

Artificial Intelligence applications to teach/learn English to the secondary level students

Dr. RAMESH PETTELA

ASSOCIATE PROFESSOR OF ENGLISH

PACE INSTITUTE OF TECHNOLOGY AND SCIENCES (AUTONOMOUS)

ONGOLE, ANDHRA PRADESH

dr_ramesh@pace.ac.in

As time passes on, machines are becoming more and more complex, fast-processing and intelligent. Being exactly like humans deducting, inferring and making decisions is still away, however some remarkable gains in the application of Artificial Intelligence (AI) techniques and machine learning have been recently recorded. Therefore, the current study seeks to examine strategies for effectively applying artificial intelligence (AI) applications to teach/learn English according to the secondary level students' point of view. The study adopts the analytical descriptive approach in order to study and analyze the literature, to describe AI and the strategies of its employment for teaching/learning English. It covers the following fields: AI strategies and its suitable applications for teaching/learning English, the effectiveness of these applications, their practical use, and the requirements for using them in the fields of teaching/learning English. The study has identified the training requirements from the study sample's point of view. A suggested plan has been envisioned that includes the basics, objectives, content, processors, and evaluation methods for the employment of AI applications in the field of English education.

English language teaching is considered an essential educational objective in terms of developing students' ability to globally communicate. English language learning is one of the necessary educational objectives at a personal, academic, and occupational level. It is dependent on the educational programs and methods that focus on building incentives and positive attitudes towards language learning, and employing skills in communicating, teaching and learning. The importance of using AI applications for creating written texts, developing students' skills in constructing sentences and building up texts, and practicing writing and reading skills. Along the same vein, added that employing AI applications help develop English language skills and language communication skills through intelligent dialog boxes. Language development processors are enhanced by a variety of intelligent sources, windows for dialogs and discussion,

intelligent tools for communication, programs that generate texts for reading, and programs that extract information from reading passages. Such props develop reading comprehension skills.

Artificial Intelligence as the abilities transmitted to computers to enable many performance systems to be smart and to resemble humans in their behavior. It is also defined as one of the fields of computer and information technology, which studies, designs, and develops computer systems that simulate human intelligence. Artificial intelligence (AI) is defined in the present study as the application of AI systems for teaching/learning English in order to develop the processes of organizing and selecting scientific content. It also diversifies learning sources and educational streams according to the learners' levels. In addition, it is employed to develop teaching strategies and evaluation methods by individualizing self-study processes, and simulating through smart and expert systems. Theoretical Background This section tackles the concept of AI, its justification, its applications in the field of education in general, and its applications in the field of teaching/learning English in particular. This is done in order to identify its uses in the field of teaching/learning English, its importance, and how it is applied.

The Significance and Justifications for Employing AI

Employing AI applications for education is a current trend in the field of experimental research. Studies refer to the diversification of AI education applications, which include programmed learning and other open source high technology. The importance of AI applications in education is determined by their ability to suit the needs and abilities of the learners, to work according to their educational preferences, and to monitor the progress rate of each learner. These applications contain tracks that suit all learners despite differences among their levels, boost their learning motivation, and cope with students' low levels of attention. They provide feedback that indicates student achievement levels and points of weakness and strength in the scientific content. They ensure that the curriculum subjects are integrated, that the parts of each subject follow logically, and that the learner has mastered one section before moving on to a more advanced one. The scientific content can be introduced in the form of problems, which the students work out according to their self-study streams. Instructors monitor this process and provide guidance and feedback. AI tutoring systems can replace instructors as they have programs that provide guidance automatically and enable learners to use self-study skills. AI moves education from a traditional form to an automated education, or education through smart interactive machines. It

employs natural language to produce new knowledge, and to boost supplementary educational tasks. AI applications can individualize tutoring and introduce varied educational models and streams in which languages are merged with fields of related knowledge. Thus, they offer students the chance to learn according to flexible streams that suit their different abilities and academic levels.

AI and Teaching English as a second language requires training in and practicing language skills. Since the opportunity to practice these skills in real life situations are often not available, students' chances of mastering these skills are diminished. Therefore, it is necessary to switch from traditional strategies to communicative ones, and rely on digital tools to face difficulties in teaching/learning English. Teaching English as a foreign language is regarded as an essential in modern life. The main aim of teaching English is to develop communicative competence, which is achieved through knowing how to use language elements and vocabulary to develop the skills of listening, speaking, reading, and writing. It also includes how to use language to produce texts, and how to use it to understand reading passages. The process of language development is based on communication as a goal and as a process. Therefore, using both traditional and digital communication strategies in the teaching/learning processes and activities is necessary. Thus, it is necessary to use AI applications such as simulation and communication programs as these simulate real life situations for conversation and communication in English, introduce practical training in language skills, and educational games based on language. Communication tools based on AI help design situations for practicing the accurate pronunciation of letters and words through sound drills and visual media. Such tools provide exercises for describing and interpreting images and everyday situations, for listening, and for practicing guided pronunciation. They also allow learners to practice language skills and provide feedback for guidance. Some programs have language drills that give training in communication through using language skills to guarantee that learners reach proficiency levels.

AI can be used to overcome many of the difficulties of teaching/learning English:

- Using Information Retrieval techniques to build the ability to comprehend reading passages.
- Employing Machine Translation to develop students' translation skills.
- Using Automatic Speech Recognition techniques to learn correct pronunciation.

- Using Text-to-Speech techniques for blind and visually impaired students.
- Using open digital language dictionaries to enrich the student's vocabulary.
- Using intelligent programs to augment speaking skills for English learners.
- Employing a writing evaluation technique to teach paragraph and essay writing.

History of AI

The Concept and Components of Artificial Intelligence (AI) and the History of Its Development Entering the 21st century has been accompanied by many radical changes in the educational system as far as learning inputs, processes, and outcomes are concerned. Smart machines as applications of AI contribute to changing the roles played by schools, teachers, and learners. They will also change the traditional and virtual patterns of interaction in the educational milieu. Both teachers and learners will be dealing with interactive machines in order to share educational experiences, and to achieve the required objectives. These machines will offer interactive educational platforms that conduct discussions with the students and respond to their questions and reactions. They will solve traditional classroom problems such as paying attention and motivation, care for individual differences among learners, and support those with special needs. They will also provide solutions to the problem of interaction in large classrooms, giving feedback, improving the levels of student achievement, and developing positive attitudes towards teaching/learning. All of these aspects will be directly and positively affected by employing AI applications in the teaching/learning process AI was recognized for the first time in 1956 by John McCarthy. At the time, it generated a considerable number of disputes and controversies around "Can machines think?" and the difference between human intelligence and AI was studied. AI is one of the modern computer sciences, which seeks developed methods of programming to achieve some tasks that simulate to some extent humans do in everyday life as it depends on simulating human intelligence. Theoretically, this science focuses on interpreting the concept of human intelligence, its patterns, and dimensions. It examines the mental abilities of the human mind in real life situations in order to simulate some of its skills and procedures. Then it translates these mental processes into computer equations used to solve complex problems. 'Expert Systems' is an AI branch that collects and analyzes data on human experiences in order to simulate and employ them in specific fields. These mental simulations are constantly developed by Expert Systems in accordance with the situations and problems to which people are

exposed while dealing with AI devices. This leads to boosting the educational process by producing the correct decisions.

AI Applications for Education

The main objectives of AI relate to simulating specific human processes and activities such as learning, thinking, and processing natural language through the technology of knowledge representation. AI applications vary, and that smart systems of online electronic learning are among the most important smart educational systems. These are the most significant applications of AI use in education. They are the outcome of merging many systems and applications in the field of AI such as:

- Intelligent Tutoring Systems
- Activating the Internet
- Activating hypermedia
- Activating distance E-education

These applications form an integrated network that can develop and update the education process at the levels of inputs, processes, and outputs. AI applications are characterized by interaction between learners and open sources and tools. They also merge real life and virtual reality in an attractive educational milieu and make it possible to use virtual labs. AI education applications are determined according to the following items.

- Natural language processing programs: These are associated with other programs and systems that can comprehend and generate language. The student interacts with the computer in natural language and the computer understands it.
- Machine programming: The student uses the computer to make software automatically in order to interpret or translate input data.
- Computerized man or robots: The robots can be used to carry out supplementary educational tasks in the school.
- The computer's ability to see through photo sensors. The computer can analyze pictures and drawings to recognize people and shapes.

- Computer games: These include competitive games that a learner can play against the computer.
- Expert systems: These enable students to build databases in specific fields, which can be used to resolve problems and analyze real life situations.
- Computer-based learning: Computers are used in the management of teaching/learning processes, giving instructions to students, and storing and retrieving educational experiences. All of this is implemented in a smart self-study environment.

AI Applications for Evaluation Processes

The importance of AI applications in analyzing and producing the results of student evaluation processes at the secondary and pre-secondary stages. AI makes it easy for instructors to measure their students' levels precisely, which is something often difficult to achieve. It enables university teaching staff to assess the level of the educational processors and determine deficiencies in the lectures, scientific content, and the educational material introduced to students. AI helps meet the needs of each student according to his/her abilities and needs by introducing home assignments and monitoring the scores obtained by each student because it has smart programs that identify the students' common mistakes, gives the instructors hints as to what the problems are, and introduces instant feedback in a file designed separately for each student. Furthermore, AI tools and programs can cope with classroom density. From the information above, it can be concluded that AI focuses on two issues. The first, the theoretical issue, relates to describing and interpreting mental processes and activities and representing human behavior in real tasks and situations. On the other hand, the second or applied issue, is concerned with employing smart tools and machines to represent human behavior. AI includes some applications that can generally be employed to perform educational tasks such as representing and storing knowledge, introducing varied models for student-student and student-machine interaction. AI can enhance the learning process with programs that translate accurately between English and Arabic according to modern dictionaries, which provide an accurate meaning of the vocabulary items according to their contexts. These programs can introduce some ideas about the reading passages, arrange words to make sentences and paragraphs, and use sounds to identify letters and words. They can identify word maps and link texts, pictures and sounds together.

References

- Ageh, K. (2019). When Artificial Intelligence Met Public Procurement: Improving the World Bank's Suspension and Debarment System with Machine Learning. *Public Contract Law Journal*, 48(3), 565–595.
- Al-Far, I. A. W., & Shahin, Y. M. M. (2019). The effectiveness of interactive chat robots to convey and instill the mathematical concepts in first prep year students. *The Arab Association of Education Technology*, 38, 541–571.
- Al-Farrani, L. A. K., & El-Hejaili, S. A. S. (2020). An educational scenario for using AI to discover the instructors' multiple facets of intelligence. *The Arab Institution of Education, Sciences, and Literature*, 11, 73–91.
- Al-Feqi, A. I. M. (2012). Management of the electronic educational situations designed by motivation and its effect on student achievement and supporting the trend to use AI and expert systems by education technology students (pp. 187–215).
- The 13th Scientific Conference: Electronic Education Technology – Current Trends and Issues: The Egyptian Association of Educational Technology. Cairo: The Egyptian Association of Educational Technology, Egypt.
- Al-Gayyar, G. A. N. M. (2013). Employing Artificial Intelligence for building educational websites as a prelude to the development of electronic university learning. *Future of Arabic education: The Arab Center for Education and Development*, 20(82), 501–510.
- Al-Omari, Z. H. Z. (2019). The Effect of using AI chat robots to develop the science subject cognitive aspects of primary stage female pupils. *The Saudi Association for Educational and Psychological Sciences*, 64, 23–48.
- Al-Qaissi, A. S. J. N. (2010). Using AI applications for developing the teaching/learning process. *Al Mansour University College*, 14, 37–58.
- Al-Shawabkah, A. A. (2017). The role of AI applications (Expert Systems) in making administrative decisions in the General Saudi Banks, Ta'if Governorate. *Ta'if University Magazine on Humanities*, 49(15), 13–59.

Al-Yajizi, F. H. (2019). Using AI applications to enhance university education in KSA. *Arab Educationalist League*, 113, 257–282.

Azmi, N. G., Mubariz, M. A. A., & Isma'il, A. R. M. (2014). The effectiveness of an electronic educational environment based on AI to solve the problems of maintaining computer networks of the education technology students. *The Arab Association for Education Technology*, 235–279.

Barnes-Hawkins, C. (2016). English language learners' perspectives of the communicative language approach. Doctor of Education, Walden University. Retrieved from <https://search.proquest.com/docview/1810440594?accountid=178282>

Blumenstyk, G. (2018, April 13). Can Artificial Intelligence Make Teaching More Personal? Chronicle of Higher Education, 1. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=131501744&site=ehost-live>

Boneau, A. (1993). Artificial Intelligence: Its reality and future (Ali SabriFaghali Translator). Alam Al-Ma'rifah series. The National Council for Culture, Arts, and Literature: Kuwait. Borge, N. (2016). White paper—Artificial Intelligence to Improve Education/Learning Challenges. *International Journal of Advanced Engineering & Innovative Technology*, 2(6), 10–13.

Calp, H. (2019). Evaluation of Multidisciplinary Effects of Artificial Intelligence with Optimization Perspective. *Broad Research in Artificial Intelligence & Neuroscience*, 10(1), 20–29. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=134949392&site=ehost-live>

Cassell, J. (2019). Artificial Intelligence for a Social World. *Issues in Science & Technology*, 35(4), 29–36. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=137577172&site=ehost-live>

Cautela, C., Mortati, M., Dell'Era, C., & Gastaldi, L. (2019). The impact of Artificial Intelligence on Design Thinking practice: Insights from the Ecosystem of Startups. *Strategic Design Research Journal*, 12(1), 114–134. <https://doi.org/10.4013/sdrj.2019.121.08>

Clark, M. (2018). Artificial intelligence for the general interest. The world summit report on AI for the general interest, The World Union for Communication, Genève, Switzerland.

Dickson, B. (2017). How Artificial Intelligence is Shaping the Future of Education. *PC Magazine*, 105–115. Retrieved from

<http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=125789751&site=ehost-live>
El-Sayed, A. A. R. (1994). AI applications and models of neuro-networks in different scientific and educational fields. Banha University, Faculty of Education, 5(15), 147–158.

Farghali, A. (1988). Computer linguistics and AI: potentials for application in computerized language learning programs. The Council of Scientific Publications, 8(32), 192–193.

Fleming, S. C. (2003). A comparison of artificial intelligence-based asynchronous internet instruction and traditional instruction in community college developmental algebra (Order No. 3083062). Available from ProQuest Dissertations & Theses Global. (305300515). Retrieved from <https://search.proquest.com/docview/305300515?accountid=178282>

Ge, X., Yin, Y., & Feng, S. (2018). Application Research of Computer Artificial Intelligence in College Student Sports Autonomous Learning. Educational Sciences: Theory & Practice, 18(5), 2143–2154. <https://doi.org/10.12738/estp.2018.5.114>

Ghazi, E. E. D. (2005). Artificial Intelligence: Is it a symbolic technology? Humanities and Social Sciences, 6, 43–81. Haupin, R. (2016). Improving receptive oral language skills of English language learners to enhance achievement in reading Recovery. Doctor of Education, Widener University. Retrieved from

<https://search.proquest.com/docview/1803233737?accountid=178282> Hennigan, T. A. (2000). Multiple intelligence and artificial intelligence: Educational implications of computers for learning interacting with multiple intelligences. University of Idaho. Available from ProQuest Dissertations & Theses Global (304624393). Retrieved from <https://search.proquest.com/docview/304624393?accountid=178282> Isa,

S. A. H. M. (2009). A suggested plan for employing electronic learning for developing some mathematical concepts for the deaf through AI processors (pp. 1–35). The First International Conference on Electronic Learning and Distance Learning. Riyadh: Ministry of Higher Education and the National Center for Electronic Learning and Distance Learning.

Kamel, E. B. K., Al-Jazzar, A. A.-S., & Mahmoud, S. (2010). Artificial Intelligence as a design variable of cooperative electronic learning and its effect on developing the cognitive achievement of educational situational designs by education technology students. Faculty of Education, 25(2), 212–257.

Kamuka, E. E. D. I. (2015). Artificial Intelligence in programmed Education. The Arab Institution for Scientific Counsel and Development of Human Resources, 49(1), 84–96. Lancaster,

F. W., Warner, A., Al-Tayyar, M. B. S., & Al-Shelail, T. I. (2008). Applications of AI techniques and expert systems in libraries and information services.

King Fahad National Library, 14(2), 394–400. Lapata, M., & Barzilay, R. (2005). Automatic evaluation of text coherence: Models and representations (pp. 1085–1090). In Proceedings of the 19th International Joint Conference on Artificial Intelligence (IJCAI).

Lotze, N. (2016). ChatbotsEinelinguistischeAnalyse. Downloaded from PubFactory at 01/11/2019 10:18:51AM. Lu, D. (2009). An artificial intelligence of expert system for college English teaching association. Beijing University of Chemical Technology. Available from ProQuest Dissertations & Theses Global (1870463615). Retrieved from <https://search.proquest.com/docview/1870463615?accountid=178282>

McMurtrie, B. (2018, August 20). How Artificial Intelligence is Changing Teaching. Chronicle of Higher Education, 1. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=131759498&site=ehost-live>
Moratz, R., Fischer, K., & Tenbrink, T. (2001). Cognitive modeling of spatial reference for human-robot interaction. International Journal on Artificial Intelligence Tools, 10(4), 589–611. <https://doi.org/10.1142/S0218213001000672>

Muhammad, N. S. E. (2014). Motivation applications in artificial intelligence. Unpublished M.A. thesis. Al-Neelain University, Khartoum. Mujahid, F. A. H. (2020). AI applications and the development of everyday skills for people with special needs

A future look. The International Institution for Future Horizons, 3(1), 175–193. <https://doi.org/10.29009/ijres.3.1.3>

Nechita, E. (2014). Teaching Advanced Concepts in Artificial Intelligence. An Experiment. Annals of the University Dunarea de Jos of Galati: Fascicle II, Mathematics, Physics, Theoretical Mechanics, 37(2), 132–139. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=113376227&site=ehost-live>

Qammourah, S. S., Muhammad, B., & Krosh, H. (2018). Artificial Intelligence between reality and the expected: A technical field study (pp. 1–19). The International Meeting entitled “Artificial Intelligence: A New Challenge for the Law”. Algeria: November 26–27.

Radwan, Z. M. (2017). Artificial Intelligence and its impact on development. ASBAR Council. Retrieved December 1, 2017, from <http://multqaasbar.com/index.php>

Raphael, N., Madoda, C., Baba, T., & Sindiso, Z. (2017). Exploring the Second Language Teaching Strategies of Ndebele English Teachers in Selected Secondary Schools in Zimbabwe. *Gender & Behaviour*, 15(2), 8626–8637.

Shabakah, N. S. E. (2012). Artificial intelligence and the logic of representing knowledge: The logic of multiple-component material. *Association of Faculties of Computers and Information*, 1(2), 19–33.

Walker, M., Stent, A., Mairesse, F., & Prasad, R. (2007). Individual and Domain Adaptation in Sentence Planning for Dialogue. *Journal of Artificial Intelligence Research*, 30. <https://doi.org/10.1613/jair.2329>

Wang, H., & Chen, S. (2007). Artificial Intelligence Approach to Evaluate Students' Answerscripts Based on the Similarity Measure between Vague Sets. *Journal of Educational Technology & Society*, 10(4), 224–241. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=27801061&site=ehost-live>

Ziegler, N. (2014). English language learners' epistemic beliefs about vocabulary knowledge. The University of Toledo. Available from ProQuest Dissertations & Theses Global (1773492386). Retrieved from <https://search.proquest.com/docview/1773492386?accountid=178282>