and create growth. In the open-ended question, economy and efficiency were mentioned three times each, and business, unemployment, agriculture, production, and finance were mentioned twice. Their diverse responses show that they believe that AI can transform economies with efficiency and higher productivity in businesses, agriculture, production and finance.

However, some are concerned that AI will create employment in the future with its wide use. For example, a respondent said, "*Artificial Intelligence can destroy human intelligence. If humans become lazy and do all their things with AI, it will cause the employees to be unemployed.*" Similarly, another respondent said, "*AI will make people unemployed, and all work will be handed over to machines.*" Their concerns are valid, as observed in the literature review section; despite its potential role in economic growth due to enhanced productivity, AI will cause disruptions in the labour market [7].

6.6 Healthcare

Of all respondents, 8 are the words of health and healthcare for which they believe AI is used. All respondents have only mentioned that AI is useful in healthcare. However, they did not superficially say how AI can be used in healthcare services except for one respondent who said, "*In healthcare, it helps doctors find diseases early and suggest the best treatments.*" This respondent specifically highlights the application of AI in healthcare, emphasizing that AI can save lives by detecting serious diseases early. Other responses that lacked specific details about AI application in healthcare suggest that the majority of the respondents have a general understanding of the potential application of AI in healthcare; however, they are less aware of its specific uses and benefits in healthcare.

6.7 Poor Use of AI

As observed in the literature review, in advanced economies, students use AI to help them choose their study program and university where they can potentially excel. They use it to help them learn faster and better and have more engaging educational experiences. It does not end here; they used it to take advice and predict future careers, and many students struggled to ascertain their favourite field of study and work at which they achieved success [28].

None of our respondents mentioned anything related to the use of AI when choosing their study and work field. Their use of Artificial Intelligence in Afghanistan is still rudimentary. In other words, they use AI as a substitute for google.com for searching, eliciting very basic information about any topic of interest; despite their knowledge about its potential and wide use and advantages, they use it to make their work easy, as discussed above. They will likely rely more on AI to complete their assignments and tasks faster. It is not that they use it to improve their skills, knowledge and capabilities; however, they use it in the way policymakers are concerned that AI is not being used in the way that should enhance human interaction and decision-making; it is used not in the responsible way which could lead to human replacements with AI in education.

6.8 Application of Artificial Intelligence in Education

In response to the open-ended question regarding the application of AI in education in Afghanistan, the majority of the respondents expressed their support for the use of AI in education in Afghanistan. Apart from their positive response, they have made some suggestions. For example, one of the respondents said, "AI can help education in Afghanistan by provid*ing personalized learning and supporting teachers. But to succeed, we must fix problems like poor infrastructure, limited technology, and low awareness.*"

Another supportive response to the use of AI in education in Afghanistan has said that "*AI can really help education in Afghanistan. It can make learning more personalized, so each student gets the help they need. I can translate languages, making lessons easier to understand for everyone. It can also make learning more fun with virtual tutors and games. Overall, AI can make education better and more inclusive for all students in Afghanistan.*"

6.9 Over-relying on AI

Taking the minor objective into consideration, whether AI is used only for writing by students or it is used more productively, such as for learning new concepts, improving their writing, brainstorming new ideas and so on, our respondents accept that many of them over-rely on AI for writing, they do not put their efforts. A respondent said, "*AI has helped students and teachers in education, but some students only rely on AI and do not new things, and it is a problem because they won't learn anything new.*" Another respondent expressed a similar opinion: "*AI is good for education purposes, but in Afghanistan, more students use AI for their assignments, so this will decrease the level of studying because they will not research.*"

Conclusion

The study found that a significant majority of students are aware of Artificial Intelligence (AI) and actively use it for their daily tasks. AI is used to ease their work and study burdens, information retrieval, and learning new concepts. However, the study also identifies a concerning trend: many participants make poor use of AI technologies, leading to over-reliance on these technologies. This over-reliance could negatively affect their learning and working capabilities.

Moreover, AI has been informally integrated into education in Afghanistan without a formal legal and ethical framework. Hence, it would be important to differentiate human work from AI-generated work, as this differentiation cannot be made now. There are no established guidelines on AI's usage in research and writing. Although AI has not yet been formally integrated into any sector, with appropriate legal and ethical frameworks, we can expect its potential benefits in education, healthcare, the economy, agriculture, and environmental protection. Proper infrastructure, training and resources are essential to realize these benefits effectively.

Recommendations

In the age of information, there is no choice whether or not to be in the race towards civilization, and it is not a matter of choice but a matter of necessity. If the world is advancing towards AI and applying it in education, health, economy, environment, and other fields, Afghanistan has to take measures to be a part of the global community and adopt AI in every necessary sector. However, it is too early for the world to use AI for the betterment and advancement of humanity, not as a substitute or replacement. With the

current usages and trends regarding AI in advanced countries, Afghanistan and its educational institutions should make a policy on how AI can be used by students and teachers in education. The policy should include the following rules.

- Training and Resources: Based on the study's findings, it is necessary to provide the necessary training and resources to improve AI literacy among students and teachers for its productive and responsible use. Training should be provided in workshops and online courses and the development of AI-focused curricula in both secondary and higher education.

- Legal, Ethical and Regulatory Framework: Higher education institutions should introduce a legal framework to avoid plagiarism, cheating, and other academic misconduct, as well as encourage AI to learn and enhance skills. The ethical framework will ensure transparency, fairness and inclusivity so all students can access AI tools and applications. The regulatory framework will ensure compliance with the legal rules and ethical standards.

- Encouragement of AI for Innovation: AI should be encouraged to enhance the capabilities of students and teachers so that they can upskill themselves, adapt to new technological advancements, and not get replaced by machines but supervise and control machines to their advantage.

- AI as a Solution for Education: To address the current education challenges in Afghanistan, AI could offer tailored and personalized education to those who cannot go to school or university for any reason, with the partnership between tech companies and academic institutions. AI can provide flexible, accessible, and high-quality education to remote and deprived communities in Afghanistan.

- Constant Monitoring of AI in Education: AI has not been developed to its complete potential. With its advancement and integration in education, it is imperative to continuously research and evaluate its effects on education, the economy, society, and health in the world and Afghanistan.

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