CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter would like to discuss related studies, those are: Artificial Intelligence, Adaptive Learning, Communication Skills, and Previous Study.

A. Artificial Intelligence

1. The definition of Artificial Intelligence

Artificial intelligence (AI) is commonly connected with computers. Chassignol et al. propose a two-sided definition and description of AI. They define artificial intelligence as a field and a theory. They define AI as a field of study in computer science whose pursuits aim to solve many cognitive issues often linked with human intelligence, such as learning, problem solving, and pattern recognition, and then adapt. He defined AI as a theoretical framework that guides the development and use of computer systems with human-like capabilities, particularly intelligence and the ability to perform tasks that require human intelligence, such as visual perception, speech recognition, decision-making, and language translation (Chassignol, Khoroshavin, and Bilyatdinova, 2018, p. 17).

Artificial intelligence is defined as robots that can approximate human reasoning (Sharma, Kawachi, and Bozkurt, 2019, p.1). Similarly, Pokrivcakova, with a definition and description oriented to the education sector, observed that AI is the result of many decades of research and development bringing together system designers, data scientists, product designers, statisticians, linguists, cognitive scientists, psychologists, education experts, and many others to develop education systems with some

level of intelligence and ability to perform different functions, including helping teachers and Wartman et al. made similar conclusions, defining artificial intelligence as the ability of computers and machines to emulate human cognition and activities.

Recently, AI and machine learning have been extensively researched for use in mobile devices, with the goal of improving computation quality and opening up new applications such as face unlock, speech recognition, natural language translation, and virtual reality. Machine learning, on the other hand, requires massive computational power to execute complicated training and learning. The advancement of AI in mobile devices elevates mobile education to a new level, providing ease by assisting students in less time and achieving interactive and personalized learning. Virtual reality, for example, extends the learning process beyond the learning environment to create a global classroom since AI can connect students to the virtual classroom.

Furthermore, AI-powered chatbots offer personalized online learning and transform teachers into chat interactions. This device can determine the students' degree of comprehension.

2. The types of Artificial Intelligence

Although at the moment AI focuses on many different tasks in narrow domains, the idea of simulating the whole of human intelligence is still there. AI systems could be generally divided into three main categories (Mueller and Massaron, 2021):

- **Artificial Narrow Intelligence (ANI) or Domain-Specific AI (Weak AI):** This category includes almost every single of the AI systems now in use. This sort of artificial intelligence is distinguished by certain domains for which a model can be developed using domain-specific rules or limits. For example, it is no longer difficult to create an AI that is brilliant at chess or other games because we already know the rules for chess or a comparable game. AI systems can master such particular domains and provide intelligent solutions within them. This is also known as Narrow Intelligence or weak AI because the intelligence gained here is far from general human-level intelligence and is just domain-specific.
- **Artificial General Intelligence (AGI) or Strong AI:** In this form of AI system, intelligence learned in one area can be used to comparable or unrelated domains, just as humans do. For example, people learn to walk primarily indoors and on smooth surfaces. However, as we mature, this tendency extends to walking on uneven ground or highways with a slight incline. Generalization in AI is critical for both domain-specific tasks and achieving human-level intelligence. However, for many years in the history of AI research, generalization has proven to be difficult, particularly at the human level. As a result, such challenges are commonly referred to as hard AI or strong AI problems to distinguish them from domain-specific AI (weak AI) with limited intelligence.
- **Artificial Super Intelligence (ASI):** In this form of AI system, machines are thought to be more intelligent than humans in practically every way. This is a fictional situation that may be plausible; however, given the

current development of AI, such machines do not exist yet. This scenario also addresses topics such as robots (artificially intelligent machines) controlling humans and a world of self-replicating superintelligence dominating future civilizations. Currently, there is insufficient evidence to support this hypothetical situation.

3. The benefits of Artificial Intelligence

These are the results of the intrinsic capabilities of currently widely used AI systems (such as deep learning) to classify (measure relevance or relationships) and/or forecast (make assertions about the future). Another crucial, albeit less noticeable, ability of AI systems is optimization, particularly using evolutionary AI methods such as genetic algorithms. Such strengths are mostly derived from machine learning techniques, such as reinforcement, supervised or unsupervised learning, and the use of big data sets (verbal, textual, image, or video streams). Perhaps most crucially, some AI systems may be operating in real time.

Any system that can offer knowledge about the relationships around us, predict the future, and advise us on the optimal course of action or sequences of actions to take, will undoubtedly be influential.

The effects of AI systems, with their inherent powers, on our current lives can be linked to some vital jobs that are complex and frequently exceed the capabilities of human-based resources, statistical methodologies, or simple algorithmic automation, digital or otherwise.

B. Adaptive Learning

1. The definition of Adaptive Learning

A learning technique known as "adaptive learning" (AL) allows the information or material to modify and adapt to the needs of the learner (Thalmann, 2014). It also provides personalized instruction to students based on their level of understanding (Chaplot, Rim and Khim, 2016). Therefore, it is part of personalized education. Another type of personalized education is, for example, one-on-one tutoring, with no computers involved. This type of personalized education has been around since the times of Socrates, and probably even predates Socrates.

Modern AL is mostly intelligent. This means that it uses AI. There are some straightforward computer algorithms in educational programs that do not use AI, but they have become rare. Not all adaptive learning systems are intelligent, and not all intelligent learning systems are adaptive, but for the most part they intersect (Brusilovsky and Peylo 2003).

A simple example would be a computer program that provides various learning resources and engages students in interactive learning (Sleeman and Brown 1982). When a student makes a mistake answering a question, the program does not simply give him another similar question. Instead, it searches for the patterns in all of the student's prior interactions with the program and analyzes them. Based on this, it creates a model of the student and uses it for the optimal response (Brusilovsky and Millan 2007).

2. Adaptive Learning environments based on learning style

The adaptive e-learning employment in higher education has been slower to evolve, and challenges that led to the slow implementation still exist. The learning management system offers the same tools to all learners, although individual learners need different details based on learning style and preferences. (Beldagli & Adiguzel, 2010; Kolekar et al., 2017). The interactive e-learning environment requires evaluating the learner's desired learning style, before the course delivery, such as an online quiz or during the course delivery, such as tracking student reactions (DeCapua & Marshall, 2015).

In e-learning environments, adaptation is constructed on a series of well-designed processes to fit the instructional materials. The adaptive e-learning framework attempts to match instructional content to the learners' needs and styles. According to Qazdar et al. (2015), adaptive e-learning (AEL) environments rely on constructing a model of each learner's needs, preferences, and styles. It is well recognized that such adaptive behavior can increase learners' development and performance, thus enriching learning experience quality. (Shi et al., 2013). The following features of adaptive e-learning environments can be identified through diversity, interactivity, adaptability, feedback, performance, and predictability. Although adaptive framework taxonomy and characteristics related to various elements, adaptive learning includes at least three elements: a model of the structure of the content to be learned with detailed learning outcomes (a content model). The student's expertise based on success, as well as a method of interpreting

student strengths (a learner model), and a method of matching the instructional materials and how it is delivered in a customized way (an instructional model) (Ali et al., 2019). The number of adaptive e-learning studies has increased over the last few years.

The learning style is a parameter of designing adaptive e-learning environments. Individuals differ in their learning styles when interacting with the content presented to them, as many studies emphasized the relationship between e-learning and learning styles to be motivated in learning situations, consequently improving the learning out-comes (Ali et al., 2019; Alshammari, 2016; Alzain et al., 2018a, b; Liang, 2012; Mahnane et al., 2013; Nainie et al., 2010; Velázquez & Assar, 2009). The word "learning style" refers to the process by which the learner organizes, processes, represents, and combines this information and stores it in his cognitive source, then retrieves the information and experiences in the style that reflects his technique of communicating them. (Fleming & Baume, 2006; Jaleel & Thomas, 2019; Jonassen & Grabowski, 2012; Klasnja-Milicevic et al., 2011; Nuankaew et al., 2019; Pashler et al., 2008; Willingham et al., 2105; Zhang, 2017). The concept of learning style is founded based on the fact that students vary in their styles of receiving knowledge and thought, to help them recognizing and combining information in their mind, as well as acquire experiences and skills. (Naqeeb, 2011).

3. The advantage of Adaptive Learning

According to its proponents, there are many benefits of teaching machines both for students and teachers.

a. It encouraged learners to study at their own speed (Skinner, 1958). Students may use teaching machines to study the topic for as long as they need.
b. Furthermore, as Skinner (1960) observed, it motivated the learners and created in them a strong sense of competence and confidence.
c. Unlike other media, such as television and radio, pupils were engaged while utilizing the teaching machine during the learning process (Skinner, 1960). It was a type of private tutor who alerted pupils and kept them engaged during the learning process (Skinner, 1958). Furthermore, with the rapid feedback offered by teaching machines, students were able to assess their knowledge without having to wait for an hour-long test or final assessment.

4. The disadvantage of Adaptive Learning

Despite the benefits as stated above, some educators and researchers were against the usage of teaching machines. For the opponents, one of the major problems about teaching machines was its one-way characteristic. Teaching machines were poorly designed (McKeachie, 1974). They were not readily portable and required maintenance (Calvin, 1969). It was difficult and time consuming to prepare programs for teaching machines; implying that the teacher must be clear about what he/she wants to teach and should determine the steps of the content at the beginning of the program preparation (Skinner,

1960). Moreover, the content in teaching machines was divided into frames and all students had to go through frames in linear sequence (Seattler, 1990). The machine forced students to take the steps identified by the instructor in a prescribed order (Skinner, 1958) They did not let the students see the correct answer until they responded correctly or altered their answer after they saw the correct answer (Calvin, 1969). As Casas (2002) stated, students could not refer to previous questions or answers in flow of the program.

Another disadvantage was becoming unsocialized because of interacting only with the machine. Casas (2002) also pointed out that affective needs of the students were not taken into consideration. Moreover, the machines did not motivate the students to go on studying because it was assumed that being right is sufficient reinforcement (Holland, 1960). Thus, boredom was the major complaint of the students in learning from teaching machines and some of them even destroyed their machine. Finally, though some students successfully completed the program, they were unable to pass the necessary tests (Seattler, 1990). Due to these problems, by the late 1960s, the popularity of teaching machines had decreased.

C. Communication Skills

1. The definition of communication skills

The word communication is used in common talk, usually, to mean speaking or writing or sending a message to another person. Communication is really much more than that. It involves ensuring that your message has reached the target audience, (that is, the persons to whom it is sent) and that the receiver understands and responds as you want them to. It also involves

ensuring that you yourself are able to understand, interpret, and respond to messages that you receive. Communication is an important aspect of behavior; human communication is affected by all factors that influence human behavior.

In the last sixty to seventy years, the study of human communication has been strengthened by contribution from many disciplines. Definitions, descriptions of the process, and analyses of the elements of communication have been developed by many scholars (Urmila, 2010).

- Communication is a process of passing information and understanding from one person to another. - Keith Davis
- Communication is any behavior that results in an exchange of meaning. - The American Management Association
- Communication may be broadly defined as the process of meaningful interaction among human beings. More specifically, it is the process by which meanings are perceived and understandings are reached among human beings. - D. E. McFarland
- Communication is the process by which information is passed between individuals and/or organizations by means of previously agreed symbols. - Peter Little

These definitions show that communication involves exchange of thoughts between two parties. In order to transfer an idea, we must use symbols (words, signs, pictures, sounds) which stand for the idea. The symbols must be understood by the person or persons with whom we intend to communicate. Both must assign the same meaning to the symbols used; otherwise, there is

miscommunication. Unless there is a common understanding of the symbols, it is not possible to communicate.

2. The elements of communication skills

In order to analyze the activity of communication, we must know the process and the elements involved in the process of communication. There are seven elements or factors which make up the process of communication (Urmila, 2010):

a. Source /Sender, is the one who initiates the action of communicating
b. Audience /Receiver is the person(s) for whom the communication is intended
c. Goal Purpose is the sender's reason for communicating, the desired result of the communication
d. Message/ Content is the information conveyed
e. Medium /Channel is the means or method used for conveying the message
f. Feedback is the receiver's response to the communication as observed by the sender
g. Environment /Context is the background in which the communication takes place.

3. Types of communication skills

We exchange symbols to express our thoughts and experiences when we communicate. We use language, a common symbol system, to communicate our experiences to other people. Verbal communication refers to communication using words, whereas non-verbal communication refers to communication using other symbols.

❖ **Verbal Communication**

The term 'verbal' is colloquially used to mean oral but in communication studies, 'verbal' means by using words and language. It includes both written or oral. Most of our communication is done by using language; we speak and write whenever we have to convey information and ideas, to discuss, to motivate, to appreciate, or to warn, reprimand, complain, and so on. We may do any of these things orally or in writing.

There are formats and structures for verbal communication in different types of situations. For example, documents used in business have names and formats; letters, reports, memos, minutes have their own· formats and layout. For oral communication we have the formats of presentations (or speeches), interviews, meeting-s of various types, negotiations and so on. The effectiveness of verbal communication depends on a person's skill in the use of language. A rich vocabulary, command of a variety of sentence structures, clarity in thinking, and focus on the audience are necessary for effective verbal communication (Urmila, 2010).

❖ **Non-Verbal Communication**

Non-verbal methods of communication include all things, other than words and language, that can convey meaning. For example, graphics like pictures, maps, charts, graphs and diagrams in a written document, and body language and voice qualities in speech, are non-verbal communication.

Non-verbal communication can be independent of verbal communication; but verbal communication is always accompanied by non-verbal communication. Non-verbal methods can be used as a substitute for words like the red color to mean danger, or nodding the head to mean "yes." Or both may be used together as when we shake the head and also say "no." Sometimes, a gesture like slapping the hand on the table may be used with words like, "We must do it," to emphasize the point (Urmila, 2010).

Nonverbal communication can be an incredibly effective way of sending and receiving messages from person to person, especially in a foreign country. It’s easy to portray being happy or sad or confused. However, there are other social expressions in foreign countries that become important to pay attention to. Nonverbal communication can also lead to things that people did not mean to communicate. Sometimes nonverbal communication can bring to light the many cultural differences that there are around the world. Clothing has been known to be a form of communication or expression, as well. (Allard-Kroopp, 2023)

D. Grammarly

Grammarly is an AI-based platform that is commonly used to help users correct or correct errors in writing. According to Perdana & Farida (2019, p. 2) Grammarly is a tool used to correct grammar, punctuation and spelling. In addition, Grammarly also adapts to language styles and also paraphrases sentences.

Based on the explanation presented by Grammarly on its website, Grammarly's AI system combines machine learning with various natural language processing approaches. Human language has many levels that can be analyzed and processed: from characters and words to grammatical structures and sentences, even paragraphs or full texts.

Firstly, the user-selected, high-quality training data is used to train the system. When it comes to Grammarly, this type of data can be a sizable corpus of text that has been categorized and annotated by human scholars so that algorithms powered by artificial intelligence can comprehend it. For example, if one wants an AI to learn the pattern of appropriate comma usage, one must first show the AI a sentence with an incorrect comma so it can identify the error, and then one must show the AI a text with a good comma so it can identify the error. AI systems also require human feedback. Although a lot of users select "ignore" for certain suggestion, for example, Grammarly's computational linguists and researchers made adjustments to the algorithms behind the suggestions to make them more accurate and useful.

Like humans, AI is not perfect all the time. This is particularly true when AI comes into novel scenarios. Because Grammarly is educated on organically

written language, it is quite effective at recognizing problems that come up as individuals write. This AI performs less well when handling phrases containing purposeful errors because intentional errors differ from naturally occurring faults in many cases.

E. Previous Study

The researcher reviewed four previous papers related to artificial intelligence, adaptive learning, and communication abilities. The first previous research was conducted by Garry White, 2020, of Texas State University in San Marcos, TX, USA, on the relationship between adaptive learning technology and students' learning outcomes. This study aims to compare adaptive learning technology (ALT) with conventional learning approaches in management information courses. The study investigated the relationship between ALT usage and exam or lecture grades. The results showed that there was no relationship between the use of ALT and exam or lecture grades. In any of the four final course grades, there was no difference between the group that completed ALT and the group that did not. LearnSmart®, the ALT group's choice, was considered the preferred learning style and provided user satisfaction. This is consistent with the findings of previous research. The similarity with this research is that both discuss the relationship between adaptive learning and student learning outcomes.

The second previous study is from Rusmiyanto, Nining Huriati, Nining Fitriani, Novita Kusumaning Tyas, Agus Rofi'i, Mike and Nurmalia Sari (2023) conducted research on the use of artificial intelligence in developing English language learners' communication skills. This research aims to study

the latest research and reviews on the use of artificial intelligence in English language learning. This literature review shows that artificial intelligence has the ability to improve students' communication skills in English by giving them a better experience. The similarity with this study is that both investigate the use of AI in English language learning.

The third previous study is by Wei Cui Zhen Xue and Khanh-Phuong Thai (2018) from Shanghai, China. This study conducted research on the performance comparison of an AI-based Adaptive Learning System in China. The major goal of the investigations was to further assess Yixue's impact on improving student learning and to identify the likely magnitude of such impacts, if any. The data obtained from this study was obtained through experimental investigation. The study found that Yixue's Adaptive Learning System produced greater results than classroom teaching by human teachers who are experts in math. This may be due to Yixue's exceptional granularity of knowledge points and intelligent adaptability. The similarity with this research is that both discuss AI-based adaptive learning in student learning.