

HWANG JI YEN AWARENESS, KNOWLEDGE AND ATTITUDE TOWARDS AI IN LEARNING 2022

**Awareness, Knowledge, and Attitude
towards Artificial Intelligence in learning
among Faculty of Medicine and Health
Sciences (FMHS) Students in UTAR**

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**AWARENESS, KNOWLEDGE AND ATTITUDE TOWARDS
ARTIFICIAL INTELLIGENCE IN LEARNING AMONG
FACULTY OF MEDICINE AND HEALTH SCIENCES
STUDENTS IN UNIVERSITY TUNKU ABDUL RAHMAN**

By

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ABSTRACT

Background and Objective: With the advancement of computing and information processing tools, AI opens up new possibilities and chances in educational processes and can offer crucial insights to administrators and decision-makers at the institutional level in learning and education industry. Besides that, AI has been extensively used in educational systems, including intelligent tutoring systems, teaching robots, learning analytics dashboards, adaptive learning systems, and human-computer interactions, computing, and information processing techniques with the current advancement and industry revolution 4.0 (Kaur, 2021). Besides that, AI also found to be useful in medical field which acts as clinical educators and offers advice for health executives on how to encourage the use of AI in the education and professional growth of healthcare workers (Randhawa & Jackson, 2019) Therefore, the aim of this study was to determine the awareness, knowledge and attitude towards artificial intelligence in learning among MK FMHS students in UTAR.

Methods: An observational descriptive study will be carried out to determine the awareness, knowledge and attitude towards artificial intelligence in learning among MK FMHS students in UTAR. Participants from Universiti Tunku Abdul Rahman, Sungai Long campus were recruited from FMHS. Awareness questionnaire were given to all the participants and required them to answer all the questions to determine the awareness, knowledge and attitude towards artificial intelligence in learning among FMHS students in UTAR. The awareness, knowledge and attitude of FMHS students were determined by scoring and were categorize them into three categories which are poor, fair and

good. The data is recorded and categorised by IBM SPSS software statistics version 26.

Results: The total 272 responses collected, there were 8 participants who did not give consent to process the data. These data were removed from the data analysis process and hence there were only 264 responses were processed in the final stage of the study. The participants consist of 72% female and 28% male. There are 18.9% of TCM, 22.7% of MBBS, 5.7% of nursing and 52.7% of physiotherapy students participate in this study. The research found that 7.6% and 92.4% of participants have fair and good awareness respectively. While for knowledge part, 19.3% of participants have fair knowledge and 80.7% of participants have good knowledge towards AI in learning. However, more than 70% of them do not been taught about any AI related course. Generally, almost all the participants have positive attitude towards AI in learning. 16.3% of them have fair attitude while 83.3 of them have good attitude. However, there are 0.4% of participant has negative attitude towards AI in learning and more than 50% of participants have a fear that AI will replace the healthcare professions.

Conclusion: In conclusion, it is found that FMHS students in UTAR generally have a good awareness and knowledge towards the basic of AI. However, they are not really understanding AI in-depth due to lack of opportunity to study in AI related course. Although there is a fear of replacement by AI, but majority of the students have a positive attitude towards AI in learning and agree that AI will be beneficial as learning tool. In addition, their willingness towards inclusion of AI in practical training and curriculum are also high. Hence, the university should consider including AI course in the syllabus to encourage the students to know and explore more about AI. Besides that, the university should also consider involving AI in practical learning and curriculum. This is giving the students a chance to learn through AI and adapt with the application of AI.

Keywords: Artificial Intelligence, Awareness, Knowledge, Attitude, Medical, Health Sciences, Learnig

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APPROVAL SHEET

This Research project entitled “**AWARENESS, KNOWLEDGE AND ATTITUDE TOWARDS ARTIFICIAL INTELLIGENCE IN LEARNING AMONG FACULTY OF MEDICINE AND HEALTH SCIENCES STUDENTS IN UNIVERSITY TUNKU ABDUL RAHMAN**” was prepared by HWANG JI YEN and submitted as partial fulfilment of the requirements for the degree of Bachelor of Physiotherapy (HONs) at Universiti Tunku Abdul Rahman.

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PERMISSION SHEET

It is hereby certified that **HWANG JI YEN** (ID No: **19UMB03068**) has completed this Research project entitled “**AWARENESS, KNOWLEDGE AND ATTITUDE TOWARDS ARTIFICIAL INTELLIGENCE IN LEARNING AMONG FACULTY OF MEDICINE AND HEALTH SCIENCES STUDENTS IN UNIVERSITY TUNKU ABDUL RAHMAN**” under the supervision of **MS SWAPNEELA JACOB** (Supervisor) from the Department of Physiotherapy, Faculty of Medicine and Health sciences.

Yours truly,

(HWANG JI YEN)

DECLARATION

I hereby declare that the Research project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

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LIST OF ABBREVIATIONS

AI	Artificial Intelligence
DL	Deep learning
MBBS	Bachelor of Medicine and Bachelor of Surgery
MK FMHS	M.Kandiah Faculty of Medicine and Health Sciences
ML	Machine learning
TCM	Traditional Chinese Medicine
UTAR	Universiti Tunku Abdul Rahman
VR	Virtual Reality

CHAPTER 1

INTRODUCTION

1.1 Chapter overview

This chapter will outline the background of the study, giving context for the overall research project. Besides that, this chapter also included the importance and relevance, research objectives, background of study and operational definition of terms for the research study.

1.2 Background of study

1.2.1 Introduction of Artificial Intelligence

Artificial Intelligence (AI) is a program or machine that required intelligence applied by human to complete the task. It is a concern of science and engineering which making the machine exhibit intelligence, particularly those that can recognise speech, make decisions, and translate between different languages. AI is the simulation of human intelligence by technology, particularly computer systems. This involves knowledge representation, self-correction, planning, reasoning, motion, manipulation, and creativity. It also includes learning. In addition, AI also a science and a collection of computational methods that draw inspiration from how humans use their bodies and neural systems to feel, remember, reason, and act. Deep learning and machine learning are related to AI, with machine learning using algorithms to find patterns and derive insights from the data it is working with. Deep learning is a branch of machine learning that moves AI one step closer to its objective of

making it possible for robots to think and function as humanly as possible (Harkut & Kasat, 2019).

1.2.2 History of Artificial Intelligence

The origins of Artificial Intelligence (AI) begin in around 1940s, a English mathematician Alan Turing developed a machine that used for code breaking which known as The Bombe for British government. The main usage of the machine was to be deciphering the Enigma code that used by army from Germany in Second World War. With this, The Bombe is generally known as pioneer computer that work with electro-mechanical. In 1950, Alan Turing published a seminal article with title of “Computing Machinery and Intelligence”. In this article, he mentioned the way to develop intelligent machines and a particular way to test the machine intelligent by using Turing test. Turing test mentioned that if a having a communication with another human and a machine and unable to differentiate the difference between the human and machine, the machine is considered intelligent. Until today, this Turing test is still used to identify an artificial system’s intelligence.

In year of 1956, which was 6 years later, a 8 weeks long Dartmouth Summer Research Project on Artificial Intelligence has been conducted at Dartmouth College in New Hampshire by Marvin Minsky and John McCarthy. This happen when they formally coined the term of "artificial intelligence". The Rockefeller Foundation provided the funding for this session. Participants such as mathematician Claude Shannon, who established theory of information, and computer scientist Nathaniel Rochester, who developed the first commercial

scientific computer which known as IBM 701. The main purpose of DSRPAI was to build a new field of study by creating artificial intelligence robots. Hence, this project had recruit the professions from diverse field.

The field of AI experienced substantial success for almost two decades after the conferences had done. Joseph Weizenbaum who develop the ELIZA computer software at MIT in the year 1964-1966 is one of the prove of the success of AI. ELIZA, processing tool for natural language was one of the earliest algorithms to try to pass the aforementioned Turing Test. It able to mimic a conversation with a human. Herbert Simon, the Nobel Prize winner and Cliff Shaw and Allen Newell, scientists from RAND Corporation who developed the General Problem Solver programme had bring another success to AI. This programme was able to solve the straightforward problems, such as towers of Hanoi.

Although AI received a great success and development in it own field, however the U.S. congress begun to criticize strongly on the high expenditure on AI research in 1973. The same year, James Lighthill, a mathematician from British questioned the positive prognosis offered by AI researchers in a paper which published in the British Science Research Council. He stated that machines will only be able to compete at the level of a "trained amateur" in the chess game, and the machine was unable to use common sense reasoning. Furthermore, although the U.S. DARPA increased funds to the Japanese government in AI research during the year of 1980s, the governments were no able to further develop AI in the following years.

However, the artificial neural networks (ANNs) has again prove its success in deep learning in year of 2015 when Google's AlphaGo algorithm defeated the Go world champion. Go is a game that is considerably more difficult than chess, and it was long thought that human will never defeat by the computer in Go. AlphaGo utilize the specific type of ANNs which known as deep learning to gain its performance in exceptional. Most of the AI applications we used nowadays are based on ANNs and deep learning. For example, Facebook use the algorithms of picture identification, smart speakers with function of speech recognition algorithms and car with algorithms of self-driving (Haenlein & Kaplan, 2019).

1.2.3 Artificial Intelligence and Machine Learning

Machine learning (ML) is the subfield of computer science. It given a definition of “the ability to learn without being explicitly programmed”. ML develop the study and algorithms construction that evolved from pattern recognition study and theory of computational learning in AI. Besides that, ML also able to predict based on data given. For example, by forming a model from sample inputs, algorithms of machine learning able to solve the static program with strict instructions by making predictions or decisions that driven by data. The example of ML usage included filter email, network intruders’ detection, recognition of optical character, rank learning and computer vision. This shown that machine learning is used in variety of computing jobs where it is complex or impractical to create and programme explicit algorithms with high performance. Machine learning has many similarities with computational statistics which both are

focusing on making predictions with computers. It is similar to optimization of mathematical and allow the discipline with methods, theory, and application domains to happen. Besides that, machine learning also been used in analysis of data to develop complex models and algorithms that are used in predicting in practical applications, this is called as predictive analytics. By learning from linkages and the data trends set before, these analytical models allow the creation of judgements and result that are dependable and repeatable and hidden insights findings by the researchers, data scientists, engineers, and analysts (Ongsulee, 2017).

Supervised and unsupervised learning are both the most widely used ML methods. Supervised learning accounts around 70% of machine learning while around 10-20% of ML used is unsupervised learning. In addition, there are also another 2 technologies that sometimes used in ML which are semi-supervised and reinforcement learning.

By utilizing labelled instances which the input will give out the desired outputs, this is the way to train supervised learning algorithms. For instance, a piece of equipment might have data points with the labels "R" (runs) or "F" (failed). A collection of inputs and their matching correct outputs are given to the learning algorithm. To identify the faults, it will compare the actual output with the proper output. Then, the model will be adjusted accordingly Supervised learning will use the pattern to forecast the values of label on the new unlabelled data by classify, regressing, predicting and gradient boosting. Supervised learning allows the prediction of future events from the past data. For example,

it can predict when transactions of credit card are prone to fraud or which consumer are most likely to go for claim submission.

While for unsupervised learning, it is used when the data do not have any historical labels. There is no “right answer” for the system. The algorithm must determine what is being display. The presentation must be determined by the algorithm. The objective is for data investigation and internal structure identification. Unsupervised learning can also be used in transactional data. For instance, it categorizes customers groups with similar characteristics so they can be handled with similar way in marketing strategy. Besides that, it able to recognize the distinction of characteristics among the target consumers. The common technique used included self-organizing maps, mapping of nearest-neighbour, clustering of means and decomposition of singular value. In addition, the algorithms also function in categorization of textual subject, recommendations of products and find out the outliers from the data.

Semi-supervised learning is similar to supervised learning as it also used for the similar application as supervised learning. However, it trains by using both labelled and unlabelled data which labelled data account for larger amount while unlabelled data account for smaller amount. Methods such as classify, regress and predict can be used for semi-supervised learning. Semi-supervised learning is effective when the labelling is too expensive and the fully labelled training procedure is not able to be proceed. One of the examples of this is recognition of a person's face by webcam (Ongsulee, 2017).

Reinforcement learning is commonly used in the field of robotics, gaming and navigation. The algorithm learns through reinforcement learning will lead to maximum benefits through multiple trials and errors previously. The person that learns and making is the agent in this form of learning, the environment will be the things that have interactions with the agent which the action represents the thing can be perform by agent. Agent need to make the best decision to maximise the expected advantages in a given time. By adhering to a good policy, the agent will attain the target in short period of time. Thus, reinforcement learning should be used in learning the appropriate policy (Ongsulee, 2017).

1.2.4 Artificial Intelligence and Deep Learning

Deep learning (DL)also known as deep structured learning, hierarchical learning or deep machine learning. It is an ANNs study that related to algorithms of machine learning and contains more than 1 hidden layer. The deep nets under the layer extract and transform features using a cascade of numerous layers of nonlinear processing units.

The output from the previous layer serves as the input for the following layers. Applications for the algorithms include pattern analysis and classification. Pattern analysis will be unsupervised while classification will be supervised learning. Besides that, these deep nets are based on the multiple levels features learning or data representation. To form a hierarchical representation, the features from lower level will derived the higher level of features. Deep nets in deep learning also involve in data representation and it enables representations

of multiple levels which correspond to abstraction of various levels (Ongsulee, 2017).

In a simple way, 2 sets of neurons may exist in a straightforward scenario: 1 set would receive input signals, and the other would send output signals. When an input is received, the input layer modifies it before passing it on to the following layer. Since there are numerous layers between the input and the output in a deep network, the algorithm can utilize numerous processing layers made up of various transformations which are linear or non-linear (Ongsulee, 2017).

DL is a larger family of machine learning techniques based on learning data representations. A set of edges, a region of a certain shape, a vector of intensity values per pixel, or other more abstract representations can all be used to represent an observation. Different representations ease the learning task in different ways. DL holds the potential of replacing manual feature creation with effective unsupervised or semi-supervised feature learning and hierarchical feature extraction methods. DL architectures are used in the industry such as recognition of audio and automatic speech, computer vision and processing of natural language. These architectures include deep neural networks, convolutional deep neural networks, deep belief networks, and recurrent neural networks (Ongsulee, 2017).

1.2.5 Artificial Intelligence in Learning

With the advancement of tools used in computing and information processing, AI opens up new possibilities and chances in educational processes and can offer crucial insights to everyone at the institutional level in learning and education industry. Besides that, AI has been extensively used in education field, including intelligent tutoring systems, teaching robots, learning analytics dashboards, adaptive learning systems, and human-computer interactions, computing, and information processing techniques with the current advancement and industry revolution 4.0 (Kaur, 2021). According to Chaudhari, More, Bhadak, Chaudhari and Gawali (2020), there are various type of AI application used in learning which included machine learning based approach for data analysis and categorization, AI Chabots which enhance learning experience, interactive AI for linguistic education with the use of VR as well as English online course that provide teaching method using AI. In addition, chatbot utilization and integration with AI both enhance the learning experiences of students because they make use of machine learning algorithms and give content tailored to students' learning requirements and skills. The AI used in enhancing the learning experience included machine translation tools, adaptive educational systems, and intelligent tutoring systems (Chen, Chen, & Lin, 2020).

1.2.6 Artificial Intelligence in Health Sciences and Medicine Field

AI are widely used in medical field especially in foreign countries and it is beneficial for the FMHS students. For example, AI can play a role as human educators, such as clinical educators, and offers advice for health executives on

how to encourage the use of AI in the education and professional growth of healthcare workers. Intelligent tutoring system (ITSs) known as BRCA Gist are effective and advance in learning about the risk of genetic breast cancer in healthcare setting. Additionally, ITSs offer a wider variety of medical cases and are not constrained by space or time; rather, they give students immediate feedback (Randhawa & Jackson, 2019). While in Malaysia, there is also involvement of AI in healthcare and medical field. In 2018, the traditional stethoscope collaborates with Stethee Pro, a strategic partnership between the Malaysian Investment Development Authority, Collaborative Research in Engineering, Science and Technology (Crest), and M3DICINE which is made possible by the Telemedicine Development Group (TDG). Users of the Stethee Pro stethoscope system can hear heart and lung sounds with sophisticated amplification and filtering technology. By enabling the records to be sent to a smart device like a smartphone or a tablet via Bluetooth technology, this allow the heart and lungs to be examined in more advance method with analysis that is accurate and thoroughly. The result analysis will a special biometric signature for every patient. This biometric signature will used to find out the lung or heart conditions of the patients (Health, D. of., 2018). With these, is clearly shown that AI applications are gradually apply for learning and education purpose in medical field.

1.2.7 Importance and relevance

AI knowledge and information are important for FMHS students because they might involve in the usage of AI in future. As mentioned before, AI such as

Intelligent tutoring system (ITSs) known as BRCA Gist and Stethee Pro have been used in medical field of foreign country and Malaysia (Randhawa & Jackson, 2019) (Health, D. of., 2018). With this research conducted among UTAR FMHS students, it able to collect the data of awareness, knowledge and attitude towards AI in learning among FMHS students. We will be able to know that the familiarity of students toward AI in learning as well as their opinion toward involvement of AI in learning. After conducted this research, some information related to AI can be added in the end of the questionnaire and hence able to improve the awareness and knowledge of the FMHS students toward AI in learning. This is important especially for FMHS students because they will become the healthcare practitioner that involve in the medical field in the future. Hence, they might need to understand the basic concept and the knowledge about AI in order to catch up with the latest AI application in learning and medical field. Besides that, by knowing the attitude of FMHS students towards AI, it will help in the decision making whether to involve AI related course or curriculum among FMHS students. If the feedback from the research is positive, course and curriculum related to AI can be considered to apply among FMHS students hence they will be able to learn and understand more about AI.

1.2.8 Concluding Remarks

In conclusion, this study will be conducted to determine awareness, knowledge and attitude towards Artificial Intelligence in learning among MK FMHS students in UTAR. The Awareness, Knowledge and Attitude towards AI in learning questionnaire is used in this research to determine the awareness,

knowledge and attitude towards AI in learning among MK FMHS students in UTAR. The questionnaire has be divided into 3 parts which are awareness, knowledge and attitude and the students will be answer them accordingly

1.3 Research objective

1. To determine the awareness towards Artificial Intelligence in learning among MK FMHS students in UTAR.
2. To determine the knowledge towards Artificial Intelligence in learning among MK FMHS students in UTAR.
3. To determine the attitude towards Artificial Intelligence in learning among MK FMHS students in UTAR.

1.4 Operational definition

- a) Awareness is the knowledge that something exists or understanding of a situation or subject at the present time based on information or experience (Cambridge Dictionary, 2019).
- b) Knowledge is the understanding of or information about a subject that you get by experience or study, either known by one person or by people generally (Cambridge Dictionary, 2019).
- c) Attitude is A feeling or opinion about something or someone, or a way of behaving that is caused by this (Cambridge Dictionary, 2019).
- d) Artificial Intelligence (AI) is the capacity of a digital computer or computer-driven robot to carry out functions often performed by intelligent beings which able possess human-like cognitive abilities like

the capacity for reasoning, meaning-finding, generalization, and experience-based learning (7 Types of Artificial Intelligence: Propelling the Technology Development, 2020).

- e) Learning is the activity of obtaining knowledge / Knowledge or a piece of information obtained by study or experience (Cambridge Dictionary, 2019).
- f) FMHS students are students that study health and diseases in human body and prepare to work in variety of health-related careers and setting such as students in MBBS, nursing, TCM and physiotherapy courses.

1.5 Structure of research project

In this study paper, Chapter 1 will include the background of the study which cover the importance and relevance, research objectives, background of study and operational definition of terms for the research study. Chapter 2 will be literature review which it included the similar study done on relevant topics in the past. Chapter 3 will outline the methodology used in the research which included the research design, sampling design, instrument used in the research and collection of data. Chapter 4 will reveal the data collection result after descriptive and inferential analysis. Chapter 5 will be the conclusion of study findings discussion, limitation of the study and suggestion for study in the future.

CHAPTER 2

LITERATURE REVIEW

2.1 Chapter overview

This chapter outlines the similar and related topic explored through past literature, study and journal which provides the framework for this research study.

2.2 Awareness, Knowledge, and Attitude towards Artificial Intelligence: Perspectives of Vietnamese Information Technology Students

According to Chao, Hsu, Liu and Cheng (2020), numerous fields, including agriculture, business, banking, information technology, mental health care, radiography, and medical, have investigated and used AI technologies and related applications. It is crucial to emphasise that the public's comprehension of AI technology and related AI literacy remains murky. One of the major obstacles that do not allow the public to approach what AI is the lack of a widely agreed definition of AI. Hence, the main objective of the research is to determine the opinions of university students from Vietnam regarding AI and how they foresee the potential of having their careers replaced by AI in the future.

This research involves 80 undergraduate students from AI, big data machine learning, computer science, management information system, network technology and security and software engineering. Using the Surveycake web application, a digital survey called Knowledge and Attitude Toward Artificial

Intelligence (KAAI) was created. Regarding attitudes regarding understanding of AI and expectations of its possible effect on the employment chances among university students in the future, the KAAI consists of 30 items divided into five areas. These 5 components are (1) Basic AI Knowledge, (2) AI Knowledge Resources, (3) AI Technique Proficiency, (4) Replacement of job, and (5) General Attitudes toward AI.

Five questions on the component 1 examine the fundamentals of machine learning, deep learning, natural language processing, computer vision, and robotics. Four topics in the section on component 2 examine the sources from which users can learn about AI. Moreover, seven items in the Proficiency of AI Techniques area relate to the students' knowledge of AI techniques. Thirteen entries in the Employment Replacement section examine the potential for job loss as a result of the development of AI. Six items in the General Attitude toward AI section which the last section, evaluate participants' perceptions of how AI influences many aspects of daily life.

The findings of this study showed that IT students in Vietnam were not well-versed in the development of AI technology, they have the range between slightly familiar to fairly familiar, probably as a result of a they do not receive any appropriate courses related to AI. In addition, the findings indicated that the participants expected certain automation and AI technologies might replace their IT positions. For instance, participants believed that the top three vocations

that AI technology could replace were computer operators (55%), data entry clerks/keyers (51.2%), and information security analysts (48.8%).

2.3 A Survey on Applications of Artificial Intelligence for Enhancement in Learning Experience

In this research, it consists of 4 different research that investigate on the various application of AI for learning. The first application of AI in learning in this research is autonomic assessment. In this research, the author has suggested a machine learning-based approach. Along with an adaptive knowledge recommendation system, they have also added an automatic reviewing mechanism for students' responses. In the research, they gathered information about students' responses to particular questions from a particular subject in the first section. They used TF-IDF, NLP, and Machine Learning techniques like Logistics Regression, Random Forest Classifier, and Linear SVC to analyse and categorise this data to determine the outcome. After reviewing the student's assignment in the second section, they continued to generate personalized recommendations. The result shown that the AI system is able to assess the students and giving recommendations accurately and the strategy is workable. However, the limitations of this research will be the AI system is entirely driven by datasets. Therefore, the manner and amount of data used for student assessment are insufficient to accurately reflect students' performance after recommendations.

The second AI application in learning in this article is the application of AI-Chatbots to improve the learning experience of students that study in higher institution in India. This is an empirical research and data has collected using quantitative approach. First, Excel spreadsheets are used to store the data. Data is exported to SPSS for the analysis phase. Following that, the descriptive and inferential statistical procedures are applied. In the field of inferential statistics,2 hypotheses are developed. The quantitative method's conclusion is that the majority of students will use chatbots to receive educational assistance. The findings of the Pearson Chi-Square test showed that the usage of chatbot technology in the higher institution in India is unaffected by the educational level of the student. However, this research does not include the ways to avoid chatbots addiction among the students.

In the third article, the research with an interactive AI for linguistic education with the use of VR is conducted. With the use of a VR gadget and native speakers, the author has created a language education learning programme. Voice RSS is the first tool used to turn the text into audio. After that, dialogue script is created using api.ai. Then comes the parameter, a function that takes the user's statement and extracts information from it. Therefore, the conversation will continue. There are a total of four parameters applied. Automated expansion of words identified by api.ai. The generated conversational script is saved in the JSON format. Using the api.ai Unity SDK, api.ai is incorporated into the Unity programming environment. The advantage of this research is a setting has been created that makes it simple to communicate with a chatbot in a foreign language

while the limitations of the AI application will be the user will not able to enter the new dialog by their own.

Last but not least, the fourth research in this paper involve the English course using AI as teaching method and the platform will be online. By combining Java with artificial intelligence, the author has proposed an online approach for learning English intelligence. The knowledge base is first prepared. For manipulating and maintaining the information base, there is a knowledge package. For each sort of base of knowledge, the operation of storage was formed. Knowledge is introduced through events and regulations. Control structure and forward inference technologies are used in reasoning. Teaching knowledge, student information, teaching action, and student feedback are all included in the repetitive cycle. This AI application is beneficial for learning because by selecting appropriate content to learn, students are able to follow a curriculum that interests them. While the limitation for this AI application will be the login process and curriculum planning cycle take a lot of time and the system has lower viability (Chaudhari, More, Bhadak, Chaudhari, & Gawali, 2020).

2.4 Artificial Intelligence in Education: A Review

This is a systematic literature review research and the research design and method used is qualitative research study. The aim of this systematic literature review research is to determine the effect of AI on education. This research involves articles focus on AI on education published after 2009 and fulfill the inclusion criteria. From the articles related to AI in learning, there are discovered

various platforms and applications. Some platforms encourage the customization and modification of content, which improves the learning experience by encouraging knowledge absorption and retention.

In this research, it found that chatbot utilization and integration with AI both enhance the learning experiences of students because they make use of machine learning algorithms and give content tailored to students' learning requirements and skills. In addition, the research also emphasizes how machine translation tools, adaptive educational systems, and intelligent tutoring systems all use AI to enhance the learning experience for students. Besides that, some platforms encourage the customization and modification of content, which improves the learning experience by encouraging knowledge absorption and retention. In addition, due to ability of AI to customize and personalize learning materials to suit each student's requirements and abilities, learning experiences for students have improved. In conclusion, AI shown major effect on education field (Chen, Chen, & Lin, 2020).

2.5 The Role of Artificial Intelligence in Learning and Professional Development for Healthcare Professionals

The rising importance of AI in the education and growth of healthcare career are discussed in this article. It gives a brief overview of the history of AI, explores its present and past uses in education and learning related to healthcare, and explains the reasons and methods healthcare leaders can use AI in healthcare education to transform current educational processes. It also explores the

potential effects of AI use as educators, such as educators in clinical setting, and offers advice for health executives on how to encourage the use of AI in the education. This can actually encourage the growth of career among healthcare workers.

Intelligent tutoring system (ITSs) known as BRCA Gist has been found to be suitable and effective in learning about risk of genetic breast cancer in healthcare setting. Additionally, ITSs offer a wider variety of medical cases and it is not constrained by space or time; rather, it gives students immediate feedback. This allow students to gain experience as a new learner.

However, it found that the implementation of AI in healthcare professional education is often limited although AI has been use for a long period in education and learning. Hence, healthcare practitioners should know the latest and advance form of learning technology and AI in their organizations, assess organizational awareness and understanding towards AI, pilot AI applications in the field of medical, nursing, and allied health specialties, and cooperate with other organizations in healthcare, AI designers, and post-secondary institutions. This is to allow designing, developing, and evaluation of AI applications and explore the potential of AI (Randhawa & Jackson, 2019).

2.6 Knowledge, Attitude, and Practice of Artificial Intelligence among Doctors and Medical Students in Pakistan: A Cross-sectional Online Survey

The aim of this research is to determine the knowledge, attitude and practice of AI among doctors and medical students in Pakistan. This study is cross-sectional and it examining demographic information, knowledge, perception, and use of AI utilizing an online questionnaire-based survey. 470 doctors and medical students were involved in the sample that is chosen using the practical sampling technique. For the comparison of the variables, the chi-square test was applied.

For the result, out of 470 people, 223 (47.35%) were physicians, and 247 (52.55%) were medical students. Among them, 165 (74%) physicians and 170 (68.8%) medical students has a basic understanding of AI, but only 61 (27.3%) physicians and 48 (19.4%) students are aware of its applications in medicine. Regarding attitudes, 237 (76.7%) people agreed that AI should be taught in schools, whereas 368 (78.3%), 305 (64.9%), 281 (59.8%), and 269 (57.2%) recognized the need for AI in radiology, pathology and the COVID-19 epidemic respectively.

The limitation in this research the questionnaire was distributed online rather than physically due to covid-19 pandemic which could have caused a selection bias that would have influenced the results. Second, there is a tiny sample size. Recall bias must also be considered. Using a convenience sample could have a big impact on how generalizable the results are to the population. The results are

biased toward younger people because the questionnaire is only assessed for convenience. Over-40 age groups are not adequately represented.

In conclusion, although most of the participants are ignorant of AI and its uses, they have a favorable opinion of AI in the medical field and are eager to accept it (Ahmed, Bhinder, Tariq, Tahir, Mehmood, Tabassum, Malik, Aslam, Asghar & Yousaf, 2022).

2.7 Knowledge and Attitudes on Artificial Intelligence in Healthcare: A Provincial Survey Study of Medical Students

This is research of medical students' awareness of AI, opinions about its place in medicine, and preferences for how AI skills should be taught in medical school. At 4 medical schools in Ontario, 321 medical students (13.4 percent response rate) completed the survey.

The questionnaire in this research is developed from review of articles advocating the inclusion of ability of undergraduate medical education (UME) in AI, physician and medical student attitudes toward AI in medicine in previous study, and consultation with educators on AI in medicine curriculum design at the University of Toronto Medical School. Three sections made up the survey. The first survey section included questions about demographics, prior education, and prior exposure to content relating to artificial intelligence. The next section examined the level of confidence that medical students have in their knowledge of terms like AI, ML neural networks, and DL.

As the result of the research, medical students are generally optimistic about the potential of artificial intelligence to complete a variety of health-care tasks, from clinical to administrative, although they have some reservations about particular work categories, like personal counselling and compassionate care. They think that new ethical and social issues will be brought up by AI. With 25% of respondents saying that it is actively influencing their choice of speciality, students are focus on how AI may affect the market of medical job. The majority of students (68 %) believe training related to AI should start at the UME level, and they agree (79%) that medical school needs prepare more for the students so that they can adapt the effects of AI in medicine.

This research respondents are from medical schools in the province of Ontario and this will be the limitation of the study because it cannot generalise its findings to a bigger population. In conclusion, medical students' understanding of and attitudes about AI in healthcare in this research revealed a general sense of optimism about the technology and a desire to develop AI skills as early as undergraduate medical education (Mehta, Harish, Bilimoria, Morgado, Ginsburg, Law & Das, 2022).

CHAPTER 3

METHODS

3.1 Chapter overview

This chapter will outline the research methodology used, focusing on the research design, sampling design, research instrument and procedure in detail.

3.2 Research design

The research design for this study is an observational cross-sectional study because it only involves collection of data from UTAR students at one specific point in time and not variables are being manipulated as well as intervention provided in this research (Cherry, 2019). This research is also a descriptive study because it does not involve any comparison group and it is conducting through survey (Thomas & Nelson, 2005). Social media such as Whatsapp and Microsoft Team are used to recruit participants for the questionnaire prepared through Microsoft form. Besides that, physical recruitment of participants in campus also been done by asking the participants to scan the QR code given and access to the Microsoft form. Convenience sampling method is used in this research which collects data from population members who are easily available to take part in the study (Dudovskiy, 2012). In my research, MK FMHS students in UTAR will be recruited as participants because it is easier sampling method for time limited study.

3.3 Ethical approval

This study was performed after obtaining the ethical approval from the Scientific and Ethical Review Committees (SERC) of UTAR (Appendix A)

3.4 Sampling design

According Krejcie and Morgan (1970) sampling method, a table calculated by sample size formula can be used to determine the sample size.

The formula:

$$s = \frac{X^2NP(1-P)}{[d^2(N-1) + X^2P(1-P)]}$$

s = required sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence

level (3.841)

N = the population size

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (0.05)

UTAR has around 700 FMHS students in Sungai Long campus and according to the table, the sample size should be around 248. The sampling method used was convenience sampling.

3.5 Research instrument

The survey was divided into 6 sections which the first section will be informed consent section with the brief description of the study which included the purpose, procedures risk and benefits, confidentiality of study as well as the contact of researcher. The second section is the personal data protection notice and required the participants to indicate their will to participate in the study. The third section will be the demographic data which the name, age, gender, course, year of study, contact number and email of the participants will be collected.

Section 4 will be assessing the awareness of participants towards artificial intelligence. There are questions in this section and the questions are adapted from previous studies with similar topic. There are total of 8 questions in this section. Questions related to definition, principles, application, limitations of artificial intelligence are asked in this section to assess the awareness of artificial intelligence of participants.

Section 5 consists of 8 questions that assess knowledge of participants towards artificial intelligence. These questions are adapted from the previous studies. Questions related to definition, application, features of AI in medical and health sciences field and role of AI are asked in this section to assess knowledge of participants.

Section 6 consists of 8 questions and presented in a Linkert scale with 5 indications which are strongly agree, agree, neutral, disagree and strongly disagree. This section is to assess the attitude of participants towards artificial intelligence. Questions related to involvement of AI as learning aid, inclusion of AI in curriculum and opinion of participants towards AI are asked in this section (Ahmed et al., 2022) (Swed et al., 2022).

The questionnaire was validated by 5 lecturers from physiotherapy department in UTAR.

3.6 Procedure

The researcher proceeds to distribute the survey form through various social media platform such as Whatsapp and Microsoft team after the ethical approval by UTAR Scientific and Ethical Review Committee was received. Besides that, participants also recruited physically in campus by require the participant to scan the QR code and assess to the questionnaire. Informed consent was asked before the participants proceed to the questionnaire and the digital signature was required for every participant. All the questions was required to answer by the participants and the participants were encouraged to contact the researcher if they have any question related to the research. The researcher proceeds to clean and code the data after the data collection process was completed.

3.7 Data analysis

Data analysis was done with IBM SPSS software statistics version 26. Since awareness, knowledge and attitude are nominal data hence no mean score, standard deviation and variance are calculated. Scoring and categorization are used to assess the awareness, knowledge and attitude towards AI in learning among MK FMHS students in UTAR. Recode and categorization of data are done by IBM SPSS version 26.

CHAPTER 4

RESULTS

4.1 Chapter overview

This chapter focus on the findings and results after completing the data collection process of the research project. Demographic data of participants is presented first follow by the score and grouping of outcome measure and inferential tests result. The results are presented in relevant graph first such as pie chart or bar chart, if any followed by a brief description and lastly the tabulation of the data.

Of the 272 responses collected, there were 8 participants who did not give consent to process the data. These data were removed from the data analysis process and hence there were only 264 responses were processed in the final stage of the study.

4.2 Demographic data of population

This subsection focuses on the demographic data of participants such as age, gender, year of study and course in graph course, descriptions and lastly a table to summarize the overall subsection.

4.2.1 Age

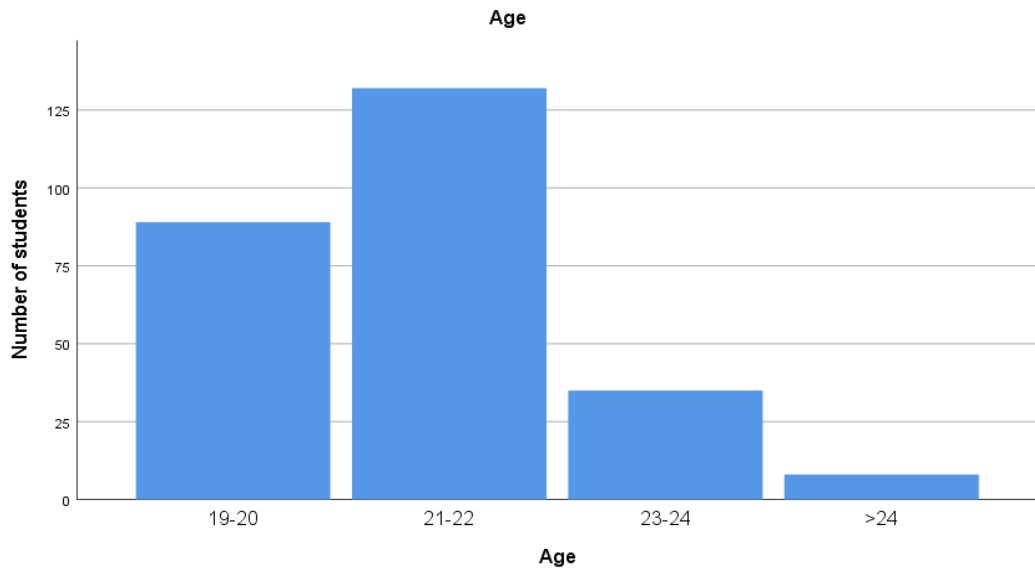


Figure 4.2.1: Age of participants

Figure 4.2.1 shown the age of participants of the study. There are 89 or 33.7% (Table 4.1) of participants with age between 19-20 while the participants with age of 21-22 are the most which with number of 132 out of 264 or 50% (Table 4.1). There are 35 or 13.3% (Table 4.1) of participants with age of 23-24. Lastly, participants with age more than 24 years old are make up with 8 persons or 3.0% (Table 4.1) of the total participants.

4.2.2 Gender

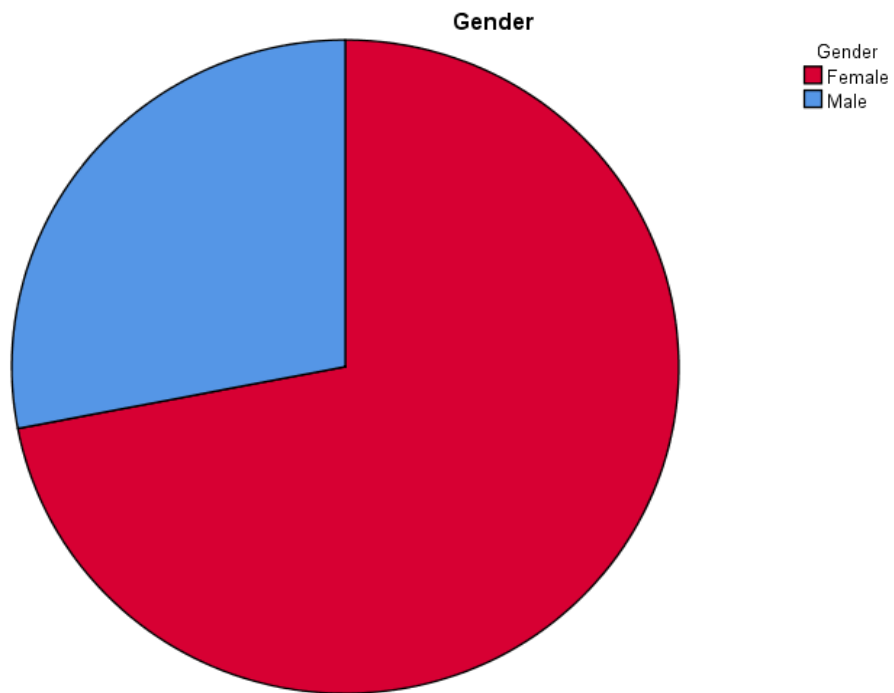


Figure 4.2.2 Gender of participants

Figure 4.2.2 shown the distribution of gender in the study. There are 190 female participants recruited in this study which represent 72.0% (Table 4.1) of the toral participants while the male participants are 74 persons or 28% (Table 4.1).

4.2.3 Course

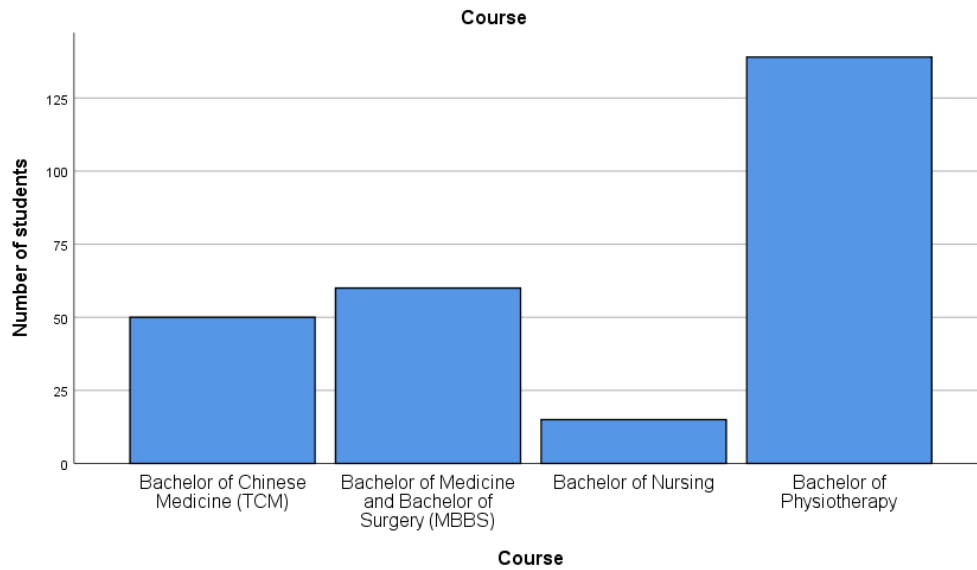


Figure 4.2.3 Course of participants

Figure 4.2.3 illustrate the number of students in different courses in the study. Students from Bachelor of Physiotherapy have the most number which is 139 or 52.7% (Table 4.1) from the total participants while students from Bachelor of Nursing have the least number of participations in the study which only made up with 15 persons or 5.7% (Table 4.1). There are 50 students from Bachelor of Chinese Medicine (TCM) participate in this study which made up 18.9% (Table 4.1) of the participants. The remaining participants are made up with 60 or 22.7% (Table 4.1)of students from Bachelor of Medicine and Bachelor of Surgery (MBBS).

4.2.4 Year of study

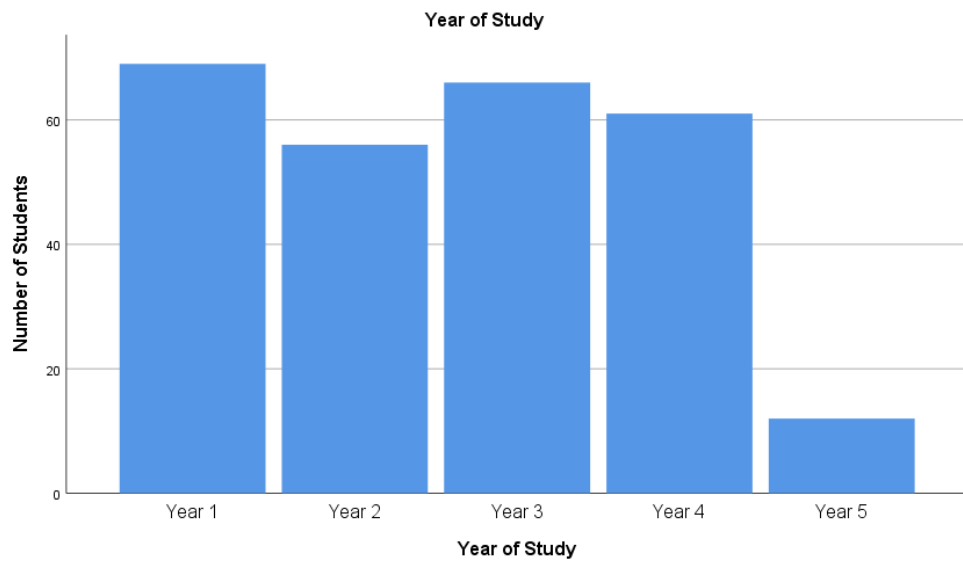


Figure 4.2.4 Year of study of participants

Figure 4.2.4 shown the distribution of year of study of participants in the study. There are 69 students study in year 1 which represent 26.1% of the participants (Table 4.1). For year 2 and year 3 students, there are 56 and 66 students respectively. The percentage of year 2 and year 3 students will be 21.2% and 25.0% respectively (Table 4.1). Year 4 students are made up of 61 persons or 23.1% (Table 4.1) while year 5 has the least number of students which only made up of 12 students or 4.5% (Table 4.1).

Table 4.1: Demographic data of participants

Demographic data	Frequency (%)
Age	
19-20	89 (33.7)
21-22	132 (50.0)
23-24	35 (13.3)
>24	8 (3.0)
Gender	
Male	74 (28.0)
Female	190 (72.0)
Course	
Bachelor of Chinese Medicine (TCM)	50 (18.9)
Bachelor of Medicine and Bachelor of Surgery (MBBS)	60 (22.7)
Bachelor of Nursing	15 (5.7)
Bachelor of Physiotherapy	139 (52.7)
Year of Study	
Year 1	69 (26.1)
Year 2	56 (21.2)
Year 3	66 (25.0)
Year 4	61 (23.1)
Year 5	12 (4.5)

4.3 Awareness towards AI in learning

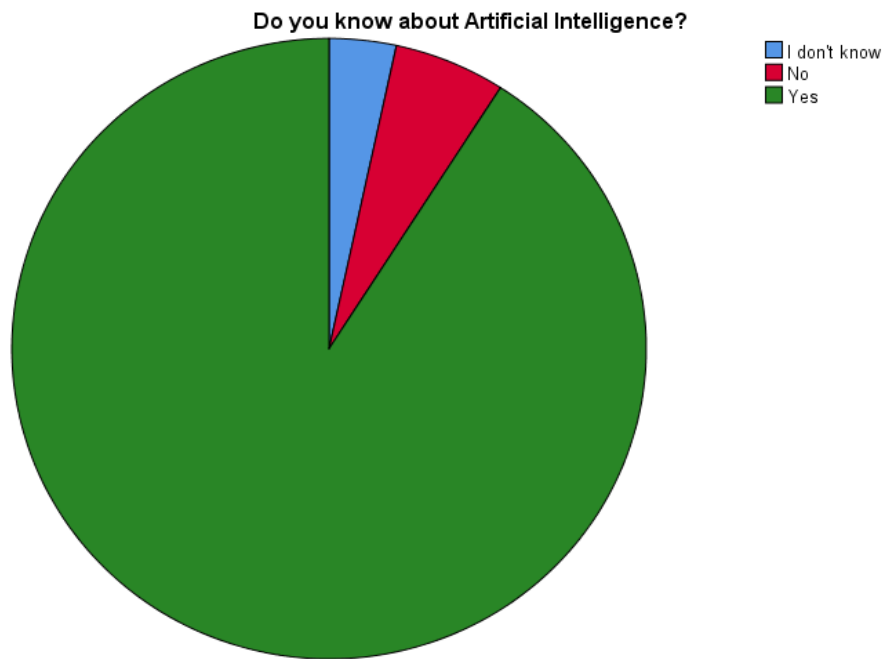


Figure 4.3.1 Percentage of participants know about AI

Figure 4.3.1 show the number of participants on do they know about Artificial Intelligence. Most of the participants select “Yes” which account for 90.9% or 240 (Table 4.2) of total participants. 15 or 5.7% (Table 4.2) of participants select “No” while the remaining 9 or 3.4% (Table 4.2) of participants select “I don’t know”.

Artificial Intelligence is often used to describe machines or computers that mimic “cognitive” functions of human mind.

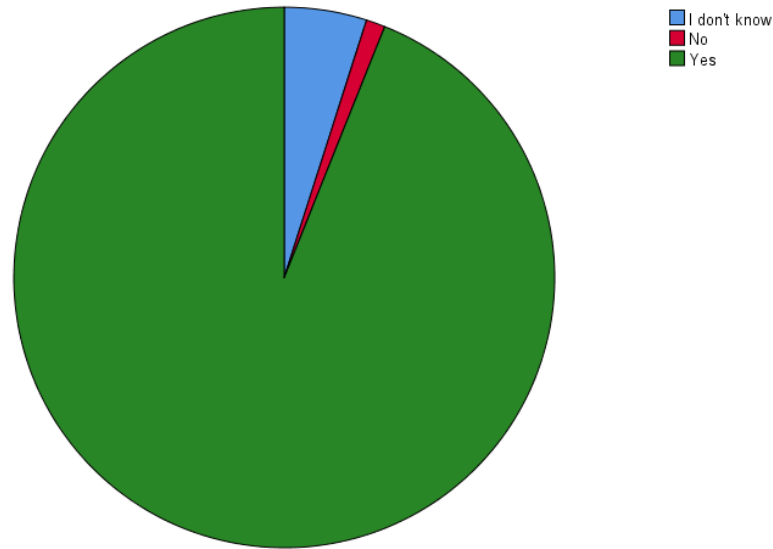


Figure 4.3.2 Percentage of participants aware about meaning of AI

Figure 4.3.2 shown the number of participants on their awareness on the definition of Artificial Intelligence. 248 or 93.9% (Table 4.2) of participants aware the definition of AI while 3 or 3.3% (Table 4.2) of participants do not aware the definition of AI. The remaining 13 or 4.9% (Table 4.2) participants do not know the definition of AI.

Figure 4.3.2 Percentage of participants aware about meaning of AI

Figure 4.3.2 shown the number of participants on their awareness on the definition of Artificial Intelligence. 248 or 93.9% (Table 4.2) of participants aware the definition of AI while 3 or 3.3% (Table 4.2) of participants do not aware the definition of AI. The remaining 13 or 4.9% (Table 4.2) participants do not know the definition of AI.

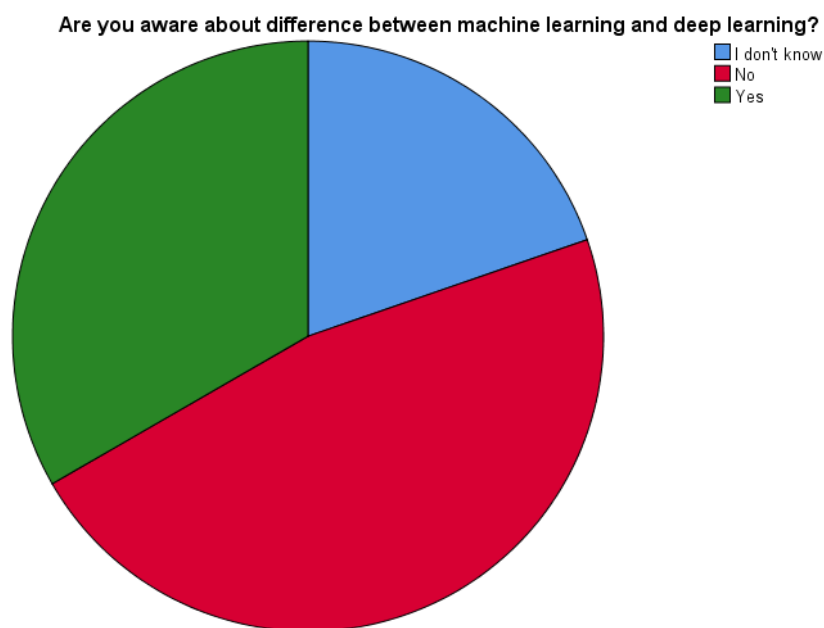


Figure 4.3.3 Percentage of participants aware about the difference between ML and DL

Figure 4.3.3 illustrate the awareness of participants on the difference between machine learning and deep learning. Most of the participants do not aware the difference which account for 124 participants or 47% (Table 4.2) of total participants. 88 or 33.3% (Table 4.2) participants aware the difference while the remaining 52 or 19.7% (Table 4.2) participants do not know the difference between machine learning and deep learning.

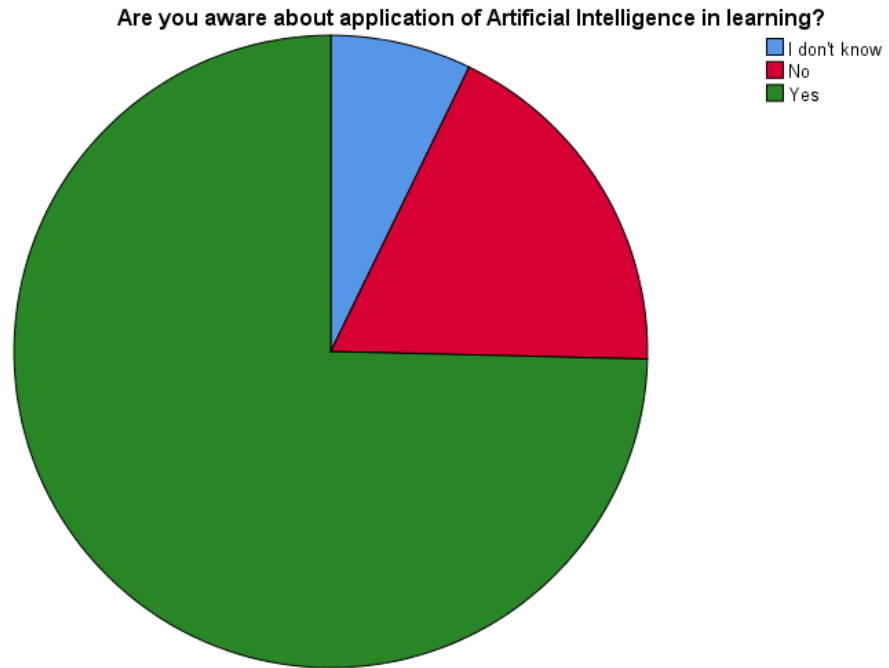


Figure 4.3.4 Percentage of participants aware about application of AI in learning

Figure 4.3.4 illustrate the number of participants on their awareness on application of AI in learning. 197 or 74.6% (Table 4.2) participants select “Yes” which indicate they aware of AI application in learning while 48 or 18.2% (Table 4.2) participants select “No” which represent they do not aware of AI application in learning. Around 19 or 7.2% (Table 4.2) participants do not know about the application of AI in learning.

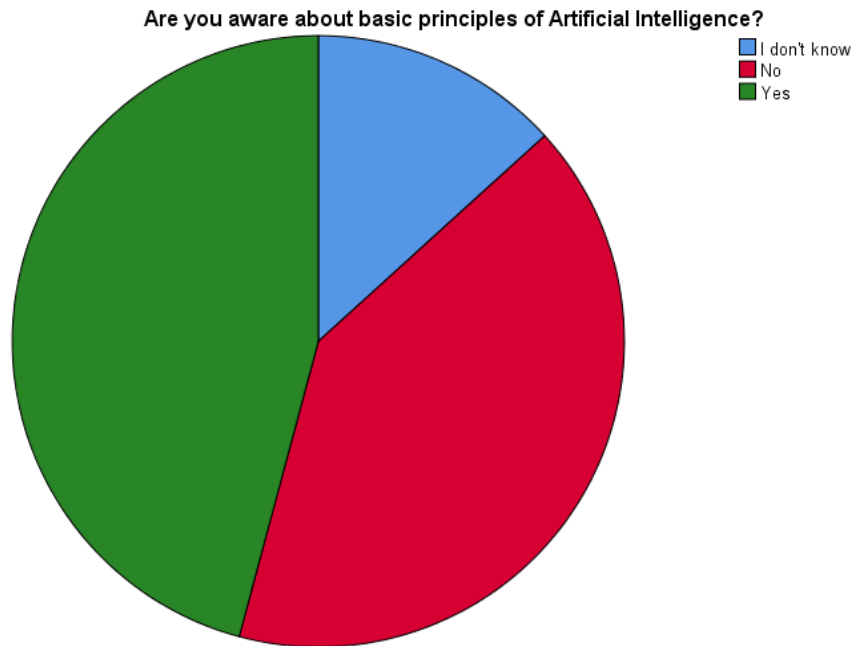


Figure 4.3.5 Percentage of participants aware about basic principles of AI

Figure 4.3.5 shown that number of participants on their awareness on basic principles of AI. The numbers of participants that aware on the basic principles account for around 45.8% or 121 (Table 4.2) persons while who do not aware on the basic principles made up of 40.9% or 108 persons (Table 4.2). The remaining 13.3 % or 35 (Table 4.2) participants do not know about the basic principles of AI.

Are you aware that some traditional learning methods will be replaced by Artificial Intelligence in the future?

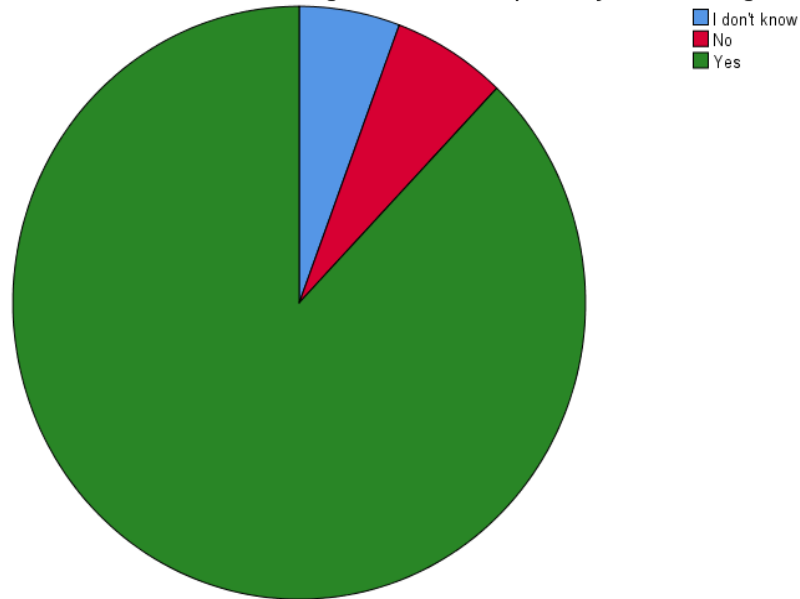


Figure 4.3.6 Percentage of participants aware about traditional learning methods will replaced by AI in future

Figure 4.3.6 shown that the awareness of participants on the replacement of traditional learning methods by AI in the future. Most of the participants which account for 232 persons or 87.9% (Table 4.2) aware on this issue while another 17 or 6.4% (Table 4.2) of participants do not aware on this. Around 15 or 5.7% (Table 4.2) of participants do not know about this issue.

Are you aware Artificial Intelligence will play an important role for learning in different fields? (e.g., medical and health sciences)

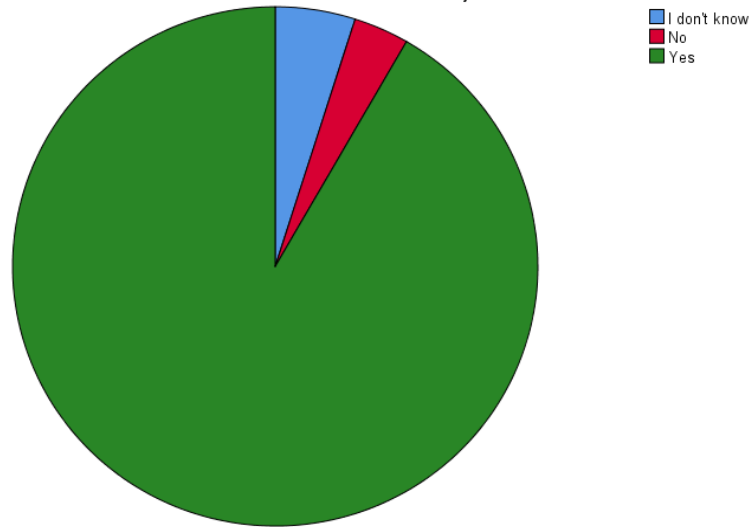


Figure 4.3.7 Percentage of participants aware about important role of AI in different fields

Figure 4.3.7 illustrate the number of participants on their awareness of important role for learning in different fields. 242 participants aware about the important role of AI which account for around 91.7% (Table 4.2) of total participants. 9 participants do not aware about the important role of AI which occupy 3.4% (Table 4.2) of total participants. The remaining 13 or 4.9% (Table 4.2) participants do not know the important role of AI for learning in different fields.

Are you aware about the limitations of Artificial Intelligence in learning in specific field? (e.g., medical and health sciences)

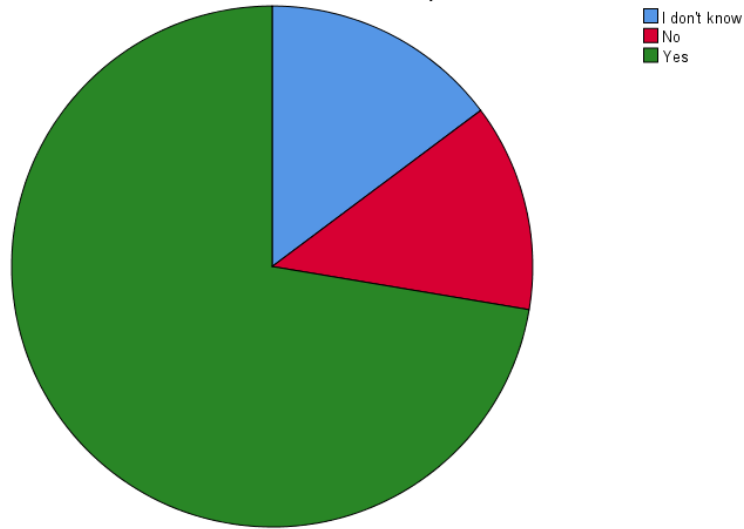


Figure 4.3.8 Percentage of participants aware about limitations of AI in specific field

Figure 4.3.8 shown the number of participants on their awareness on limitations of AI in learning in specific field. The results shown that most of the participants aware on this issue which account for 72.3% or 191 participants (Table 4.2). 12.9% or 34 participants (Table 4.2) do not aware on this issue while 14.8% or 39 participants (Table 4.2) do not know about this issue.

Table 4.2: Awareness towards AI

Awareness towards Artificial Intelligence	Frequency (%)
Do you know about Artificial Intelligence?	
Yes	240 (90.9)
No	15 (5.7)
I don't know	9 (3.4)
Artificial Intelligence is often used to describe machines or computers that mimic “cognitive” functions of human mind.	
Yes	248 (93.9)
No	3 (1.1)
I don't know	13 (4.9)
Are you aware about difference between machine learning and deep learning?	
Yes	88 (33.3)
No	124 (47.0)
I don't know	52 (19.7)

Are you aware about application of Artificial Intelligence in learning?	197 (74.6)
Yes	48 (18.2)
No	19 (7.2)
I don't know	

Are you aware about basic principles of Artificial Intelligence?	121 (45.8)
Yes	108 (40.9)
No	35 (13.3)
I don't know	

Are you aware that some traditional learning methods will be replaced by Artificial Intelligence in the future?	
Yes	232 (87.9)
No	17 (6.4)
I don't know	15 (5.7)

Are you aware Artificial Intelligence will play an important role for learning in different fields? (e.g., medical and health sciences)	242 (91.7)
Yes	9 (3.4)
No	13 (4.9)
I don't know	

Are you aware about limitations of Artificial Intelligence in learning in specific fields? (e.g., medical and health sciences)	191 (72.3)
Yes	34 (13.9)

No

39 (14.8)

I don't know

4.4 Knowledge towards AI in learning

Artificial Intelligence is about creating intelligent machines so that the machine can think intelligently in the same manner as a human does.

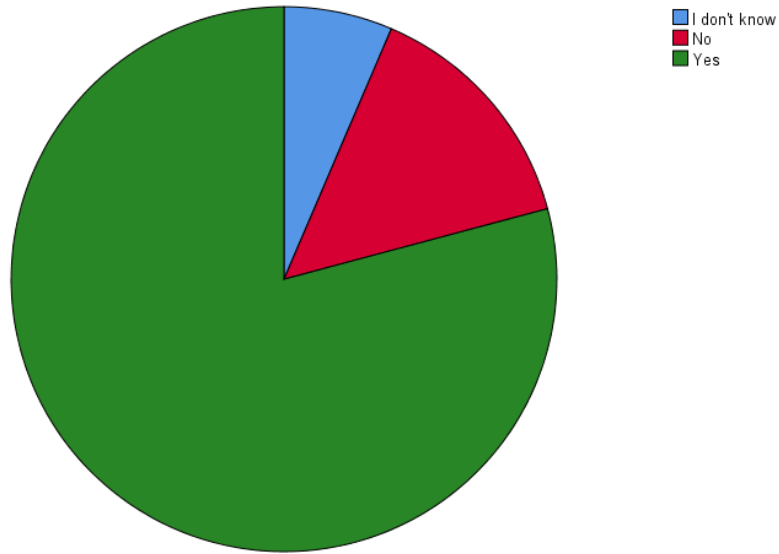


Figure 4.4.1 Percentage of participants know about the definition of AI

Figure 4.4.1 shown that the number of participants on their knowledge towards definition of AI. 79.2% or 209 (Table 4.3) participants agree with the definition of AI given while 14.4 or 38 (Table 4.3) participants do not agree with the definition given. The remaining 17 or 6.4% (Table 4.3) participants do not know the definition of AI.

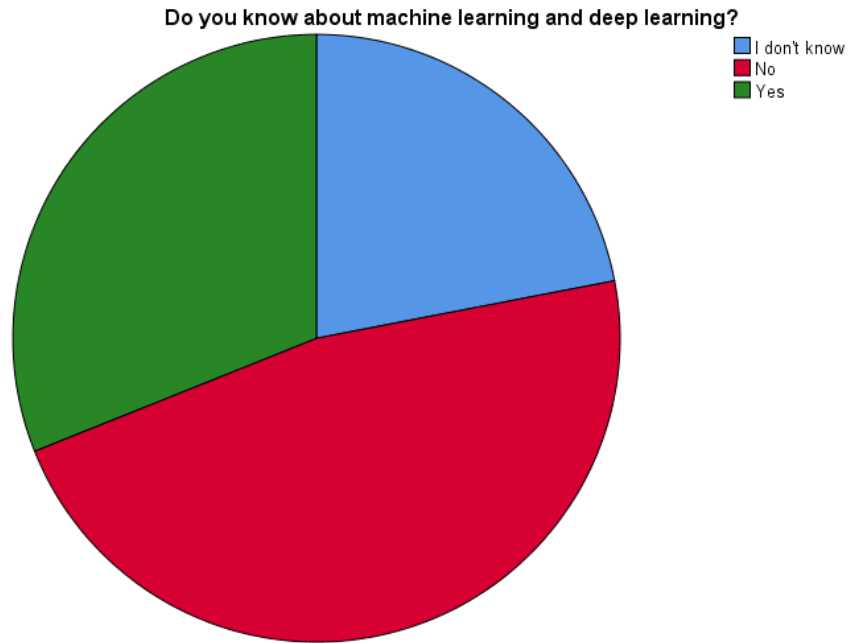


Figure 4.4.2 Percentage of participants know about ML and DL

Figure 4.4.2 illustrate the number of participants on their knowledge towards machine learning and deep learning. Participants that do not know about machine learning and deep learning account for 47.0% or 124 (Table 4.3) which occupy the most from the total participants. 82 or 31.1% (Table 4.3) participants know about machine learning and deep learning while 58 or 22.0% (Table 4.3) of the participants do not have the knowledge on machine learning and deep learning.

Machine learning is about Artificial Intelligence that provides computers with the ability to learn without being programmed.

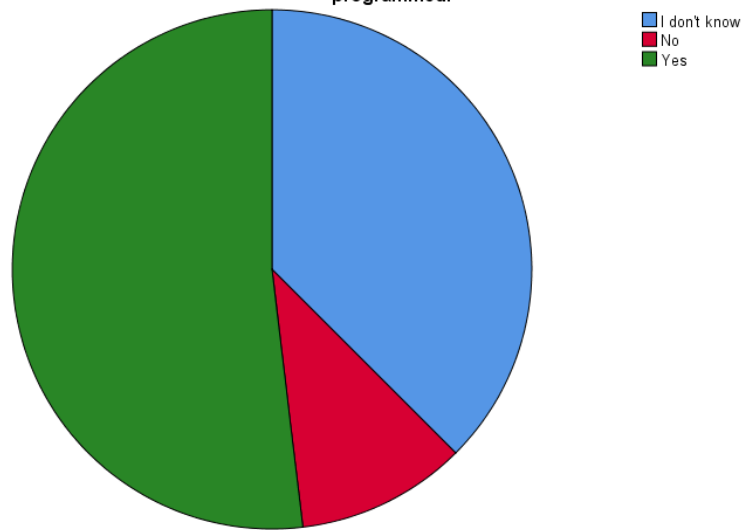


Figure 4.4.3 Percentage of participants know about definition of ML

Figure 4.4.3 illustrate on the percentage of participants on the knowledge related to meaning of machine learning. 51.9% of or 137 (Table 4.3) participants select “Yes” to the definition of machine learning given while another 28 or 10.6% (Table 4.3) of the participants select “No” to the definition given. There are 99 participants (Table 4.3) that do not know the meaning of machine learning which account for 37.5% (Table 4.3) of the total participants.

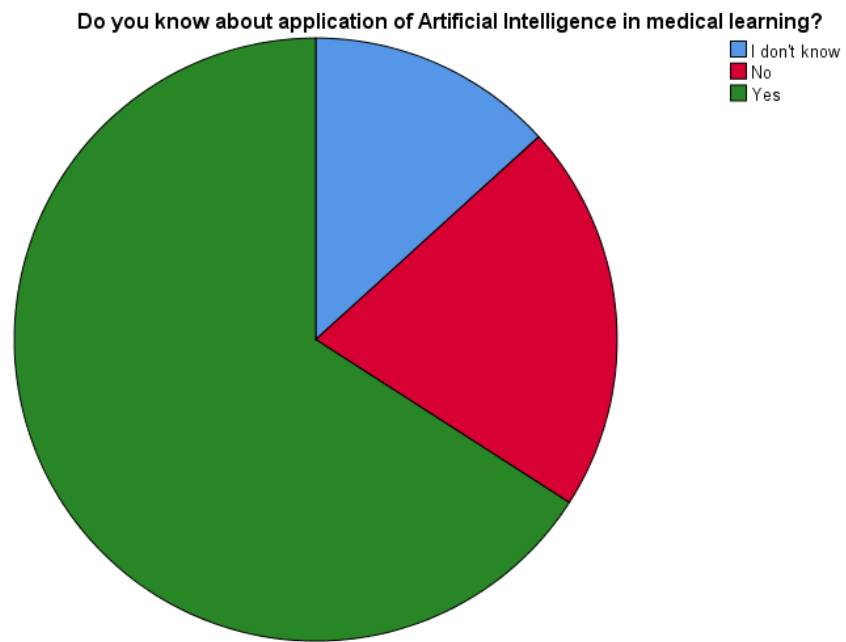


Figure 4.4.4 Percentage of participants know about application of AI in medical learning

Figure 4.4.4 illustrate the number of participants on the knowledge on the application of AI in medical learning. 65.9% of or 174 (Table 4.3) participants know about the application of AI in medical learning while 55 or 20.8% (Table 4.3) of participants do not have knowledge about this. The remaining 35 or 13.3% (Table 4.3) of participants do not know about the application of AI in medical learning.

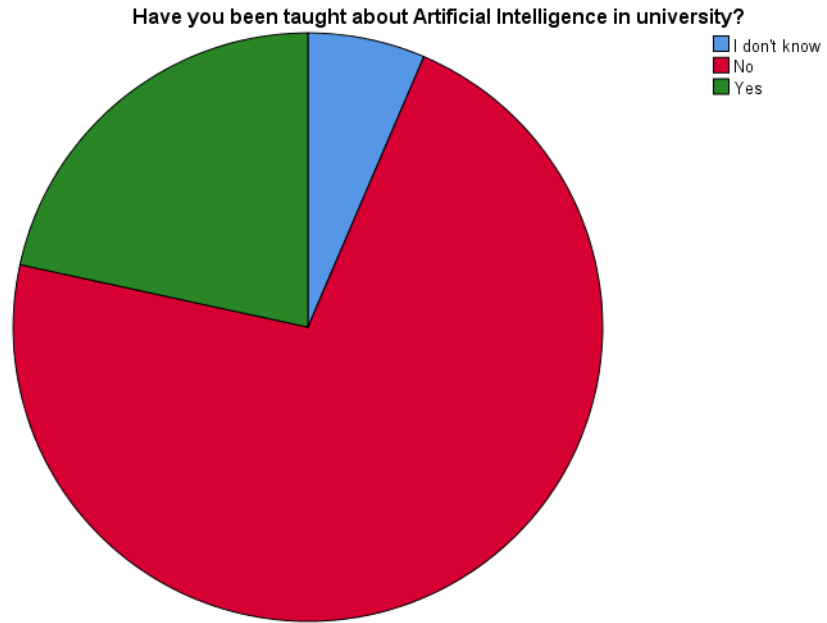


Figure 4.4.5 Percentage of participants have been taught about AI in university

Figure 4.4.5 shown that the number of participants related to the AI learning in university. Most of the participants has not bee taught about AI in university which accounts for 72.0% or 190 (Table 4.3) participants. Around 57 or 21.6% (Table 4.3) participants have been taught about AI in university. The remaining 17 or 6.4% (Table 4.3) of participants do not know about whether AI has been taught in university or not.

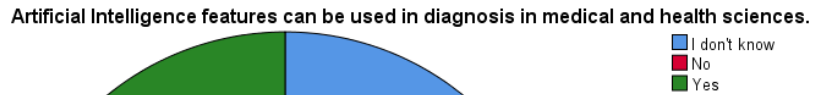


Figure 4.4.6 Percentage of participants know about AI features used in diagnosis in medical and health sciences

Figure 4.4.6 shown that the number of participants on the knowledge of AI features in diagnosis in medical and health sciences. 206 or 78.0% (Table 4.3) of the participants know that AI features can be used in diagnosis in medical and health sciences while 14 or 4.2% (Table 4.3) of participants do not think that AI features can be used in diagnosis in medical and health sciences. There are also participants that do not know AI features can be used in in diagnosis in medical and health sciences which account for 16.7% or 44 (Table 4.3) participants.

Types of Artificial Intelligence like Natural Language Processing and Rule-based Expert System are relevance to medical and health sciences field.

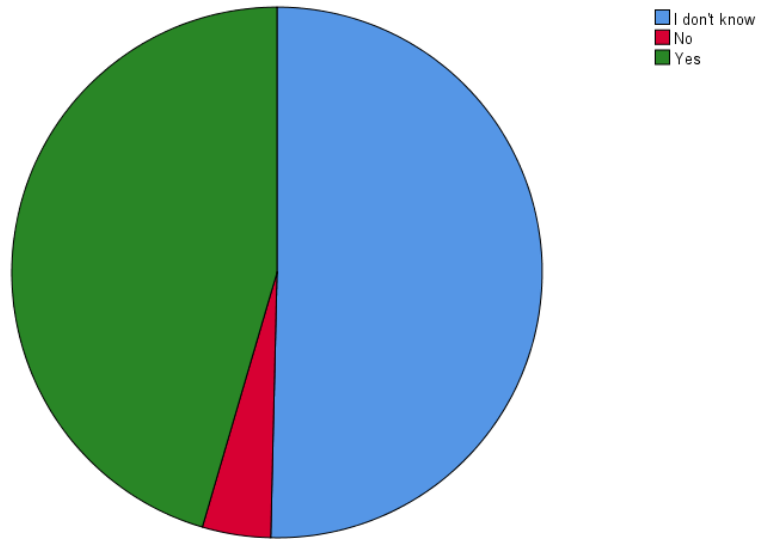


Figure 4.4.7 Percentage of participants know about the types of AI relevance to medical and health sciences field

Figure 4.4.7 illustrate that the number of participants on the knowledge related to AI used in medical and health sciences field. Most of the participants do not know about the types of AI like Natural Language Processing and Rule-based Expert System are relevance to medical and health sciences field which account for 50.4% of or 133 (Table 4.3) participants. 120 or 45.5% (Table 4.3) of participants know the types of AI that relevance to medical and health sciences field while 11 or 4.2% (Table 4.3) of participants disagree that types of AI like Natural Language Processing and Rule-based Expert System are relevance to medical and health sciences field.

Artificial Intelligence can play a vital role in documentation (e.g. designing short term goal and long term goal) in field of medical and health sciences.

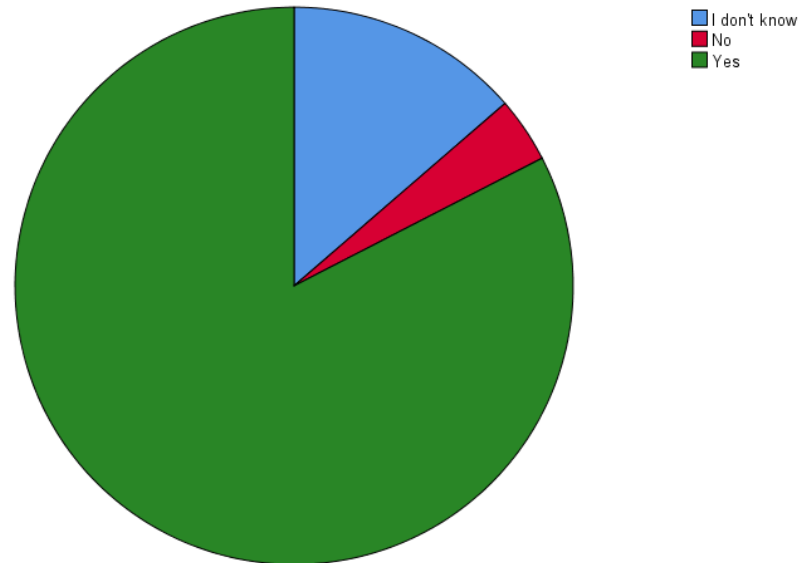


Figure 4.4.8 Percentage of participants know about the vital role of AI in documentantation

Figure 4.4.8 shown that the number of participants on the knowledge related to role of AI in documentation in medical and health sciences field. 218 or 82.6% (Table 4.3) of participants agree that AI can be used in documentation such as designing short term goal and long-term goal while 3.8% or 10 (Table 4.3) participants have the opposite opinion. The remaining 36 or 13.6% (Table 4.3) of participants do not know about the role of AI in documentation.

Artificial Intelligence is about creating intelligent machines so that the machine can think intelligently in the same manner as human does.	209 (79.2)
Yes	38 (14.4)
No	17 (6.4)
I don't know	

Do you know about machine learning and deep learning?	82 (31.1)
Yes	124 (47.0)
No	58 (22.0)
I don't know	

Machine learning is about Artificial Intelligence that provides computers with the ability to learn without being programmed.	137 (51.9)
Yes	28 (10.6)
No	99 (37.5)
I don't know	

Do you know about application of Artificial Intelligence in medical learning?	
Yes	174 (65.9)
No	55 (20.8)

I don't know	35 (13.3)
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Have you been taught about Artificial

Intelligence in university?

	57 (21.6)
Yes	190 (72.0)
No	17 (6.4)
I don't know	

Artificial Intelligence features can be used in diagnosis in medical and health sciences.

Yes	206 (78.0)
No	14 (5.3)
I don't know	44 (16.7)

Types of Artificial like Natural Language Processing and Rule-based Expert System are relevance to medical and health sciences field.

Yes	11 (4.2)
No	133 (50.4)
I don't know	

Artificial Intelligence can play a vital role in documentation (e.g. designing short term goal and long-term goal) in field of medical and health sciences.

Yes	10 (3.8)
No	36 (13.6)

I don't know

4.5 Attitude towards AI in learning

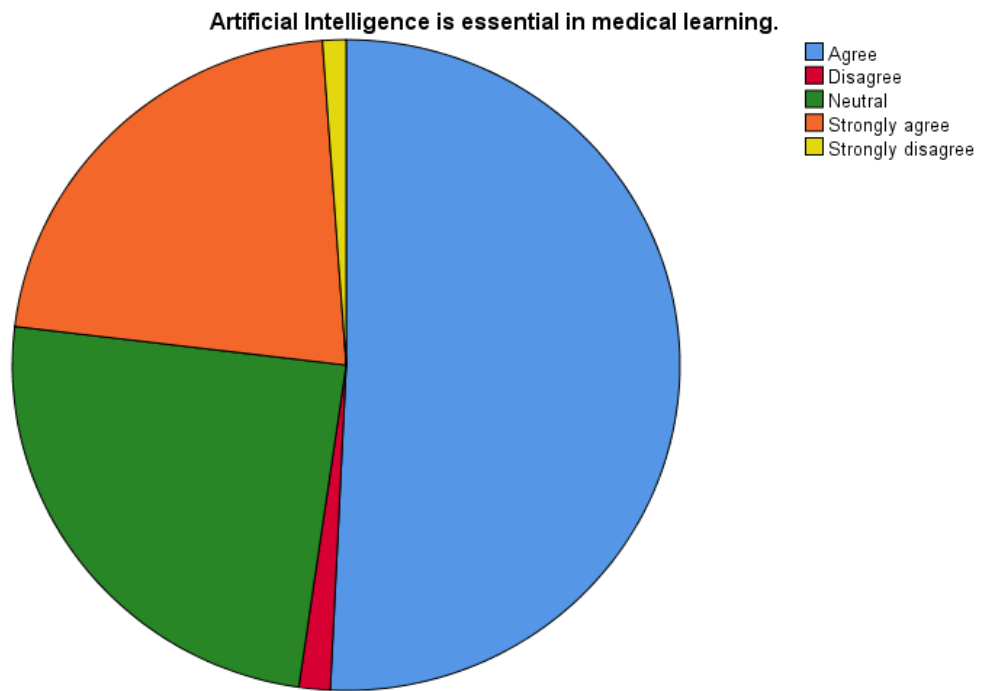


Figure 4.5.1 Attitude of participants towards AI in medical learning

Figure 4.5.1 shown that the attitude of participants towards AI as an essential in medical learning. 58 or 22.0% of participants strongly agree with this statement while 134 or 50.8% of participants agree with this statement. 65 or 24.6% of participants neutral about this statement. However, there are also participants have the opposite opinion which 4 or 1.5% of the participants disagree while 3 or 1.1% of participants strongly disagree with this.

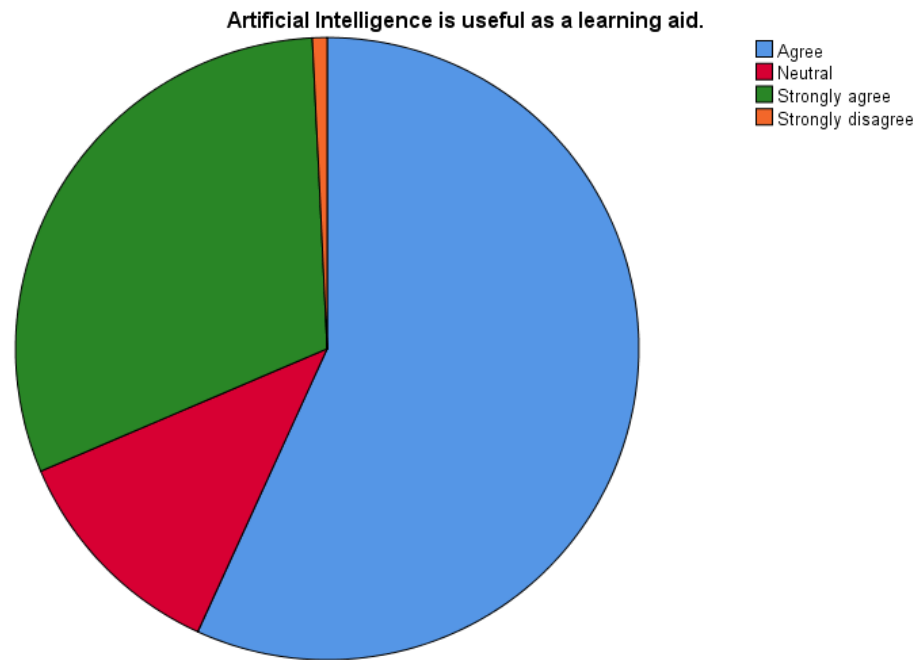


Figure 4.5.2 Attitude of participants towards AI is useful as learning aid

Figure 4.5.2 shown that the attitude of participants towards AI as a learning aid. There is total 231 participants who having positive attitude towards AI as learning aid. 150 participants agree while 81 participants strongly agree on this statement which account for 56.8% and 30.7% respectively. There is 31 or 11.7% of participants neutral on this statement. There is 2 or 0.8% of participants strongly disagree on this statement while there is no participants select the option of “disagree”.

There is better understanding of Artificial Intelligence usage in healthcare and medical field after using Artificial Intelligence as learning aid.

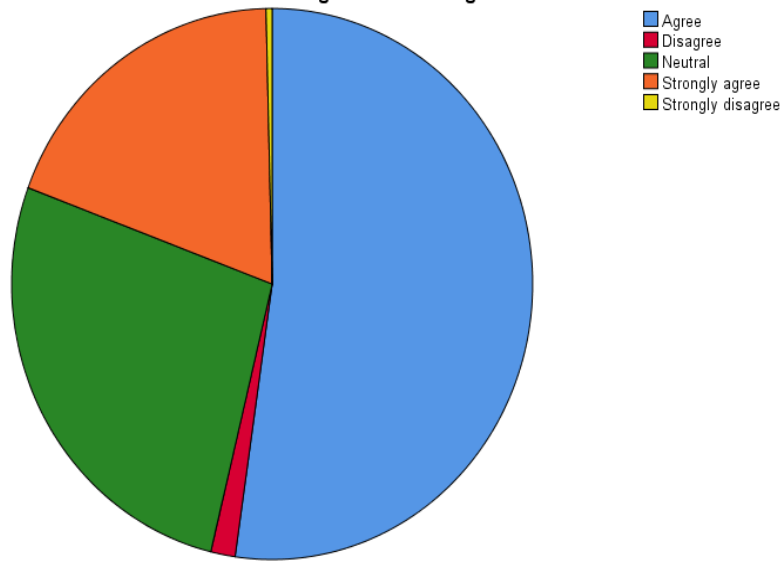


Figure 4.5.3 Attitude of participants towards AI allow better understanding as learning aid

Figure 4.5.3 shown that the attitude of participants on AI usage as learning aid helping in better understanding in healthcare and medical field. 50 or 18.9% of participants strongly agree on this statement while 138 or 52.3% of participants agree on this statement. 5 participants are disagreeing and strongly disagree on this statement which account for 1.5% and 0.4% respectively. The remaining 71 participants remain neutral on this statement which account for 26.9% of the participants.

Artificial Intelligence implementation will decrease percentage of error in healthcare diagnosis.

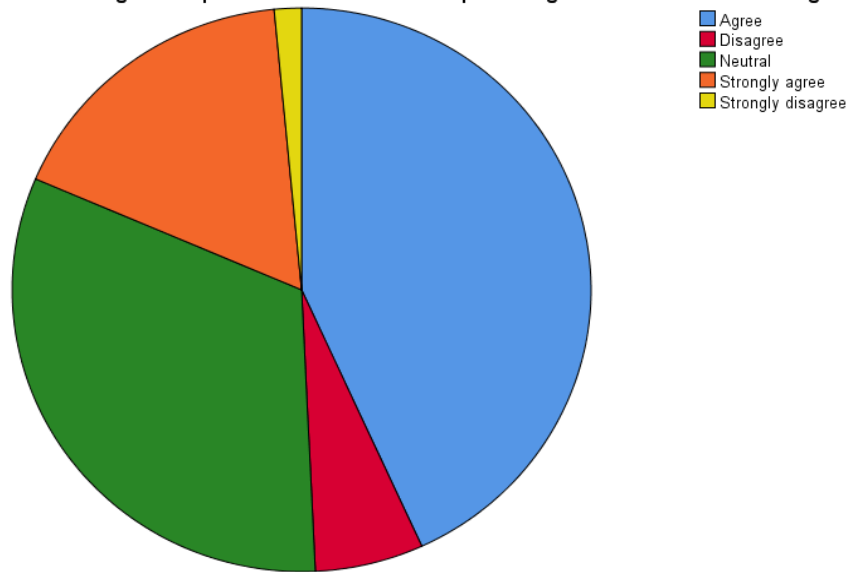


Figure 4.5.4 Attitude of participants towards AI in decrease error in healthcare diagnosis

Figure 4.5.4 shown that the attitude of participants on implementation of AI in decreasing percentage of error in healthcare diagnosis. 45 or 17.0% of participants strongly agree while 114 or 43.2% of participants agree on this statement. 85 or 32.2% of participants is neutral on this statement. However, there are 16 or 6.1% of participants disagree and 4 or 1.5% of participants strongly disagree that implementation of AI can reduce the percentage of error in healthcare diagnosis.

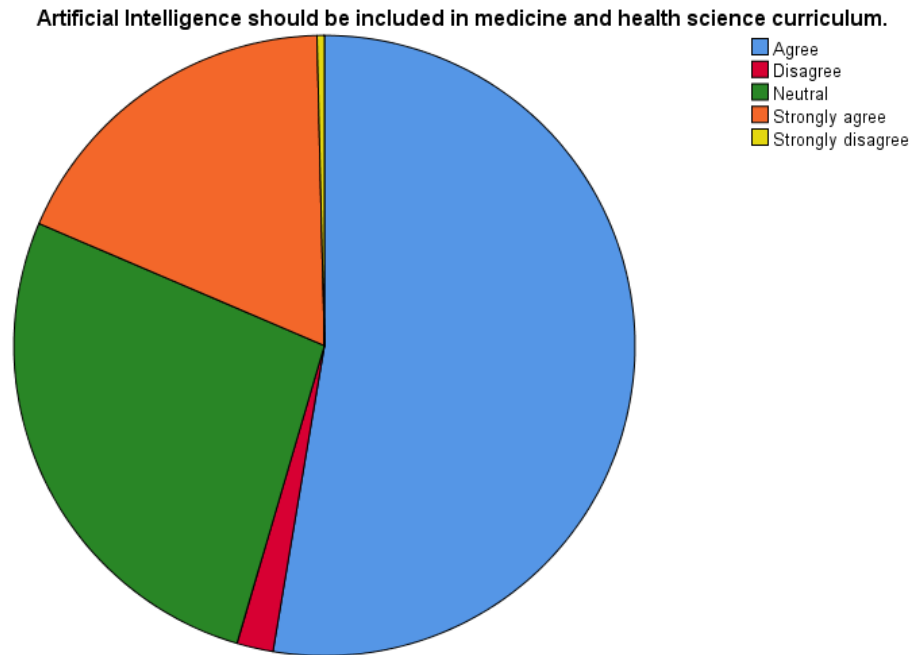


Figure 4.5.5 Attitude of participants towards inclusion of AI in medicine and health science curriculum

Figure 4.5.5 shown that the attitude of participants on the inclusion of AI in medicine and health sciences curriculum. Most of the participants strongly agree and agree on this suggestion which account for 18.2% and 52.7% respectively. 71 or 26.9% of participants are neutral on this suggestion. 1 or 0.4% of participant strongly disagree and 5 or 1.9% of participants disagree on this suggestion.

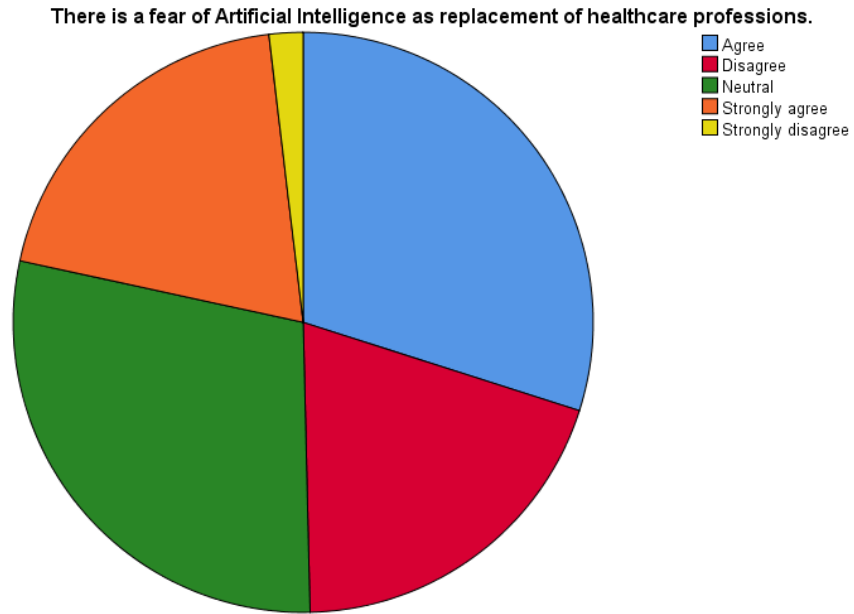


Figure 4.5.6 Attitude of participants on fear of AI as replacement of healthcare professions

Figure 4.5.6 shown that the attitude of participants on replacement of AI to healthcare professions. 5 or 1.9 of participants strongly agree and 79 or 29.9% of participants agree that there is a fear of AI as replacement of healthcare professions. 76 or 28.8% of participants remain neutral on this. 52 or 19.7% of participants disagree and 5 or 1.9% of participants strongly disagree on this statement and indicate they are not fear of AI will replace healthcare professions.

Learning with Artificial Intelligence will be beneficial for medicine and health sciences career.

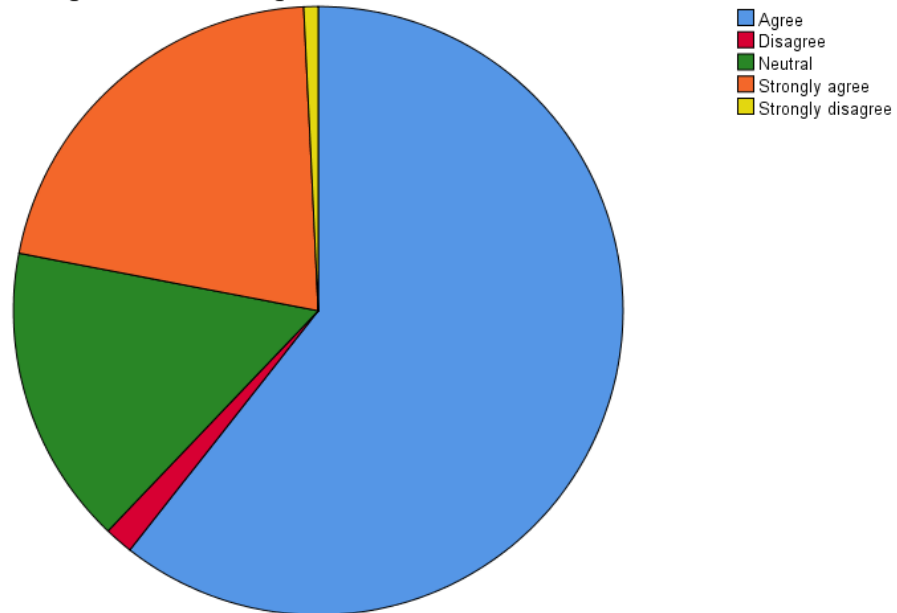


Figure 4.5.7 Attitude of participants on learning with AI will be beneficial for medicine and health sciences career

Figure 4.5.7 shown that the attitude of participants on will learning with AI be beneficial for medicine and health sciences career. 56 or 21.2% of participants strongly agree and 160 or 60.6% of participants agree that leaning with AI will be beneficial. However, there are 6 participants disagree and strongly disagree that learning with AI will be beneficial which account for 1.5% and 0.8% respectively. 42 or 15.9% of participants remain neutral in this statement.

Medical and health sciences students should receive practical teaching in Artificial Intelligence.

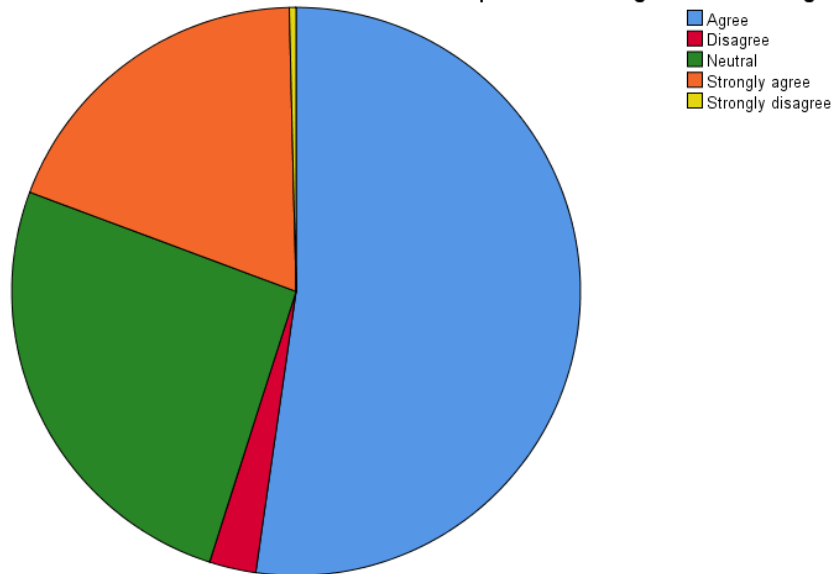


Figure 4.5.8 Attitude of participants on acceptance of practical teaching in AI

Figure 4.5.8 shown that the attitude of participants on whether the medical and health sciences students should receive practical teaching in AI. There are 50 or 18.9% and 138 or 52.3% of participants strongly agree and agree on this statement. 68 or 25.8% of participants remain neutral on this statement. Another 7 or 2.7 and 1 or 0.4% of participants disagree and strongly disagree that medical and health sciences students to receive practical teaching in AI.

Table 4.4: Attitude towards AI

Attitude towards Artificial Intelligence	Frequency (%)
Artificial Intelligence is essential in medical learning.	
Strongly agree	58 (22.0)
Agree	134 (50.8)
Neutral	65 (24.6)
Disagree	4 (1.5)
Strongly disagree	3 (1.1)
Artificial Intelligence is useful as a learning aid.	
Strongly agree	81 (30.7)
Agree	150 (56.8)
Neutral	31 (11.7)
Disagree	0 (0.0)
Strongly disagree	2 (0.8)
There is better understanding of Artificial Intelligence usage in healthcare and medical field after using Artificial Intelligence as learning aid.	
Strongly agree	50 (18.9)

Agree	138 (52.3)
Neutral	71 (26.9)
Disagree	4 (1.5)
Strongly disagree	1 (0.4)

Artificial Intelligence implementation will decrease percentage of error in healthcare diagnosis

Strongly agree	45 (17.0)
Agree	114 (43.2)
Neutral	85 (32.2)
Disagree	16 (6.1)
Strongly disagree	4 (1.5)

Artificial Intelligence should be included in medicine and health science curriculum.

Strongly agree	48 (18.2)
Agree	139 (52.7)
Neutral	71 (26.9)
Disagree	5 (1.9)
Strongly disagree	1 (0.4)

There is a fear of Artificial Intelligence as replacement of healthcare professions.

Strongly agree	52 (19.7)
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Agree	79 (29.9)
Neutral	76 (28.8)
Disagree	52 (19.7)
Strongly disagree	5 (1.9)

Learning with Artificial Intelligence will be beneficial for medicine and health sciences career.

Strongly agree	56 (21.2)
Agree	160 (60.6)
Neutral	42 (15.9)
Disagree	4 (1.5)
Strongly disagree	2 (0.8)

Medical and health sciences students should receive practical teaching in Artificial Intelligence.

Strongly agree	50 (18.9)
Agree	138 (52.3)
Neutral	68 (25.8)
Disagree	7 (2.7)
Strongly disagree	1 (0.4)

4.6 Inferential analysis

This subsection will focus on the analysis of the data. Since there is no hypothesis in this study and the objective of the study is just to determine the awareness, knowledge and attitude of FMHS students towards AI in learning, hence no correlation test is used for analysis. An article by Swed et al. (2022) stated that in the knowledge part, participants that choose yes will be given 1 mark while participants select no will be no given mark and good knowledge is with score higher than 3 marks. For the attitude part, participants that select don't know, disagree and strongly disagree will be given no mark while participants that select agree or strongly agree will be given 1 mark. The good attitude is indicated by score higher than 5 marks.

Hence in my study, the awareness, knowledge and attitude towards AI in learning among FMHS students will be determine by categorized them into three group which are poor, fair and good by scoring. The total scoring for awareness and knowledge parts will be 24 marks. Participants that select "Yes" will be given 3 marks, "I don't know" will be given 2 marks and "No" will be given 1 mark. Participants with scoring 1-8 will indicate as poor awareness / knowledge (category 1), scoring 9-16 indicate fair awareness / knowledge (category 2) and scoring 17-24 indicate good awareness / knowledge (category 3). While for the attitude part, the total scoring will be 40 marks. This part will be access using the Likert scale and mark will be given like "strongly disagree = 1 mark to strongly agree = 5 marks". One of the questions in attitude part is negative attitude towards AI and hence the scoring will be reversed (Kwak et al.,

2022). Participants with scoring 1-13 indicate as poor attitude (category 1), 14-26 indicate as fair attitude (category 2) and 27-40 marks indicate as good attitude (category 3). The recoding and categorization of data are done by IBM SPSS version 26.

4.6.1 Awareness towards AI in learning (category)

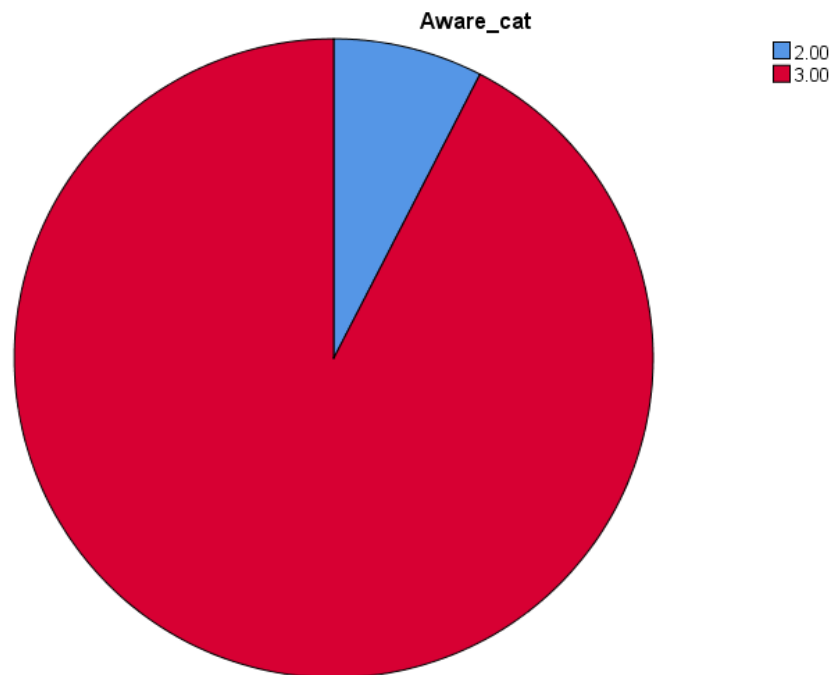


Figure 4.6.1 Awareness of participants towards AI in learning (category)

Figure 4.6.1 shown the awareness category of participants. Most of the participants fall under category 3 which indicate most of them have a good awareness towards AI in learning. There are total of 224 or 92.4% (Table 4.5) of participants in category 3. While for fair awareness, there are total of 20 or 7.6% (Table 4.5) of participants in this category which indicate them have a fair awareness towards AI in learning. There is no participants score below 9 marks hence there is no participants fall in the category of poor awareness towards AI in learning.

Table 4.5 Awareness towards AI in learning

Awareness towards AI in learning (Category)	Frequency (%)
Poor awareness (Category 1)	0 (0.0)
Fair awareness (Category 2)	20 (7.6)
Good awareness (Category 3)	244 (92.4)

4.6.2 Knowledge towards AI in learning (category)

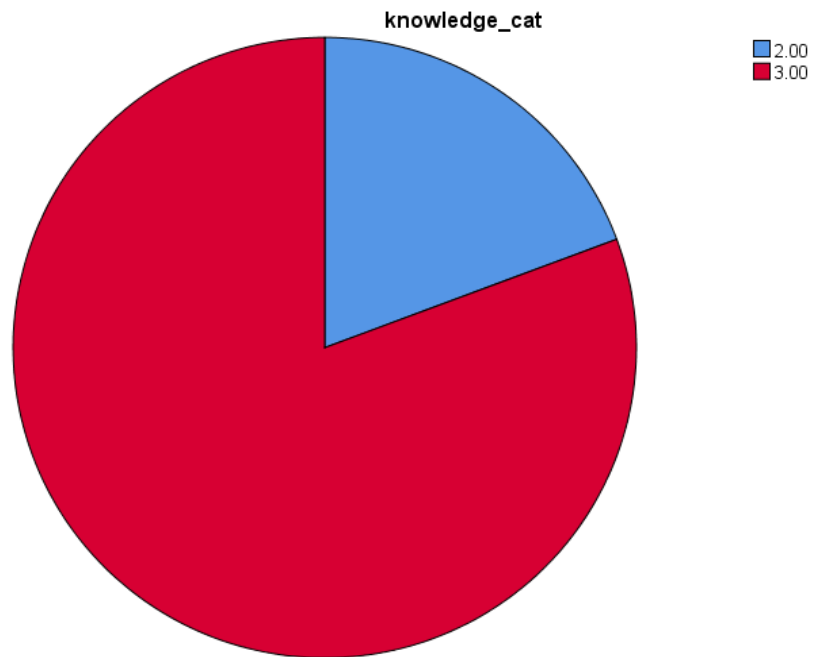


Figure 4.6.2 Knowledge of participants towards AI in learning (category)

Figure 4.6.2 shown the knowledge towards AI in learning in different category. Most of the participants are categorize in good awareness with scoring between 17-24. There are 213 or 80.7% (Table 4.6) of participants fall in this category. Besides that, there is 51 or 19.3% (Table 4.6) of participants in category 2 which indicate fair knowledge towards AI in learning. There are no participants in category one which indicate there is no participants has poor knowledge towards AI in learning,

Table 4.6 Knowledge towards AI in learning

Knowledge towards AI in learning (Category)	Frequency (%)
Poor knowledge (Category 1)	0 (0.0)
Fair knowledge (Category 2)	51 (19.3)
Good knowledge (Category 3)	213 (80.7)

4.6.3 Attitude towards AI in learning (category)

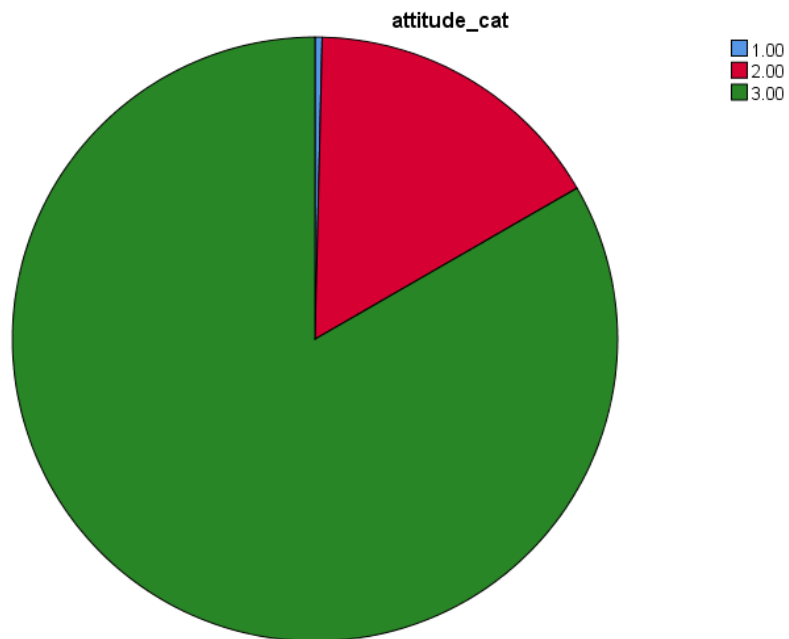


Figure in 4.6.3 Attitude of participants towards AI in learning (category)

Figure 4.6.3 shown the attitude towards AI in learning among the participants in category. Most of the participants are in category 3 which have a good attitude towards AI in learning. 220 or 83.3% (Table 4.7) of participants are in this category. There are 43 or 16.3% (Table 4.7) of participants in category 2 which represent fair attitude towards AI in learning. However, there is 1 or 0.4% (Table 4.7) of participants fall in category 1 which indicate poor attitude towards AI in learning.

Table 4.7 Attitude towards AI in learning

Knowledge towards AI in learning (Category)	Frequency (%)
Poor attitude (Category 1)	1 (0.4)
Fair attitude (Category 2)	43 (16.3)
Good attitude (Category 3)	220 (83.3)

CHAPTER 5

DISCUSSION

5.1 Chapter overview

This chapter will outline the discussion on the significant findings from the results sections according to research objectives, limitations of study, recommendations for research in the future and conclusion.

5.2 Discussion

5.2.1 Awareness towards AI in Learning

Based on the result shown in section 4, it indicates that all the students have fair or good awareness towards AI in learning. There are 7.6% of students having fair awareness while 92.4% of students having good awareness. This may be due to although AI is developing rapidly and its implementation is almost in every industry. Even the smart phone and electronic gadgets that we used nowadays are related to AI. Evidence suggests that AI is now a hot topic in academia, accounting for 2.2% of all scientific papers as of 2018 and growing. Higher education institutions, particularly those in developed nations, have already begun to deploy AI technology in a variety of contexts, including

management and teaching and learning (Vieira et al., 2022). With this, the students will have great explore to AI in daily life.

While compared to the study done by Chao, Hsu, Liu and Cheng (2020) in Vietnam, the result shown that that Vietnamese IT students were not well-versed in the development of AI technology, the students range between slightly familiar to fairly familiar, probably as a result of a lack of appropriate courses related to AI. With the maximum mean score of 5, the score of Vietnamese students ranges between 2.51 to 3.09.

However, although most of the participants has aware about the definition of AI but most of them are not able to differentiate between machine learning and deep learning in AI (No=47%, I don't know=19.7%). In addition, most of the participants also not able to aware the basic principles of AI. The reasons of this phenomena may be due to FMHS students are not explore to courses that related to AI in university hence they are not able to learn advance information related to AI.

Although the students not aware about the basic principles of AI, but most of them still aware that AI actually play an important role for learning in different fields and it may replace the traditional learning method in the future. Cannot be doubted that after covid-19 pandemic, revolution in education has been ushered. IBM Research recently worked with Rensselaer Polytechnic Institute, in Troy, New York, to utilize AI-based education to assist students

learning Mandarin. Students experience learning Mandarin in a Chinese restaurant while being taught by an AI-powered assistant in an immersive classroom setting. With AI-based education, the function of academic faculties changes considerably from one that disseminates knowledge to one that coaches students. This change was observed when chatbots were utilised by the Georgia Institute of Technology in the United States to respond to students' common academic questions. While faculty members handle activities that demand for creative, cognitive, and emotional intelligence, AI can handle repetitive and mundane tasks. AI is capable of guiding students via repeating tasks and teaching them theoretical or rule-based ideas. Lecturers then advise, assist, and guide students as they develop their critical thinking skills (Chong, 2020).

For example, both undergraduate and graduate students at UOW Malaysia KDU collaborate with academics to develop machine learning models for facial recognition, text-to-speech, and speech-to-text (voice recognition) for Internet-of-Things devices, and trend forecasting. Collaboration across disciplines is prioritised. Students in engineering and computing might collaborate on projects that require for knowledge of programming, electronics, and mechanics to enable the project can be run smoothly (Chong, 2020). This has shown that AI has gradually involve in different field including education.

Most of the students also realize that there are limitations of AI in learning. Some of the limitations of AI in learning included reduce human

interactions, communication barriers, unemployment of educators, financial problems and AI addiction.

With the implementation of AI in learning, students do not have interactions with others during class. With this, students are not able to develop and gain their skills for social.

This will be a challenge for them when they need to interact or communicate with others after their graduation and start working. Moreover, although AI has the potential to revolutionise education, human still find gap in communicating with computer. Language barriers frequently arise because machines are unable to perceive the true meaning of human during the communication. In contrast, a human respond with words or body language that give context clues about their intentions without the need for an explanation of why they took a particular action during the conversation. Besides that, implementation of AI in learning will lead to the unemployment of educators. This is because students can be taught by computers without the need for human interference. This also reduces burdens as the AI computers can help with the grading instead of having educator for marking for each student. Hence, reducing the need for many employees to be involved. Furthermore, many financial issues are coming with AI in education. This is because research related to AI need much funding and expenditure for creation and development. Hence the school with limited funds or budget with find it difficult to adopt these technologies for learning purpose because those AI supported application such as facial recognition or natural language processing tools are highly costed. Last but not least, AI carries the risk

of developing an addiction. The use of artificial intelligence in education has some drawbacks, including the possibility that students will become less interested in learning as they become more interested in AI equipment (Says, 2022).

5.2.2 Knowledge towards AI in Learning

Based on the data collected in section 4, it shown that overall, the participants have fair and good knowledge towards AI in learning. There are 19.3% of the students have fair knowledge and 80.7% of students have good knowledge towards AI in learning. Most of the students able to know the definition of AI but more than half of them do not know about machine learning and deep learning. However, more than 50% of the students able to understand the meaning of machine learning. Although most of the students know that the involvement of AI in medical learning, medical diagnosis and documentation, but more than 70% of them have not been taught about AI in university.

In a study by Ahmed et al. (2022), participants are asked questions about the fundamentals of artificial intelligence (AI), its subtypes (such as machine learning (ML) and deep learning (DL), and its applications. 335 participants (71.28%) are found to have a fundamental understanding of AI, but only 166 (35.3%) know anything about machine learning and deep learning, and just 109 (23.2%) know anything about applications. 361 (76.8%) participants do not know any applications of AI in the field of medicine, while 135 (28.7%) participants do not know about the fundamentals of AI, 304 (64.7%) participants had no knowledge of ML and DL, and Only 116 (24.7%) people

know how AI was used in radiology, and only 88 (18.7%) people know how AI is used in pathology.

While in another study by Swed et al. (2022) in Syria, the results indicate that 70% of participants from Syria have only basic understanding of AI, 23.7% are aware of its applications in medicine, and 34.7% have significant knowledge of ML and DL. This clearly reveals a lack of medical AI integration knowledge among Syrian participants. Knowledge of subtypes, deep AI, and its applications appears to be lacking among the participants. This can be explained by traditional curriculum-based medical studies that provide little or no AI education. Same goes to FMHS students in UTAR that lack of certain knowledge about AI, it is due to the university does not provide any AI related courses to the students. Hence, the students are not able to know about the latest AI technology or learning method that related in medical and health sciences field.

There is a study conducted in Malaysia known as “The MERLIN Project” to determine the Malaysian students’ acceptance of an AI chatbot in their learning process. 102 students are involved in this study. In order to create virtual classrooms for 21st-century learning using mixed reality technology, Telekom Malaysia's Research & Development department supported a research project that included the MERLIN chatbot. In order to facilitate online student learning, a project was carried out at the Faculty of Creative Multimedia, Multimedia University, which examined the use of Artificial Intelligence (AI) and Natural Language Processing (NLP) elements in a virtual learning assistant.

The content of MERLIN was mapped to themes covered in the faculty's Diploma of Creative Multimedia curriculum for this research project. These subjects were offered by the course instructor and were created to supplement the instructor's lesson plans when students are studying independently online. Then, these subjects were redesigned to be presented in a media-rich format, enabling MERLIN to respond to the students' inquiries with more aesthetically appealing and interactive content. The learning process with MERLIN are presented in 3 ways. First, the students will learn the topics with their lecturer through online. Then, the students can also involve in Augmented Reality (AR) game, Virtual Reality (VR) game or a hologram application. These applications can allow the students to learn the topic experientially. Depending on the results of each game, students may be encouraged to interact with the MERLIN chatbot to gain more in-depth information on the subject or to brush up on their understanding so they may return to the game and improve their results. In the end, it is proven that the chatbot helped students learn more effectively and better understand the course material according to the results. (NEO, 2022)

AI play an important role in diagnosis especially in diagnose the infectious diseases such as Covid-19 that led to the global pandemic. BlueDot, a digital health organization with Canadian headquarters that use an AI-driven algorithm to forecast the spread of infectious diseases, alerted its clients to the discovery of abnormal pneumonia cases in Wuhan, China, in December 2019. The World Health Organization (WHO) then published its first public alerts concerning a virus that is now known as COVID-19 a few days later. Due to the lethal nature of the COVID-19 virus, which needs quicker detection and

therapies, the global spread of the COVID-19 pandemic has since accelerated the use of AI in healthcare settings (Khemasuwan & Colt, 2021). Besides that, the use of AI in drug development has also been demonstrated through analysis of COVID-19 data. Real-time drug testing has been sped up because of technology. With this, it able to overcome the slower and traditional human testing methods. For instance, Huawei Malaysia and the Malaysian Ministry of Health worked together in the middle of 2020 to donate a Huawei Cloud AI-assisted diagnosis solution to a COVID-19 hospital in Malaysia in order to deliver speedier COVID-19 diagnosis. AI has proven to be beneficial for clinical trials throughout the creation of the vaccine and has played a part in the much faster than typical development of vaccines and medicines (Vaishya et al., 2020).

In addition, documentation by using AI provide a platform to transform unstructured data into structure data hence making the data easier for understanding, analysing and consuming. This will enable the document of the patient to be more organized and easier to process. With this, can conclude that AI is useful in learning and diagnosis purpose and knowledge towards AI is important to the new generation. Since most of the students know about the beneficial use of AI, university should take consideration to involve courses and curriculum related to AI among FMHS students. Hence, they will have a better explore and understanding towards AI.

5.2.3 Attitude towards AI in Learning

From the data obtained from result section, it shown that most of the students have a positive attitude towards AI in learning. Majority of the students agree that AI is an essential and useful learning aid. More than 70% of the participants agree that there is better understanding of AI usage in healthcare and medical field after using AI as learning aid. In addition, 60.2% of the students also agree on the implementation of AI will decrease the percentage of error in healthcare diagnosis. Besides that, more than 70% of the students agree that AI should be included in medicine and health sciences curriculum and practical teaching. However, there are around 50% of the participants agree that there is a fear of AI as replacement of healthcare professions.

In a study that determine the attitude of undergraduate medical students towards AI in radiology and medicine, it found that majority of respondents (83%) thought artificial intelligence (AI) could be able to identify abnormalities in radiological examinations, but only 56% thought it would be able to make a conclusive diagnosis. The majority disagreed (83%) with claims that AI will replace radiologists, although they did agree (77% and 86%) that AI will revolutionise and improve radiology. 71% of respondents felt that AI should be taught in medical school. Male and tech-savvy respondents had higher levels of confidence in the advantages of AI and lower levels of fear of these technologies in sub-group analyses. In conclusion, undergraduate medical students are aware of the possible applications and implications of AI on radiology and medicine,

but they do not concern that AI will replace human radiologists (Pinto dos Santos et al., 2018).

While in another study by Ahmed et al. (2022), 689 (45.7%) participants highly agreed and 628 (41.7%) agreed that AI was necessary in the medical business. 558 (37%) participants strongly agree and 690 (45.8%) agree with the statement that AI aided practitioners in early identification and assessment of disease severity. 127 (8.4%) participants strongly agree and 97 (13.1%) agree that AI may eventually replace doctors. 445 (29.5%) and 396 (26.3%) people strongly agree that AI is important in pathology and radiology. The majority of participants oppose the idea that AI would lead to 496 (32.9%) more diagnostic mistakes.

This shown that medical students generally have a positive attitude towards AI in medical field. This is because the students have opportunity to expose to AI related courses and AI application. Hence, the students will be more confident towards AI involvement in medical field.

Artificial intelligence has the potential to decrease medical errors by 30–40% and treatment costs by up to 50%, according to a 2016 Frost and Sullivan research. By using machine learning and pattern recognition algorithms, artificial intelligence can support doctors' judgement and reduce mistakes. When using electronic health information, the Israel-based business MedAware has created a comparable system to assist physicians in avoiding medication errors.

When a doctor writes a prescription for a drug that does not fit the patient's profile, the doctor is informed at the time of writing the prescription. If a patient is given a prescription for a medication that negatively affects another medication, the system can also notify the doctor. In addition, mobile apps powered by AI offer fundamental healthcare services, enhancing the work of human healthcare practitioners. For instance, the chatbots at Your.MD ask patients about their symptoms and provide them with medical information on their ailments. Their AI engine connects the dots between the causes of the illnesses and their symptoms using data from a large database. Therefore, the likelihood of an incorrect diagnosis and unintended medical mistakes are greatly reduced (H, 2021). With the advancement of technology in AI diagnosis, it enables the students to believe that AI is able to reduce the error in diagnosis. Hence this led to the positive attitude of FMHS students towards AI.

Most of the FMHS students think that the university should involve AI in practical teaching and curriculum. This is because they believe AI in learning will be beneficial for them and allow them to have better understanding towards AI application that used in medical and health sciences field. In Hong Kong, the Chinese University of Hong Kong started a project called AI for the Future (AI4Future) to develop a pre-tertiary AI curriculum (CUHK). This is the first secondary school AI curriculum. AI4Future is a collaborative project that involves five parties—Faculty CUHK's of Engineering and Faculty of Education, local secondary schools, the local government, and the local AI industry—to co-create a formal AI curriculum for junior secondary students. It draws on CUHK's experiences in launching the first AI undergraduate degree programme in Hong

Kong in 2018. The proposed curriculum considerably improved perceived competence in attitude and intrinsic desire toward AI, according to the first finding. This result further demonstrated that the created activities and content are suitable for school-aged children and covered the skills children needed to acquire in order to use AI technologies. In order to encourage perceived knowledge, ability, confidence, significance of AI and motivation to learn AI for a student sample that is from a variety of backgrounds, the curricular framework is more likely to offer an integrative, comprehensive, and flexible point of view of AI (Chiu et al., 2021). With this study, it shown that involvement of AI in curriculum can benefits the students and allow the students to understand and explore more about AI. Hence, the students will be more interested about AI and apply it for learning purpose.

While regarding the fear of AI in replacing the healthcare profession, there is a study by Huisman et al. (2021) found that there is 38% of fear of replacement occur among 1041 participants. The result shown that Male participants and those with only a basic understanding of AI are substantially more likely to report fear of replacement. Participants that aged and those with intermediate or advanced knowledge of AI-specific are less likely to feel afraid of replacement by AI. The most frequent causes of replacement anxiety are expecting changes to the diagnostic radiologist's job, thinking full replacement or partial replacement, will lead to a decrease in the employment for radiologists. Same goes with FMHS students in UTAR, they will also be employed in medical field after their graduation. Hence, they will worry that their job will replace by AI and hence lead to unemployment among themselves.

5.3 Limitation of study

The questionnaire used is not a validated questionnaire and it is adapted from various study that conducted previously. However, the questionnaire is validated by 5 lecturers from physiotherapy department.

Besides that, the questionnaire is done in the Microsoft form and the data is collected through online platform such as Whatsapp, Microsoft team. This will be the limitation of the study because the participants may have difficulties in understanding and comprehending the questions asked but unable to ask the researcher immediately. This may cause the data obtained is not clear, precise and valid.

Moreover, since the questionnaire is conducted online, participants may search the answer online. With this, the result from the study can be inaccurate and the participants actually do not have any awareness or knowledge towards AI in learning.

The next limitations will be the response rate of the participants. The researcher has message and sends the questionnaire personally to almost all the FMHS students that is reachable through Whatapps and Microsoft team. However, the response rate in Microsoft team is less than 20%. Although the researcher has recruited the participants physically in campus, but there are some

3rd, 4th and 5th year FMHS students having their clinical posting and are not reachable in campus. Initially there is planning to have 273 participants recruited in this study after adding 10% of participants from Krejice and Morgan table but in the end there is only 264 participants recruited in this study.

Lastly, since the study is only done among FMHS students in UTAR but no every student in UTAR hence there is no comparison between health sciences and non-health sciences in awareness, knowledge and attitude towards AI in learning. Besides that, only FMHS students are recruited in this study and hence awareness, knowledge and attitude towards AI in learning of students from other faculty are no able to be represent in this study.

5.4 Recommendation for future study

For the recommendations for future study, researchers should consider conducting face to face or one to one interview physically to obtain more valid result. The researcher able to clarify the question asked by the participants and the types of responses required. This will allow the data obtained is more precise, accurate and valid, hence the cleaning of the data will be more efficient. Besides that, physical interview will prevent the typing error or anything missing response in every question. Even the error happens, the researcher is able to correct the data immediately by asking the participants to fill in the question again. In addition, physical interview also prevents the participants from obtain the answer through internet and hence able to assess the awareness, knowledge and attitude of the participants in more accurate manner.

Besides that, the low response rate through online platform can be solved by frequent reminder from the researchers to ensure the participants will response to the questionnaire.

Lastly, the sample population can be broadened by recruit non-health sciences students for better representation of the overall population in UTAR. Besides that, with recruitment of non-health sciences students in the study, comparison can be made and hence able to determine is that any difference on awareness, knowledge and attitude towards AI in learning. This also aid in determination of whether involve AI in learning in other faculty. Besides that,

by recruiting a larger sample, smaller sampling error will occur and enable the researcher to obtain a more accurate result.

5.5 Conclusion

In conclusion, it is found that FMHS students in UTAR generally have a good awareness and knowledge towards the basic of AI. However, they are not really understanding AI in-depth due to lack of opportunity to study in AI related course. Although there is a fear of replacement by AI, but majority of the students have a positive attitude towards AI in learning and agree that AI will be beneficial as learning tool. In addition, their willingness towards inclusion of AI in practical training and curriculum are also high. Hence, the university should consider including AI course in the syllabus to encourage the students to know and explore more about AI. Besides that, the university should also consider involving AI in practical learning and curriculum. This is giving the students a chance to learn through AI and adapt with the application of AI.

Since the technology nowadays are getting more and more advance, AI will gradually be implemented in every industry including medical and health sciences field. With the advancement of AI, it will further improve the overall services and making the diagnosis process to be more efficient. Hence, it is important for the FMHS students to have and master the AI knowledge. This will allow them the adapt and learn the AI application used in medical and health sciences field in a more efficient way. With this, it can reduce the burden of the

healthcare professions while providing best quality of healthcare service to the patients.

Future study can broaden the sample population by recruit non-health sciences students for better representation of the overall population in UTAR. Besides that, with recruitment of non-health sciences students in the study, comparison can be made and hence able to determine is that any difference on awareness, knowledge and attitude towards AI in learning. This also aid in determination of whether involve AI in learning in other faculty. Besides that, by recruiting a larger sample, smaller sampling error will occur and enable the researcher to obtain a more accurate result.

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APPENDIX A- ETHICAL APPROVAL FORM

12.	Prevalence of Low Back Pain and Its Association with Ergonomic Usage Among UTAR Students	Ian Lee Haorong	Ms Swapneela Jacob
13.	Awareness, Knowledge and Attitude Towards Artificial Intelligence in Learning Among Faculty of Medicine and Health Science (FMHS) Students in UTAR	Hwang Ji Yen	Co-Supervisor: Mr Tarun Amalnerkar
14.	Awareness & Knowledge of Breathing Exercise as Covid-19 Management Among UTAR Students	Low Wai Kit	Ms Meneka Naidu a/p Mohnaraju
15.	Awareness on the Adverse Effects of Vaping on Health Among UTAR Students	Lim Yu Hui	
16.	Awareness Towards Bell's Palsy Among University Students	Pong Jia Shan	

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,



Professor Ts Dr Faiz bin Abd Rahman

Chairman

UTAR Scientific and Ethical Review Committee

c.c Dean, M. Kandiah Faculty of Medicine and Health Sciences
 Director, Institute of Postgraduate Studies and Research

APPENDIX B – INFORMED CONSENT FORM

Awareness, Knowledge and Attitude towards AI in Learning Among MK FMHS Students

Dear participants,

You are invited to participate in a research study conducted by HUANG JI CHEN, from Bachelor of Physiotherapy (Hons) Universiti Tunku Abdul Rahman (UTAR), Sungai Long Campus.

Please read this information sheet and contact me to ask any questions that you may have before agreeing to take part in this study.

You are welcome to help us to complete this research if you are undergraduate students from M.Kandiah Faculty of Medicine and Health Sciences (MK FMHS).

Purpose of the Research Study: The purpose of this research study is to determine the awareness, knowledge and attitude towards Artificial Intelligence (AI) in learning among MK FMHS students in UTAR

Procedures: If you agree to be in this study, you will be asked to fill up a questionnaire regarding your awareness, knowledge and attitude towards Artificial Intelligence (AI) in learning . The questionnaire will take 5-10 minutes to complete.

Length of participation: One-time participation only. This questionnaire consists of 4 parts and will take approximately 5-10 minutes to complete.

Risks and Benefits: No risk will be involved throughout the current study. The benefits of participating in this study include increased awareness, knowledge and attitude towards Artificial Intelligence (AI) in learning .

Confidentiality: No information that will make it possible to identify you, will be included in any reports to the University or in any publications. Research records will be stored securely and only approved researchers will have access to the records.

Voluntary Nature of the Study: Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Contacts and Questions: If you have any questions, clarifications, concerns or complaints, about the research, the researcher conducting this study can be contacted at:

Name: Hwang Ji Yen
Phone number: 010-3815937
Email: jiyen007@utar.my

...

* Required

1. Are you willing to participate in this study? *

Yes

No

APPENDIX C- PERSONAL DATA PROTECTION NOTICE

PERSONAL DATA PROTECTION NOTICE

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:

- a) Name
- b) Identity card
- c) Place of Birth
- d) Address
- e) Education History
- f) Employment History
- g) Medical History
- h) Blood type
- i) Race
- j) Religion
- k) Photo
- l) Personal Information and Associated Research Data

2. The purposes for which your personal data may be used are inclusive but not limited to:

- a) For assessment of any application to UTAR
- b) For processing any benefits and services
- c) For communication purposes
- d) For advertorial and news
- e) For general administration and record purposes
- f) For enhancing the value of education

- g) For educational and related purposes consequential to UTAR
- h) For replying any responds to complaints and enquiries
- i) For the purpose of our corporate governance
- j) For the purposes of conducting research/ collaboration

3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

4. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

6. By submitting or providing your personal data to UTAR, you had consented and agreed for your personal data to be used in accordance to the terms and conditions in the Notice and our relevant policy.

7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you

7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

8. You may access and update your personal data by writing to us at jjyen007@utar.my

2. Acknowledgment of Notice *

I have been notified and that I hereby understood, consented and agreed per UTAR above notice.

I disagree, my personal data will not be processed.

Back

Next

Never give out your password. [Report abuse](#)

APPENDIX D- KERCJIE AND MORGAN (1980) TABLE

TABLE 1
Table for Determining Sample Size from a Given Population

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note.—*N* is population size.
S is sample size.

APPENDIX E- QUESTIONNAIRE FORM (DEMOGRAPHICS)

Demographic Data

4. Name *

5. Age *

19-20

21-22

23-24

>24

6. Gender *

Male

Female

7. Course *

- Bachelor of Medicine and Bachelor of Surgery (MBBS)
- Bachelor of Nursing
- Bachelor of Physiotherapy
- Bachelor of Chinese Medicine (TCM)

8. Year of Study *

- Year 1
- Year 2
- Year 3
- Year 4
- Year 5

9. Contact number *

10. Email *

APPENDIX F – AWARENESS TOWARDS AI

Awareness towards Artificial Intelligence

Based on your awareness towards Artificial Intelligence, choose the most suitable answer.

11. Do you know about Artificial Intelligence? *

Yes

No

I don't know

12. Artificial Intelligence is often used to describe machines or computers that mimic “cognitive” functions of human mind.

*

Yes

No

I don't know

13. Are you aware about difference between machine learning and deep learning?

*

Yes

No

I don't know

14. Are you aware about application of Artificial Intelligence in learning?

*

Yes

No

I don't know

15. Are you aware about basic principles of Artificial Intelligence?

*

Yes

No

I don't know

16. Are you aware that some traditional learning methods will be replaced by Artificial Intelligence in the future?

*

Yes

No

I don't know

17. Are you aware Artificial Intelligence will play an important role for learning in different fields? (e.g., medical and health sciences)

*

Yes

No

I don't know

18. Are you aware about the limitations of Artificial Intelligence in learning in specific field? (e.g., medical and health sciences)

*

Yes

No

I don't know

APPENDIX G – KNOWLEDGE TOWARDS AI

Knowledge towards Artificial Intelligence

Based on your knowledge towards Artificial Intelligence, choose the most suitable answer.

19. Artificial Intelligence is about creating intelligent machines so that the machine can think intelligently in the same manner as a human does.

*

Yes

No

I don't know

20. Do you know about machine learning and deep learning?

*

Yes

No

I don't know

21. Machine learning is about Artificial Intelligence that provides computers with the ability to learn without being programmed.

*

Yes

No

I don't know

22. Do you know about application of Artificial Intelligence in medical learning?

*

Yes

No

I don't know

23. Have you been taught about Artificial Intelligence in university?

*

Yes

No

I don't know

24. Artificial Intelligence features can be used in diagnosis in medical and health sciences.

*

Yes

No

I don't know

25. Types of Artificial Intelligence like Natural Language Processing and Rule-based Expert System are relevance to medical and health sciences field.

*

Yes

No

I don't know

26. Artificial Intelligence can play a vital role in documentation (e.g. designing short term goal and long term goal) in field of medical and health sciences.

*

Yes

No

I don't know

APPENDIX H – ATTITUDE TOWARDS AI

27. Question



	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	+
Artificial Intelligence is essential in medical learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Artificial Intelligence is useful as a learning aid.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
There is better understanding of Artificial Intelligence usage in healthcare and medical field after using Artificial Intelligence as learning aid.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Artificial Intelligence implementation will decrease percentage of error in healthcare diagnosis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Artificial Intelligence should be included in medicine and health science curriculum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
There is a fear of Artificial Intelligence as replacement of healthcare professions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Learning with Artificial Intelligence will be beneficial for medicine and health sciences career.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Medical and health sciences students should receive practical teaching in Artificial Intelligence.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

APPENDIX I – TURNITIN REPORT

Awareness and knowledge of Artificial Intelligence

ORIGINALITY REPORT

12%	8%	5%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	pubmed.ncbi.nlm.nih.gov Internet Source	1%
2	Thomas K. F. Chiu, Helen Meng, Ching-Sing Chai, Irwin King, Savio Wong, Yeung Yam. "Creation and Evaluation of a Pretertiary Artificial Intelligence (AI) Curriculum", IEEE Transactions on Education, 2021 Publication	1%
3	Submitted to Asia Pacific University College of Technology and Innovation (UCTI) Student Paper	1%
4	Sarya Swed, Hidar Alibrahim, Nashaat Kamal Hamdy Elkalagi, Mohamad Nour Nasif et al. "Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Syria: A cross-sectional online survey", Frontiers in Artificial Intelligence, 2022 Publication	1%
5	pdfs.semanticscholar.org Internet Source	<1%

6	Pei-Ju Chao, Tsu-Hsuan Hsu, Tsai-Pei Liu, Yu-Huei Cheng. "Awareness, Knowledge, and Attitude towards Artificial Intelligence: Perspectives of Vietnamese Information Technology Students", 2020 International Symposium on Computer, Consumer and Control (IS3C), 2020 Publication	<1 %
7	openjicareport.jica.go.jp Internet Source	<1 %
8	www.mondaq.com Internet Source	<1 %
9	Zaboor Ahmed, Khurram Khaliq Bhinder, Amna Tariq, Muhammad Junaid Tahir et al. "Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A cross-sectional online survey", Annals of Medicine and Surgery, 2022 Publication	<1 %
10	jett.labosfor.com Internet Source	<1 %
11	Submitted to Universiti Tunku Abdul Rahman Student Paper	<1 %
12	www.azmilaw.com Internet Source	<1 %
13	ir.unimas.my Internet Source	<1 %

14	learningschoices.blogspot.com Internet Source	<1 %
15	"ECR 2020 Book of Abstracts", Insights into Imaging, 2020 Publication	<1 %
16	Submitted to International University of Malaya-Wales Student Paper	<1 %
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20	Submitted to Intercollege Student Paper	<1 %
21	Submitted to Quest International University Perak Student Paper	<1 %
22	Submitted to University of Wolverhampton Student Paper	<1 %
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