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Using Information Technology to teach English Language
การใช้เทคโนโลยีสารสนเทศในการสอนภาษาอังกฤษ

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Abstract

Nowadays the information technology has been a part of everyone's daily life. Everyone uses at least a single mobile device. Everyone spends more time on a cellular device than on watching television. Learning English in the current era, E-Learning is an important part of the teaching. E-Learning is a part of blended education which combines information technology with teaching English. There are definitely pros and cons. This paper shall apply the information technology toward teaching English language and shall explore its pros and cons.

Keywords: Information Technology; Natural Language Processing; English Language

Introduction

Information Technology (IT) is the use of computers to save or manipulate data in the context of a business achievement. Information Technology is considered a subset of Information and Communications Technology. Information and Communications Technology includes the network communication as well. Humans have been using information for a long time. (Beck & Sison, 2006, p. 21)

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Figure 1 Computer activity.

Note. From *ELearning Trends in 2021: Perspectives To Help You Reframe And Rethink Your Training Programs.* by Asha Pandey, 2021, Retrieved June 23, 2021, from https://elearningindustry.com/elearning-trends-in-2021-perspectives-to-reframe-and-rethink-training-programs

The role of a computer system consists of three main tasks: Input, Processing and Output (Ai & Litman, 2011, p. 12). The term is commonly used not only as a synonym for computers and computer network and computer communication, but it also refers to other areas of information technology and encompasses other information channels. Other information channels include devices such as television and telephones.

Several products or services in today's economy are associated with Information Technology. This includes computer hardware, software, electronics, semiconductors, internet, telecom equipment, and e-commerce. Based on the storage and processing technologies employed, it is possible to distinguish four distinct phases of IT development: pre-mechanical (3000 BC-1450 AD), mechanical (1450-1840), electromechanical (1840-1940), and electronic (1940 - present) (Eskenazi, 2009, p. 41).

Challenges

Using Information Technology to teach English language can a challenge. Information Technology can be applied to what's called Blended Learning. It refers to a mixing of different learning environments (Boyer, Phillips, Wallis, Vouk., & Lester, 2008, p. 42). Blended learning gives learners and teachers a potential to conduct an interactive learning (Aluisio, 2009, p. 45). This learning approach is sometimes referred

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to as Online Learning or E-Learning. It combines face-to-face instruction with computer-mediated instruction (D'Mello, Craig, Witherspoon, McDaniel, & Graesser, 2008, p. 67). E-Learning is conducted at every levels of education. At the university level, there are many study programs. There are Sunday programs, Saturday-Sunday Program, Weekday Program or sometimes Evening Program (Chi, VanLehn, Litman, & Jordan, 2011, p. 74). These programs are limited in teaching time. E-Learning or Online-Learning helps in terms of allowing students to study at home. Learners and teachers work together to improve the quality of learning and teaching. The ultimate aim of blended learning is to provide realistic practical opportunities for learners and teachers to make learning independent, useful, sustainable and ever growing (Dzikovska, Moore, Steinhauser, Campbell, Farrow, & Callaway, 2010, p. 13). Whether a course should be proposed as a face-to-face interaction, an online course or a blended course depends on the analysis of the competences at stake, the nature and location of the audience, and the resources available. Depending upon the cross-analysis of these three parameters, the course designer will opt for one of the three options. In the course syllabus, he or she will then have to decide which parts are online, which parts are offline? For example, there is a course of English as a second language where the instructor has reached the conclusion that all audio-based activities will take place in the classroom which all text-based activities will take place online. Online learning increases the options for greater quality and quantity of human interaction in a learning environment (Evens & Michael, 2006, p. 17). It offers learners the opportunity to be both together and apart (Eskenazi, 2009, p. 29). A community of learners can interact at anytime and anywhere because of the benefits that computer-mediated educational tools provide (Falakmasir, Ashley, Schunn, & Litman, 2014, p. 120). Blended learning provides a good mix of technologies and interactions, resulting in a socially supported, constructive, learning experience (Falakmasir, Ashley, Schunn, & Litman, 2014, p. 101).

However, there are also some weak points about Online Learning and E-Learning (Forbes-Riley & Litman, 2012, p. 123). There has been little evidence showing that a blended learning environment will really have tangible benefits as measured by levels of voluntary preparation of weekly work or performance on a final examination (Foltz & Rosenstein, 2015, p. 21). E-Learning can make students lazy and not eager to read as much material. E-Learning should be that students require more active involvement in the teaching/ learning processes with an emphasis on research and flexibility of approach. It evaluates the difference in student preparation and performance when a blended learning environment is adopted as compared to a traditional approach (Leacock, Chodorow, Gamon, & Tetreault, 2010, p. 100). Students are indeed given significant flexibility and autonomy in the blended environment (Glass, Hazen, Cyphers, Malioutov, Huynh, & Barzilay, 2007, p. 27). Flexibility is not just provided by the online components but also by the extended time in which students have to undertake various elements of the course (Heilman & Smith, 2010, p. 33). Further, it is the individual student's choice whether to attempt many assessment tasks, with the only prerequisite that they have to achieve an overall mark of at least 50 percent in the course and sit the final examination (Johnson, 2007, p. 122).

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Teaching English

Teaching English consists of four fundamental parts: listening, speaking, reading, In the traditional teaching, students are required to practice when they are in classroom. Learning in classroom has a limitation of time. With the assistance of computer technology, learning can be made with ease. Such limitation has been eliminated. Computer technology, such as the recorded video clip, can make listening easier and students can listen to the video clip at the convenience of their own home. Speaking can also be accomplished with many available computer programs to let students record their speaking and the evaluation can be made by the computer program immediately. There are many reading passages or stories available on the internet which students can practice at their own pace. The computer technology makes the learning borderless.

Natural Language Processing

One of the oldest language evaluations involves language assessment. Summative language assessment has typically involved evaluating student proficiency in reading, writing, or speaking as a first or second language. Work in language assessment uses Natural Language Processing to assess typed or spoken student artifacts with respect to linguistic dimensions(s). Syntactic analysis has been used to detect and potentially correct writing errors such as incorrect proposition usage for populations such as ESL or deaf students (Kumar, Rose, Wang, Joshi, & Robinson, 2007, p. 25).

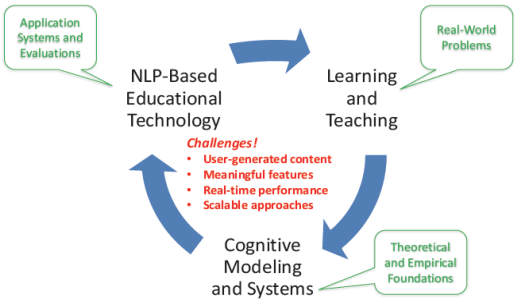

Figure 2 Typical NLP for education research lifecycle.

Note. From *Natural Language Processing for Enhancing Teaching and Learning* (p. 4171), by D. Litman, 2016, Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence (AAAI-16), 4170-4176.

Since standard “proofreading” tools do not focus on errors that are important for language learners, a grammatical error detection community has emerged to address this particular need. These are online tools, using the software to implement the grammatical errors. There is also an interest in exploring whether

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methods for detecting the errors of machine translation systems might be applicable to language learners (Kersey, Eugenio, Jordan, & Katz, 2009, p. 122). Semantic analysis has been used to assess the meaning of both essay-length and short-answer student responses with respect to reference answers, as in the shared task noted earlier and coarse grained levels of analysis (Loukina, Zechner, Chen, & Heilman, 2015, p. 29).

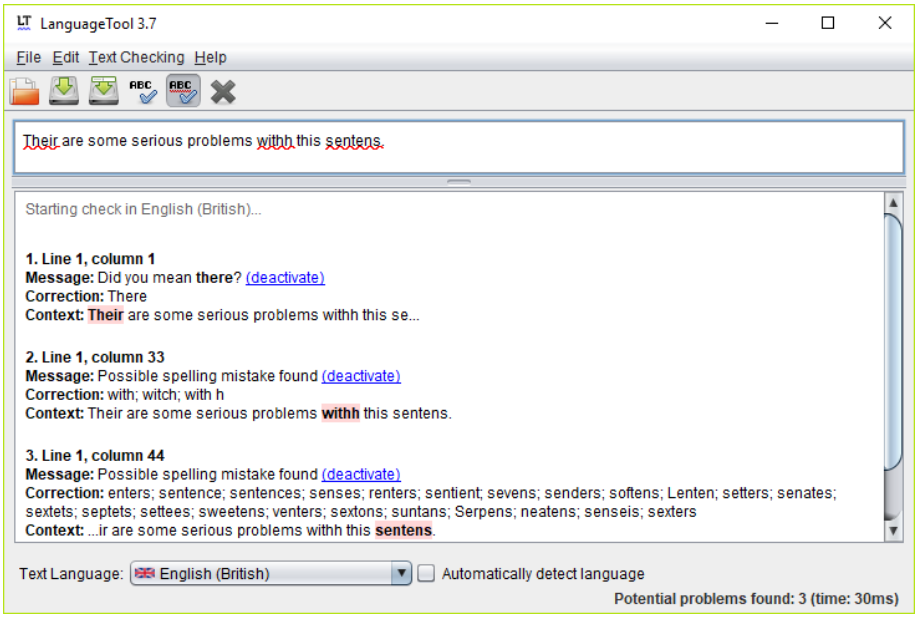

Figure 3 LanguageTool 3.7.

Note. From *A Multi-language Spell, Grammar, Style Checker,* by M. Williams, 2019, Retrieved June 11, 2019, from https://www.downloadcrew.com/article/35191-languagetool

Knowledge of pragmatics has been used to train non-native speakers in back channeling and culturally-dependent aspects of foreign language learning, while knowledge of discourse has been used to score the coherence of student essays (Leacock, Chodorow, Gamon, & Tetreault, 2010, p. 22). Evaluating essay can be a challenge as there are many ways to write an essay. Sometimes it is the writing style. Speech Recognition Software has been used in education to assess both reading and speaking proficiency. Spoken dialogue systems for teaching or assessing the speaking skills of second language learners have also been getting increasing attention. There are many speech recognition nowadays to gauge the speaking performance of the learners. Current instructional and assessment needs are pushing the field forward in a number of ways. Firstly, with respect to text, the types of assessment environments, writing tasks and linguistic skills being assessed are constantly expanding, which poses challenges for existing methods (Madnani, Burstein, Sabatini, & OReilly, 2013, p. 111). Many people believe that the automated scoring method of MOOCs is essential to MOOC success (Luo & Litman, 2015, p. 22). This has helped the expanding research from the analysis of writing generated during the time of standardized assessment to more classroom-oriented types

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of writing. In fact, there are some MOOC platforms which do use student peers rather than automated systems to grade writing due to concerns about poor reliability, full automated assessment methods are being explored. Even within the field of standardized assessment, a wider variety of writing tasks is being considered.

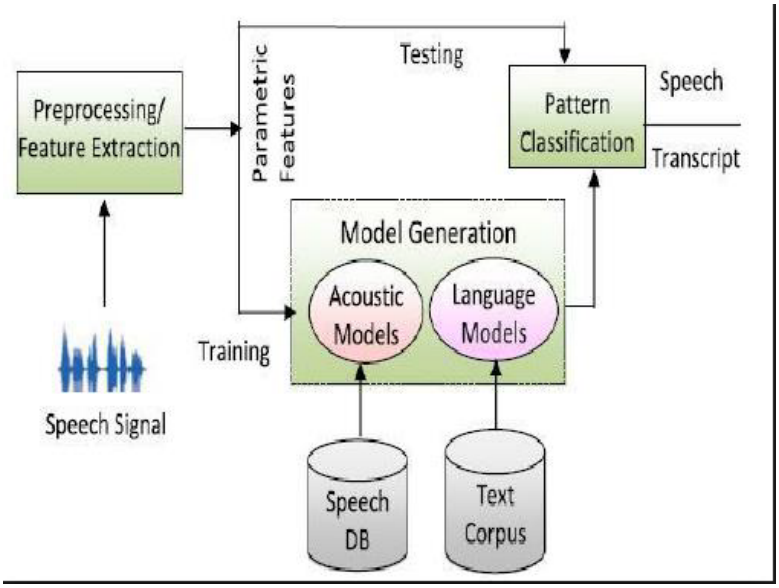

Figure 4 System architecture of for automatic speech recognition system.

Note. From "A Review on Different Approaches for Speech Recognition System (p. 24)", by R. R. Deshmukh, 2015, *International Journal of Computer Applications, 115*(22), 24.

There are indeed researchers to address the challenges, generated by such expansions (McGraw, & Seneff, 2007, p. 76). As a matter of fact, these researchers include modifying classic assessment methods to deal with noisier student inputs. In terms of speech recognition software, the needs of language assessment will likely require a modification of supporting technologies such as more speech recognition and more spoken dialogue systems. Language learners are more likely to speak with incorrect pronunciation and to use incorrect lexical and grammatical structures. That can in fact lead to an incorrect assessment (Miltsakaki & Kukich, 2004, p. 150). Language learning applications have properties such as user tolerance or pedagogical value of system errors that system designers can exploit to yield robust systems, at least from the speech and language perspective (Mitkov, Ha, & Karamanis, 2006, p. 11). Secondly, there is an increasing interest in developing systems that go beyond summative assessment to formative assessment and instruction (Mitchell, Evanini, & Zechner, 2014, p. 105), by moving from grading to feedback and tutoring, or by moving from error detection to correction. This poses challenges for existing research in several ways. Many assessment systems often achieve high reliability in replicating human scores by using only features that are easily computable. Using an easily computable assessment tool may not result in an

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accurate application's assessment (Nguyen & Litman, 2015, p. 52). To achieve validity as well as reliability, the dimensions of the rubric need to be well represented by the features used in the automated scoring system and the features should be irrelevant to the rubric. A system with validity has greater potential to generate useful formative feedback to students and teachers (Madnani, Heilman, Tetreault, & Chodorow, 2012, p. 71). While recent studies of the commercial educational technology systems suggest that some aspects of student can be improved after receiving formative feedback from an automated scoring system, much work remains to be done to improve the utility of such systems (Ng, Wu, Wu, Hadiwinoto, & Tetreault, 2014, p. 52). More technology needs to be more involved. More researchers are indeed needed to improve the assessment tools (Michaud & McCoy, 2006, p. 13).

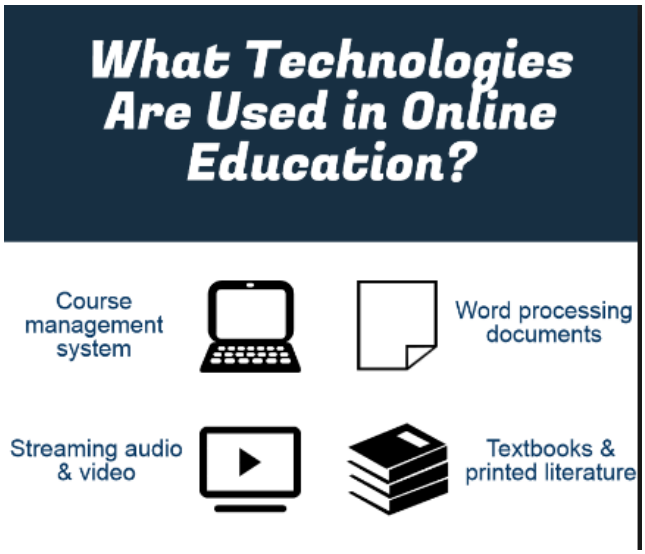

Figure 5 What technologies are used in online education?

Note. From *Technologies You Can Expect To Be Used In Online Education?*, by eLearners.com, 2019, Retrieved November 22, 2019, from https://www.elearners.com/ education-resources/what-technologies-are-used-in-online-education/

The computerized work in language assessment is largely focused on both the summative and formative assessment of argumentative dimensions of source-based writing. It provides opportunities for tackling many research challenges noted above. Essays written by students typically contain more grammatical and spelling errors. The challenges in modifying the computational techniques to be robust with such data, remains to be resolved. As mentioned above, more researches are indeed needed to expand the knowledge domain.

Considering the method of tutoring, it has been shown that students working one-on-one with human tutors often score higher than students working with computer tutors.

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Figure 6 Computer tutoring.

Note. From *How to Get Support with Assistive Technology,* by Trinity College Dublin, 2019, Retrieved November 10, 2019, from https://www.tcd.ie/disability/services/assistive-tech/how-to-book.php

One major noticeable difference between human tutors and computer tutors is that only human tutors participate in unconstrained natural language dialog conversation with other students (Paiva, Glenn, Mazidi, Talbot, Wylie, Chi, Dutilly, Helding, Lin, Trickett, & Nielsen, 2014, p. 121). This leads to the conjecture that human tutoring might be so effective because of its use of dialogue. In recent years, dialog-based intelligent tutoring systems have become more prevalent as one method of attempting to close the performance gap between human and computer tutors (Petersen & Ostendorf, 2009, p. 72).

Social Media

Assessing student linguistic inputs and serving as a medium of instruction can be extended to processing text and the individual speech in other ways which support students and teachers as well as researchers and system developers. Taking advantage of an increasing amount of electronically available text and speech, found in social media, personal blogs and websites is therefore advised.

The social media has many data which can be taken advantage of. It has been used to automate tasks that traditionally have required human efforts. By creating curriculum or assessment materials, these methods can be used to support fine-grained personalization of curriculum materials by automatically finding materials from electronic sources such as the website or blog that are particularly tailored to a student's reading level and topics of interest. These methods can also be used to automatically generate

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multiple-choice, exam bank, and online educational system or other types of test questions by processing texts in the subject domains. For students, it can also be used to help them better navigate text and speech-based course related materials.

Conclusion

This paper has presented a summary of computer-based teaching researches. Such research is motivated by addressing the needs for teachers and learners to depend upon the technology to ease the learning difficulties. Although education is arguably one of the oldest application areas, new phenomena such as MOOCs and big data have triggered an expansion of current interest in this area, as well as increased strong ties between researchers and artificial intelligence. In the future paper, the author plans to dig deeper in artificial intelligence which impacts the online teaching system.

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