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Artificial Intelligence (AI): A Review of its Uses in Language Teaching and Learning

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Artificial Intelligence (AI): A Review of its Uses in Language Teaching and Learning

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Abstract. The uses of Artificial Intelligence (AI) seems to be relevant in many fields nowadays due to its ability in providing a simulation of human intelligence processes that are handled by machines; in particular computer systems. This paper concerns with reviewing the uses of AI in language teaching and learning. In particular, it reviews the research on the uses of AI in its application in the learning and teaching of language. Qualitative research method; specifically content analysis, is employed as the technique to review the articles that are obtained from relevant databases. Findings from the study reveal that there are four (4) themes emerge in the uses of AI in relation to teaching and learning a language. The uses of AI for pedagogy, therefore, prove that its uses eases language teaching and learning.

1. Introduction

Artificial Intelligence (AI) is a system that will start to become visually invisible for multiple human tasks as it uses would become accustom like other technologies that are used in our everyday life. As a consequence, the dependency on AI, may be natural among human. It seems that in language learning and teaching, the term Computer Assisted Language Learning (CALL) gets a wider scope of meaning in its usage when AI is integrated in conducting classes [1]. In fact, with the relevant of AI in language teaching and learning, it may branch the term CALL to Intelligent CALL (ICALL) [2].

In terms of roles that can be explored by AI in language teaching and learning, one of it is it enables learners to speed up their learning of a particular language [1]. Learners are able to learn a language based on repetition of phrase patterns that show the relationships between words. An example of AI that is used for learning language is when a learner uses Siri; an operating system of iOS that is developed by Apple, to converse in English. This is especially relevant for learners of ESL (English as a Second Language) and EFL (English as a Foreign Language) [3]. More specifically, it helps the group of learners to improve their speaking; in particular pronunciation and listening skills.

Other AI technology that are commonly used nowadays are Google Now and Microsoft Cortana. The former is a search engine that is developed to listen and comprehend the command and queries of the users. The search engine opens up the most relevant webpage automatically following the voice command of the users. However, only users of Samsung Galaxy with its Android versions are able to



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use the AI [4]. On the other hand, Microsoft Cortana like the two (2) AIs previously discussed assist its users in making calls, sending messages, setting reminders, taking notes, recognizing music and many others [5]. Though Microsoft Cortana shares the same features of Apple's Siri and Google Now, its features in answering user queries are getting better in which it is able to track flights, add reminders for users upon their asking of directions – to name a few [6].

Despite that, the current review aims to identify the use of AI in the teaching and learning of language. Moreover, with the Fourth Industrial Revolution where technology is very much integrated in teaching and learning, AI is the technology that every educator needs to be exposed to. Using AI, it seems that the presence of a teacher nor the learning of language is necessary in spite of the fact that a machine is able to handle a class [7]. With its use, education can be more student-centered and, consequently, it leads to the empowerment of the learners.

2. Methodology

These sections explain the methodologies that are employed in the current review of articles. They discuss the research design in terms of sampling of the research articles, data collection procedures and data analysis procedures in synthesising the review of articles.

2.1. Research Design

The current study employs a qualitative research design; more specifically content analysis in finding the answer to the single research question that is formulated in the current study. Fraenkel, Wallen & Hyun [8] state that content analysis is the analysis of any written contents that are in textbooks, essays, newspapers, novels, magazine articles, cookbooks, songs, political speeches, advertisements and pictures. Having said that, the review of articles in this paper is derived from research articles as the researcher synthesises information relevant in these resources for the purpose of answering the question in point.

2.2. Sampling of research articles

The research articles that are gathered for the purpose of reviewing the uses of AI in teaching and learning of English; in particular discussions in 'Findings', are obtained from databases - Ebscohost, Science Direct and Scopus. Such is the eligibility criteria of the resources due to they are more reliable compared to using web search engines for instance Google and Yahoo. Moreover, the quality of the papers that are deposited in the databases are more guaranteed. Also, only research articles that are within five (5) years' time are selected as the samples of articles for the review. The reason being merely current research findings are discussed prior to understanding the uses of AI in language teaching and learning.

2.3. Data collection procedures

Four (4) steps are observed in collecting data for the current study. The first step is 'Determine relevant databases' in that selected databases namely Scopus, Ebscohost and Science Direct are chosen as to obtain the resources from. In the second step i.e. 'Scout relevant articles', articles that concern with the uses of AI in language teaching and learning are selected. Moreover, only articles that provide full papers are selected to be analysed. In step three, data synthesizing is carried out. Articles are read, comprehended and inferred to obtain the essence of contents that are written by researchers. Finally, in step four, themes are composed by which important and interesting data is identified [9]. The formulated themes are used to discuss the findings following the research question that is developed at the beginning of the writing this review paper.

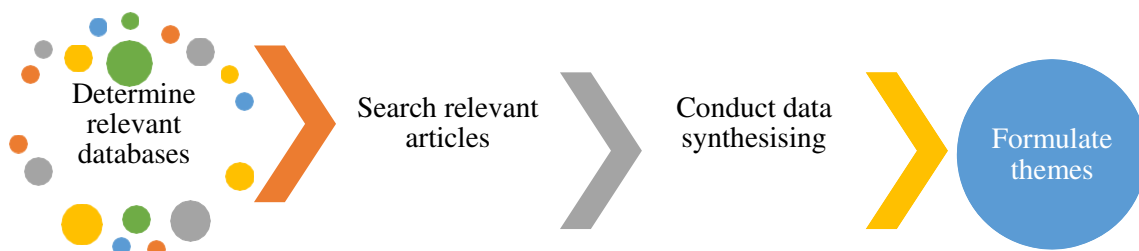


Figure 1. Steps in collecting data for the review of articles

2.4. Data analysis procedures

Five (5) stages are carried to analyze the research articles [8]. First, ‘Specify Unit of Analysis’ whereby the researcher determines phrases, words and sentences that may be typed in the database in her quest to find the relevant articles. Thesaurus is used to search the synonyms and definitions of the phrases, words and sentences. Second, ‘Locate Relevant Data’ in that relevant data from online databases is tracked down to find current research articles. Third, ‘Develop a Concept or Rationale’. In this stage, skimming, scanning, analyzing and synthesizing are performed as the researcher read the contents that are printed in the articles. Fourth, in ‘Develop a sampling plan’, Step 3 is merged with Step 4 through which the researcher exercises a random sampling in finding appropriate information prior to skimming, scanning, analyzing and synthesizing the selected articles. In carrying out this stage, she tries to immerse herself; ideally being sensitive and observant taking her time to process the data in the selected articles [10]. Fifth, ‘Formulate Coding Category’ takes place as she makes a critical link between the research articles she is reading with that of creating codes and categories. This task that is called memoing [11] as it requires her to summarize the contents of the research articles. The question, ‘What does the data says?’ lingers in her mind as she concludes the significant and relevant findings that are manifested from the empirical studies written by scholars. Figure 2 shows the data analysis procedures that are carried out in the writing of this review article.

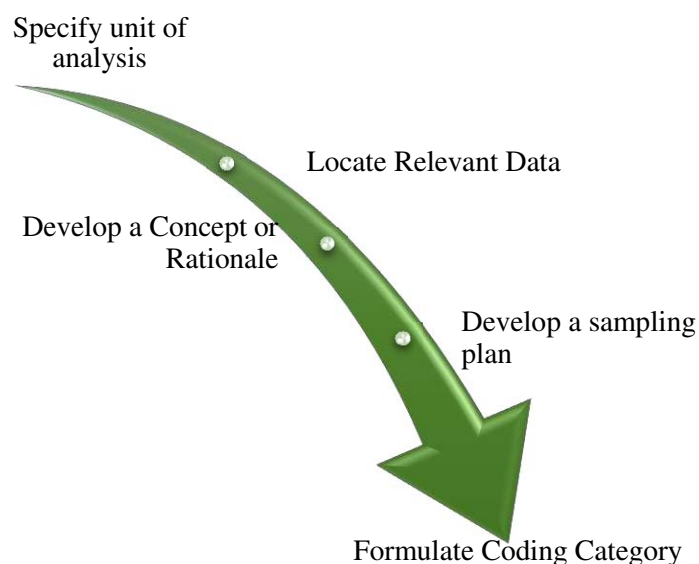


Figure 2. Data analysis phases for the review of articles

3. Research Findings

To recapitulate, the review seeks to find answer to the uses of AI in language teaching and learning. Four (4) themes are found in relation to the research question that is posted at the beginning of the review. These themes are:

3.1. *AI is used to recognize natural human speech*

The use of AI is able to assist researchers in developing natural language systems in that it helps to program more precise speech recognizing system [12]. In their study, AI helps to recognize oral communication that is demonstrated in people who are under stress. The experimental study employed small groups of subjects consisting of three (3) to 10 members. Their characteristics vary except that English is not their first language. Using AI in their study, it was found that the platform enables the researcher to identify the linguistics coping strategies that people develop when they are under stress due to physiological and psychological factors. Moreover, the use of AI in psycholinguistics is important as it can analyze the natural language processes in humans. Precisely AI in this regards can be programmed to become human-machine communication that is more functional, quicker and easier.

3.2. *AI amalgamate Flipped Learning Classroom for effective learning*

In the study that uses AI for the learning of English, its application is integrated with flipped learning approach [7]. Precisely, AI and flipped learning amalgamate in the blended classes and this combination provides many positive impact to the learning of the language. In terms of self-efficacy, it was found that students were more positive in learning English. This is true when students who were selected to be in the experimental group were more confident in their speaking than those in the control group. Likewise, students' listening skills in the experimental group outperformed those who were in the control group. Finally, it was found that students' extrinsic motivation was higher compared to intrinsic motivation in that the former factor i.e. determination to earn rewards, make students became more motivated to learn English rather than the motivation that was derived for the sake of merely performing the listening/ speaking activity.

3.3. *AI promotes efficiency and effectiveness in teaching English*

An analysis on the uses of AI found that English language teaching and learning can be improved with the use of the tool [13]. It helps practitioners in their teaching-related matter; more specifically in translation tasks. In the study, AI enabled practitioners of English to enhance listening activities as well as prepare students with native- like communication environment. In fact, it seemed that indirectly, the other two (2) language skills i.e. reading and writing can also be strengthen with the use of the tool. The researcher concluded that integrating AI in English teaching activities, enable students to interact and optimize their learning horizons. In fact, it may encourage positive development among the practitioners in their attempt to teach the language.

3.4. *AI is used for assessment of speech*

In a narrative writing concerning Web speech technology language learning application, it is found that AI is used in human conversation [14]. In other words, instead of using AI for human to talk to a computer, human now can talk through a computer. Previously, it was human-to-human communication when Computer-Mediated Communication is employed to communicate between one individual to another individual. Yet, with the use of AI, human are able to talk to machine akin to when they talk to a human. Daniels [14] further explains that Chatterbots or Artificial Conversational Ethics is one example of AI in that human are able to communicate through a machine. It holds intelligent conversation using a keyword matching technique. For instance, if a human asks the Chatterbots, 'What is your name?', the AI then will reply accordingly to the question based on the records of answers in its database. Hence, the assessment of speech can be made possible with the use of AI in today's world. In summary, Fig. 3 shows the overall themes that are developed after analyzing and synthesizing of articles are conducted.

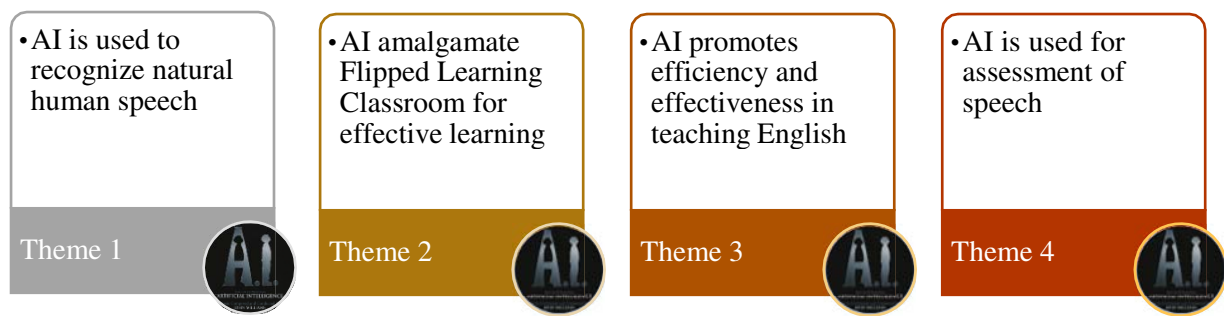


Figure 3. Formulated themes as findings for the review of articles

4. Conclusion

The purpose of the current reviews is to identify the uses of AI in language teaching and learning. This review has found that AI is a system that is used to understand natural human speech, able to incorporate flipped learning approach for teaching and learning of language, make learners become more competence and productive and able to assess human speech. Overall, the review strengthens the idea that AI is paramount in the language teaching and learning due to its various benefits. The findings will be of interest to educators who intend to integrate AI in their classrooms. Nonetheless, the study is limited by the lack of information on the uses of AI in other language skills namely reading and writing since the review of articles previously discussed concerns with its use in speaking and listening only. As such, a further review could assess the uses of AI for the two (2) skills to better understand its benefits in language teaching and learning as a whole.

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