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**The Role of Artificial Intelligence in Language  
Learning and Teaching: A Reflective study**

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## **Section One: Introduction**

Artificial Intelligence has a lot of impact on various aspects in technology, art, problem-solving and even encyclopedia. One of the aspects that Ai has affected notably is education. As now, people have started to use AI as a source of language learning for its ease of use and availability so do in teaching as well. Also, Artificial Intelligence has seen a huge step forward in the past decade in other areas rather than teaching and learning like medicine, business, language, accounting and many more which has a potential of replacing these jobs in the near future.

It is important to know the amount of impact that AI has now in language learning and teaching due to its popularity among students in all over the world. Thus, this study paper could help students and teachers be more aware about AI and how it can be exploited for learning a subject and get information to using it for solving homework and cheating which can cause laziness.

AI is a machine that thinks, understands languages, solves problems, diagnoses medical conditions, keeps cars on the highways, plays chess, and paints impressionistic imitations of van Gogh paintings. AI is often defined as a computer system with the ability to perform tasks commonly associated with intelligent beings (Tuomi, Ilkka, 2018: p.7). Language is the specialized sound-signaling system which seems to be genetically programmed to develop in humans (Jean Aitchison, 2010: p.14). Language teaching is the process of transferring the language with the phenomenon by the teacher to learners (Ahmed Faizin, 2015: p.70).

This study paper is divided into four main sections. The first section is Introduction. The second section is about theoretical background and literature review which include historical overview on AI in education, AI applications in language learning, benefits and challenges of AI in language learning and teaching and previous studies and research gaps are discussed. The third section is about experience and reflection that explain the experience the authors of this research has went to and the reflection which involves critically analyzing what have been mentioned in the experience. Lastly, the fourth section is concluding all what have been covered and the finding of this research paper.

## **Section Two: Literature Review**

### **2.1 Historical Overview of AI in Education**

Artificial Intelligence or AI is a machine or program that has the ability to think and perform tasks that is intelligent being related. There are many misconceptions that AI is a new trend that suddenly emerged in the past few years. However, that is not entirely true. Artificial intelligence has been around since 50s with the first AI program that was written back in 1951. It is important to note that the main purpose of the very first AI program was to teach computers how to play a game of checkers which let the computers play checkers in a good pace. After this significant achievement, it was important to understand and assess AI. The British mathematician and computer scientist Alan Turing started studying AI in the 1930s and in the 1950 he did his famous test called The Turing Test which aims to know the amount of intelligence and the capabilities of AI. Decades after, technologies started spreading across the globe and AI with it until they made their way to education field. (Lynch, 2023)

#### **2.1.1 Emergence of AI in language learning**

Language learning is the process of learning a foreign language in order to be able to communicate and understand. Back in the day, learning a language was a bit challenging for so many people due to learning a language needed textbooks, tapes, grammar exercises, courses, classroom lessons and dictionaries. Elinor Zucchet (2023) states that these methods often encounter challenges in engaging learners effectively, often perceived as “boring”. These requirements are called traditional methods of learning a language. After technology revolutionized the world, it also had a lot of impact on language learning in general. For example, multimedia resources like YouTube have a huge advantage for the modern method of learning a language. Learners can just watch a video about basic words and phrases of the Spanish language easily without getting bored or even need to pay. Also, applications like Duolingo serves a decent way to learn a language via playing games and answering questions in the target language. AI has also played a significant role in the area of language learning. Natural Language Processing (NLP) is the process of training computers to understand texts and voices humanly. As for computers

cannot understand human language, NLP is used to train computers or AI to comprehend human language. Instead of typing codes or programming, NLP uses text or speech which a lot of chatbots nowadays are based of this technique like ChatGPT or Gemini which can they can be used to talk to just like talking to a normal person. Of course, this helps in many aspects of language learning like the person can talk in various languages with the chatbot, they even can ask the AI to evaluate their language and correcting any mistakes with high precision. Moreover, chatbots are able to generate tests for assessing the person's foreign language, and they can even generate the test for any level of the language too. (Zucchet, 2023)

### **2.1.2 Key Milestones in AI Integration**

In 1956, 10 computer scientists gathered for a workshop about AI in New Hampshire. the aim of the workshop was to make a machine that behaves like a human being. This workshop paved the way of AI to be in the research discipline area. However, a lot of people discussed the idea of a machine being as intelligent or even more as a human. In the 17<sup>th</sup> century, Rene Descartes, a philosopher and scientist proposed the idea of machine being able to make decisions like a human being. In 1854, Gregore Boole established the Boolean algebra, one of the main components that is being commonly used in programing languages, proved that logical reasoning can be inserted systematically is solving equations. Means that machines can be trained to think and make decisions logically just like solving a math question. In 1912, the Czech author Karel Capez did the first ever mentioning of the word Robot which was used to define machines that do work or behave like humans. In 1929, the Japanese biologist Makoto Nishimura created the first robot that had the ability to change its facial expressions and moving its head and hands via air pressure structure. In 1950, a mathematician called Claude Shannon published an article about Programming a computer for playing chess which helped to train computers in playing a complex game like chess. In the same year, Alan Turing did his famous test (the Turing test) stating that a machine can deceive a human by making them think it is a human like them. The test was like that, a human and a machine having a conversation. And another human who is only responsible to tell which one is human and which isn't. As Micheal Wooldridge argues that if you can't distinguish them by any such test, then you can't claim they are different (2021:28). The history

witnessed the born of AI in 1955 by making an intelligent machine by the scientist John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon whom they made the term Artificial Intelligence. Herbert Simon and Allen Newell made the first ever AI program called The Logic Theorist in the same year too. Arthur Samuel is also an honorable mention for creating the term machine learning which defines as a branch of AI that let the programs to function intelligently. In 1961, the world witnessed the machines being in the factories as workers. General Motors company started the first industrial robots for making cars. The first ever chatbot which was called ELIZA was created by Joseph Weizenbaum in 1966. Also, ELIZA is considered to be the great grandfather of chatbots we have today like Alexa and Siri. In 1970, the first ever embodied robot was made called WABOT-1. In 1997, a computer chess program called Deep Blue had beaten the world chess champion Gary Kasparov. In the year 2000, the beginning of a new century the AI Kismet was developed by Cynthia Breazeal. Kismet was able to recognize and simulate emotions. In the same year, Honda company created ASIMO that had the ability to walk as fast as a human to deliver things to customers in a restaurant. In 2006 a new term emerged by Michele Banko, Oren Etzioni, and Michael Cafarella that states the ability to understand and read texts. In 2011, IBM's language question-answering called Watson was able to win and beat two champions of the famous TV game show Jeopardy. Also, Google's deep mind was able to beat Lee Sedol, the champion of the complex board game of GO. As it looks, AI had a lot of people developing on it and making it better decade after decade, with each decade a revolutionize development was demonstrated which indicates the significance and complicity of AI. (Wooldridge, 2021) (Anon, 2021) (Sarker, 2021)

### **2.1.3 Evolution of Educational Technology**

Since the revolution of technology at the half end of the 20<sup>th</sup> century and the beginning of the 21<sup>th</sup> century. Technology managed to enter every area of life like governmental buildings, hospitals, houses, hotels and etc. Also, it managed to have a much impact in the education area too, making teaching and learning process more diverse and easier. In the 80s, schools started incorporating computers into their classrooms. Although computers were very useful to do math or to write documents like word, there were huge drawbacks. The computers at that time were

extremely slow and only offered limited options. Upon that, using a computer was difficult as it had MS-DOT operating system which was only used by typing commands. In the 90s, the operating system Windows started replacing MS-DOT as it was much easier to use because of its interface. Students were facing less problems in using them in the classroom. The biggest impact came with the spread of the internet in 1996. Schools began adapting internet access in their building so that teachers and students could use it to access or gain information through a click. Moreover, the only negative side of computers at the time was the expensiveness of computers. However, computers were really useful as many websites and pages began to be uploaded and with it, the access of variety of information was easier. In the 2000s till now, computers were getting cheaper, stronger and easier to use alongside with the spread of laptops. Instead of just browsing the internet or writing a document, computers can be used now in programming which benefits the students who study in computer science or mathematics. And, because of computers, other forms of technology started integrating into classrooms like CD players and projectors. (Tapalaga, 2023)

## **2.2 AI Applications in Language Learning**

The artificial intelligence reached in various forms, one of them or perhaps the broadest form of AI is software like applications. Open AI is perhaps the company that revolutionized AI applications, with it many more companies followed the same path of Open AI by making their own special AI applications whether for chatting, generating images or even videos and music. Among them, chatting is much more relatable in the process of language learning due to it enhances the practice side of learning a language by talking or typing. Also, there is virtual language tutors that act as a virtual teacher to teach language through the phone's screen instead of attending classrooms.

### **2.2.1 Chatbots and Conversational AI**

Chatbots are programs accessed through a computer or phone. They are like Messenger or Viber but instead to chat with a human, it is used to chat with bots. Usually, the bots are overly advanced in understanding what the person says and responding to it. One of the best and most advanced chatbots is *ChatGPT* by OpenAI. ChatGPT can answer and perform any task by just

asking it a question or to ask it to perform a certain task. Also, it has the ability to write codes, generate images and even preparing PowerPoint slideshows in form of a code or, the person can just go and start a conversation with it about any topic they like without limitation. However, there are some flaws like ChatGPT requires a paid subscription, and the free version has a limitation of knowledge access as it can't get any information past 2022 at the date of preparing this research. There are also other chatbots without these flaws like Google Bard which is now called *Gemini* which has the same features ChatGPT provides but without the limitation of accessing knowledge. Moreover, these chatbots are extremely beneficial for language learning process as they are able to engage in talking, doing exercises, ask and answer question games, and even provide a test for assessing the learner's skills. There are also virtual language tutors that are made specially for language learners. (Zucchet, 2023)

#### **2.2.1.1 Virtual Language Tutors**

Virtual Language Tutors are teachers or instructors who teach language through online approach like *Skype* or *Zoom*. Instead of attending a classroom, the learners can attend classes with comfort in their homes, pauses the lesson or replay it whenever they want and save it on their computers to watch it later. Also, they can be real-time lessons too. However, there might be some lack of engagement between students or teachers, or poor internet connection can have a bad effect on the lesson. (Zucchet, 2023)

#### **2.2.1.2 Language Learning Chat Applications**

Learning a language through chatting is an efficient way to enhance practicing the foreign language. As smartphones and internet is widely available around the globe, people can download chatting apps and start talking in a digital world. There are plenty off applications and websites for chatting. The first one is *Hello Talk*. Hello Talk is a chatting and language exchange application made for chatting with strangers or experts to practice language via texting, voice messaging and even video calls. Hello Talk has over 18 million users worldwide. Besides English language, there are other languages for learners to practice like *Korean, French, Spanish, Chinese* and many more. The application is free to use but there are some limitations like only one language can be used to chat and learners must pay a monthly subscription in order to chat in



more than one language. *Tandem* is another app for chatting similar to Hello Talk. Tandem has a huge number of users and each user has their own reviews. These reviews determine how active, informing and fun users to use the foreign language with which might help a lot to choose whom the learner should chat with. It also has a free version and a paid subscription. The *Mixxer* is a website that serves the same purpose of the above examples. However, The *Mixxer* emphasis more on live video calling rather than just chatting as it benefits learners a lot in the practice of speaking area. The *Mixxer* connects with the learner's skype and they can immediately text other learners to plan a video call later. Although The *Mixxer* has a small user base, it is completely free to use and it can be accessed any time with even native speakers. One more language learning app that is not specifically for learning by chatting is *Duolingo*. *Duolingo* is the most popular app for learning a variety of languages for free by playing games like listen and repeat, listen and type, match the word with the picture and etc. (Parr, 2024)

### **2.2.2 Adaptive Learning Platforms**

Adaptive learning is a strategy for teaching a subject in classroom, online course of even workplace according to the needs of the learners. Mixing AI with adaptive learning can be helpful as AI can detect or select the perfect content for learning a specific language for example, as not languages are all the same and some of them might need different content and studying styles. Here are some of adaptive learning platforms. *Edapp* is a platform for microlearning, although it doesn't necessary teaches language for beginners, it provides variety of features like gamification and repetition. Also, it implements AI in asking and answering questions if the learner is stuck at a point, the AI can generate a solution or an answer for that specific question. *Knewton* is another platform that presents many options to assist educators like providing which section of the subject should be continued on and which shouldn't. Also, *Knewton* gets multiple information from the materials of the course to enhance learning and teaching by determining which content is effective and increases the level of the skill by the learners. There also many other adaptive learning platforms that provides same features but for a different price, or even extra features like *Adaptemy*. *Adaptemy* has Xapi feature which is a new technology that is widely used to track learner's experience. (Small, 2023)

### **2.2.3 Gamification and AI**

Gamification is involving game like activities and mechanics into non-game environment like classrooms. As the definition suggests, playing games in an environment that is not related to games. Gamification can be an important approach as it enhances the learning process by playing games and having fun, and being away from boredom. Gamification can engage learners to be more active and focused on a specific task by finishing the game and getting a reward. It helps to secrete the dopamine hormone which is responsible to give pleasure and happiness and might reduce stress and increases relaxation in the classroom. (Alexander, 2018)

#### **2.2.3.1 Gamified Language Learning Apps**

There are plenty of language learning apps on web and smartphones that presents different approaches for learning a language. One of the approaches that are getting more popular is gamifying. Many apps use this approach, here are some of them. *Duolingo* is perhaps the most famous and effective language learning app on the internet. It implements game mechanics into the learning process like write what you hear, matching, and unscramble the sentence and many more. Also, it sends a notification daily to continue practice, and it encourages the learners to use it daily by adding up their learning streak. Moreover, it contains many other languages all for free. The drawback is Duolingo does not emphasizes a lot on the basics like the letters and so on. The next app is called *Babbled*. Babbled is the full package of learning a new language, it teaches the basics, grammar, vocabulary and pronunciation beforehand. Babbled presents scenario like games, where the learner must ask or answer questions depending on the scenario. Babbled also does not strict the learners to continue on a course path, the learners can do and choose whatever game or activity they like. In addition, bubbled provides booking feature to live online classes with teachers, but it is expensive which leads to the babbled's biggest drawback. Unlike Duolingo, bubbled is not free to use as it requires a monthly subscription by 15 dollars per month. *Drops* is a vocabulary building app that teaches vocabulary using gamification. It provides many games like matching, connecting the letters, and even it teaches how to write letters which is a huge advantage to those who want to learn Chinese or Japanese letters for example. However, drops do not come up with speaking or grammar activities and like Bubbles it requires monthly

subscription by 13 dollars a month which seems a little high compared to Bubbles as it is full package language learning only for 15 dollars. (Hill, 2023)

### **2.2.3.2 The Role of AI in Gamification**

Developers used to make applications with standard user interface and pre-installed games for the learners to be familiar with what they learn, but there were some cons about this kind of app development, the app cannot determine if the learner needs more time and training in learning a subject or a language skill. But now, developers started implementing AI to make the activities more efficient. The AI will detect if the learner is facing difficulty in an aspect or a point in the subject. For example, Duolingo can detect if the learner is good at speaking and writing but bad in listening, so the app will show more listening games and making it harder each time the learner wins the game.

## **2.3 The Benefits and Challenges of AI in Language Learning**

The artificial intelligence revolutionized technology and many other aspects of life since its birth. Of course, this revolution has provided a lot of advantages to the process or the language learning area. With it, learners can exploit it to improve their learning pace. On the other hand, the artificial intelligence caused many drawbacks or disadvantages to the area of education in general.

### **2.3.1 Advantages of AI Integration**

AI can be said as a brain that constantly only learning and improving itself. So, it can do a huge assist in the process of learning a language. The AI can enhance language skills via many approaches considering the level and the ability of the learner. Also, AI is more accessible nowadays than ever. Anyone can download an app or use a chatbot to learn something new. Lastly, AI can provide objective and immediate feedback to the learner. These points determine the advantages of AI in which they would be discussed below. (Portakal, 2023)

### **2.3.1.1 Enhanced Language Skills**

Artificial Intelligence can improve the very four language skills reading, writing, speaking and listening effectively. AI can improve reading and writing by chatting with AI chatbots like ChatGPT or others. It can even recorrect mistakes and gives explanations why something is written wrong like a typo or even a grammar tense. Also, it improves reading too as the person is forced to read the responses from the AI carefully. And, if the person could not understand the response, the AI can simplify it easily. Not to mention that AI can make conversations about anything so the person or the learner wouldn't be bored. Same thing applies for speaking and listening. As Open AI released ChatGPT as standalone app on Android and IOS, people can download the app and make an account and talk with the Chatbot verbally too. The person can send voice messages to the chatbot and gets verbal responses from it. This feature increases the amount of practice of speaking and listening which leads to advance the two skills.

### **2.3.1.2 Accessibility and Inclusivity**

AI tools are more accessible now than ever. Anyone can go to the internet and use an AI tool for most of the needs. In the language learning case, there are tons of conversational AI and Chatbots that can be used to learn, solve and discuss language. Also, the conversations can be about nearly anything or according to the interest of the learner. Someone with an interest of sports or football can improve their language by making a conversation with AI about their favorite football player or club. Even debates can be arranged too.

### **2.3.1.3 Real-Time Feedback**

AI is a well-trained artificial brain that can answer and reply immediately to the messages from the learner it receives. It can detect mistakes and provide notes to clarify the mistake and how to avoid it next time. That is why it is preferred sometimes to use AI to improve language as AI also rarely misses, means most of the time the feedback is reliable.

## **2.3.2 Challenges of AI Implementation**

Many advantages Artificial Intelligence presents, but unfortunately many other dark sides it has. As nowadays AI is available everywhere. Many people can exploit it for bad things or for cheating. In this subsection the disadvantages of AI are shown.

### **2.3.2.1 Privacy and Data Security**

AI tools needs a lot of data so that it can function properly, including the user data too sometimes. There are two types of collecting data, direct collection and indirect collection. The direct collection is when the AI module is programmed to collect specific data from the user like the location of the user, the device they use and even the conversations. The Indirect Collection is collecting data through social media platforms like Facebook or YouTube. These data do include further information like email, password, date of birth and even credit cards. In addition, these important data can be stolen or being leaked by hackers and malicious software which can cause the users data to be shared publicly. (Sullivan, 2023)

### **2.3.2.2 AI-Related Bias and Equity**

As it was mentioned before, AI needs to access data in order to work. These data can be a reflection of society. If a society is still close minded about women working at jobs for example, then the AI will think the same. For instance, Amazon developed an AI program to hire new workers at the company, but the AI preferred to hire men more than women, not because the job wasn't appropriate for women, but the AI reflected the behavior of the employees whom were responsible for hiring. This proves that AI is exactly like a human mind as it adapts and learns from its developers or as its preferred to say, the environment. (Pittenger, 2023)

### **2.3.2.3 Teacher-Student Relationship**

AI can also have its own damages on the education field. AI can plant mistrust between teacher and students. Abdul Razzaq (2023) claims that AI might result in a lack of trust and between teachers and students if AI tools are used in a way that minimize the interactions between teacher and students or the role of the teacher. Students might cheat using AI chatbots in their daily tasks

or homework. In a result, the true potential of students might not even be shown. Also, the teacher won't be able to lead the class due to the lack of interactions from students whom did not study their task and just prepared it using an AI tool without understanding it. (Razzaq, 2023)

## **Section Three: Experience and Reflection**

### **Experience**

Artificial intelligence is created to serve humanity, and it can be a place of learning for students, artificial intelligence has been a good helper to talk to me and better recognize words and sentences and even interpret sentences and words if I do not understand. During my four years of study, it was a smart and quick friend to use in my studies. The first year our teacher gave us a report on a book, which was very difficult for me. I was able to learn how to write and prepare a report by myself. In the second phase, I had a seminar. 15 minutes before the seminar started, I lost my seminar file. In short, I resorted to artificial intelligence. ChatGPT was able to prepare a complete seminar for me in less than two minutes. It made it better than I prepared. I tried to learn German for a while. It was a good help to learn more. If I didn't understand a word, the chatbot would translate it for me and explain it to me in a scientific way. I made a Russian friend who didn't speak Russian. I wanted to learn Russian. Artificial intelligence translated every letter I wrote to him in Kurdish or English. AI can be used to travel when you travel to a country where you don't speak the language. Artificial intelligence helps in direct speech translation, although it has its downsides, but this does not mean that artificial intelligence is bad, but can be further developed for language learning that sometimes answers you wrong or gives you the knowledge to interpret sentences and words. It will make mistakes, which is unlikely. In the future, if it deviates from the boundaries, it may create its own language, which will be difficult or dangerous for everyone to use.

### **Reflection**

I had some mixed feeling about AI being involved not in learning a language particularly, but in the whole education field in general. AI sure helped us in many ways to understand some subjects and improve our language. However, many students used it completely to prepare homework which is unfair compared to those who struggled and worked hard to get the homework done. Surely, I was surprised about the capabilities of AI and how it can behave like humans. And here the problem resolves, it act like a human means sometimes it is nearly impossible to tell if something is AI generated or not. Recently, OpenAI made another AI

program that can clone any voice of someone near perfection. Despite the damages to the education field these AI tools cause, it even damages the society. Imagine if someone has a voice of you saying things you never even thought about. But in our case, AI have a potential to make teachers and tutors to lose their jobs as people would just access AI language instructors with their phone in their pockets. All in all, AI is a digital super brain that it should have boundaries or limitations so that it benefits the society rather than harming it.



## Section Four: Conclusion

In the end, a lot was discussed about AI and its effects on language learning and teaching in this research. It was demonstrated that AI is not a trend or something that suddenly appeared recently. As matter of fact, AI originates to past centuries, and how each scientist, mathematician and even philosophers had their mark on and about AI. It was discussed how AI effects on language learning and teaching or even the learning and teaching process in general. AI and technology in general sometimes positively affected the process of language learning and teaching by facilitating works. Learners for example can use AI chatbots to improve their language skills by chatting with them. And teachers can teach language without even having a place by teaching language online which is known as virtual language tutors. Moreover, there AI adaptive learning platforms that assist teachers to prepare a course for a class, taking into account the level and progress of the learners. In addition, there are many apps that provide learning a language without even having a virtual language tutor like *Duolingo*. Gamification is inserting gaming methods into another field. AI have also influenced the implementation of gamification into education and language learning. *Babbled* was one example of an AI and gamified powered language learning app with tons of features like grammar or speaking skills. Despite the accessibility of AI tools and language learning apps and how it is available for free, it is even easy to use. Although the idea of AI was presented centuries ago, it got its attention and serious development recently which of course have many pros and cons, pros like improving the language skills, its fast and accurate feedback alongside with its accessibility to cons like the risk of data leaks or hacks, stereotype behavior like mimicking the bad behaviors of a society to harming and planting mistrust between teacher and students. Finally, positively and negatively, the amount of impact of AI in language learning and teaching is undeniable, and the development of these effects on AI in the future is inevitable with all the help and hinder it carries.

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