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# Computational linguistics and its implementation in e-Learning platforms

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**Abstract.** We have experienced in the past few years massive use of various kinds of e-Learning methodology, such as m-learning and blended learning etc. Despite this ubiquitous implementation of these modern approaches, we still lack their proper use regarding their full exploitation in the virtual learning environment. M-learning platforms are ubiquitous, however, they lack the potential which is given to us from computational linguistics, deep learning, and artificial intelligence. The paper attempts to highlight this fact and brings this neglected topic to the attention of the creators and designers of these mobile apps because their potential is much greater and we should put our undivided attention to this issue if we want to improve the technology which we use.

**Keywords:** Artificial intelligence, computational linguistics, e-Learning, m-Learning, blended learning, corpus linguistics, natural language processing, deep learning

## 1 Literature review

In the past few years, we have experienced a vast increase in the use of mobile devices used for various purposes such as communication, learning, teaching, data processing, planning, etc. [4, 10, 14, 15, 17, 24, 26, 30, 35, 40]. Mobile devices are present and used every day and everywhere, regardless the society and culture globally [2, 5, 31, 39, 40, 43]. Traditional desktops have seen a decline recently and, on the contrary, mobile apps and tools have experienced a dramatic rise [16, 19, 28, 39]. The number of the users is increasing year on year in a dramatic pace, and all these aspects of modern society must be reflected by the professionals responsible for the development of the area of smart learning, e-Learning, hybrid learning, etc. [8, 18]

In education, this rise described above is very similar and follows the same trend [12, 13, 44, 45, 46], i.e. more and more people are using computers and smart devices on a daily basis [7], not only for basic communication with the tutor but as – potentially – a very efficient tool for educational purposes [11, 20, 21, 25, 27, 29].

It is mostly the young generation which cannot imagine its life without these tools of everyday life. Educational professionals and IT professional have a unique chance

to use this opportunity and implement these modern tools into educational process on a larger scale.

Despite all the facts, the topic of the use of artificial intelligence and computational linguistics in e-Learning is basically non-existent, not only in theory in academic papers but also in practice of the use of mobile apps. The opportunities of the use and implementation of computational linguistics and artificial intelligence are vast and it is a question why this topic still lacks attention of the creators of various online learning courses, i.e. e-Learning tools and platforms.

Naturally, there are many apps which have implemented the computational linguistics practice, deep learning and artificial intelligence, however, the trend in e-learning and m-Learning is still rather old fashioned, i.e. these platforms are still used more like repository warehouses for data and texts to be studied and don't use their full potential, i.e. information analysis through modern means of artificial intelligence. The possibilities are vast, however, still neglected, and this paper brings this topic into attention of the creators and professionals who are active in IT business and therefore responsible for the implementation of the modern tools into various technological aspect of human communication, interaction and learning [7, 23, 25, 27].

The efficiency of the use of e-Learning, m-Learning, blended learning, etc., has already been proven significantly [32, 33, 34] and it must be taken into consideration so that it is added to traditional approaches in educational processes [41, 42] and mostly in language acquisition of grammar and vocabulary [3, 22, 36, 37, 38].

The use of e-Learning tools is so ubiquitous in our universities and other educational institutions that it is complicated to acknowledge the fact that a systematic approach to creation of the courses is still missing and the implementation of artificial intelligence into these courses is still more or less non-existent.

## **2 Computational linguistics in e-Learning**

Computational linguistics has been used for decades, not only by linguistics but also by IT specialists, however, the massive use of this extremely useful tool is still expected and this paper is an attempt to urge this process. The use of artificial intelligence and computational linguistics in mobile platforms has been proven to be extremely useful in the learning process [1, 6, 9] as the student receives updated motivation based on their progress in the learning process.

Computational linguistics uses very efficient tools of data analysis which can be very beneficial when creating larger texts, assessing of the progress of students, creating more systematic approach to the learning process by analysing big data and using data mining so that the input is more optimised and the output more targeted to the current needs of the users of the app or mobile platform [23].

The most important use of these modern tools is in data processing based on the development of the situation, i.e. the progress of the information is important for further information processing. For example, if the students use a mobile platform, they are provided with the information based on their previous information processing - if the

student is tested and makes mistakes, they will be provided with the information which still contains the yet not acquired information until it is acquired properly. This beneficial tool supported by computational linguistics is simple, however, brings incredible progress if implemented in the learning platforms which are already in use.

When using computational linguistics and even artificial intelligence, we are equipped with the tools we never had available and these tools bring many opportunities to data processing and management that must be used and exploited as much as possible.

### **3 Research**

The research was conducted by the author of the paper into the use of any kind of artificial intelligence in e-learning platforms which are currently used in our universities, such as the Blackboard and Moodle. These environments are extremely popular both in the creators of curricula and the users, i.e. university students because they provide us with comfortable tools which can be used easily without the need to attend the classes physically.

The author of the research has access to both platforms (Blackboard and Moodle) because he is a teacher at two Czech universities which use both of them. The subjects varied but were mostly language classes (English and German), finance, and economics.

The research was qualitative and was conducted in January 2019. Data were collected by analysis and comparison of the online courses of the given universities. The author visited online courses as a fictitious student, the data were collected, and researched the contents and structure of the classes. The total number of the university courses which were researched was 46, equally spread through Blackboard and Moodle, from both universities which both have more than 15,000 students and are considered to be the major educational institutions in the Czech Republic.

### **4 The result of the research and discussion**

The research results are extremely surprising. Forty-six online university courses were researched, however, none of them uses any kind of artificial intelligence, deep learning or computational linguistics methodology. The most surprising is that even language courses did not use any of these tools.

The e-Learning platforms were used only as text repositories without any interactive environment which could be fostered by the use of computational linguistics and other kinds of artificial intelligence. Even the tests were just online tests without any interaction with the student based on their previous progress during their studies. Both platforms were used but not appropriately and it is also due to the lack of these basic tools in themselves. Neither Blackboard nor Moodle, even if they are used massively in our universities, do not provide efficient computational linguistics tools which would process the information and create an adapted course based on the needs of the users.

It is difficult to accept that in the year 2019 when artificial intelligence progress and computational linguistics findings are vast and unprecedented, we still lack any sign of this progress implemented in e-Learning, even if we know that the implementation of these basic technological tools for data processing would change the learning process positively and the progress would be enormous.

It is crucial to redesign all e-Learning courses with the use of artificial intelligence as it will move the traditional learning process a few levels higher compared to the current situation and it will also provide us with a dramatic improvement in our competitiveness. Big data and machine learning will also provide us with indispensable tools for data analysis which will help us to create more targeted and personally oriented webs, apps, tests, learning contents, etc. These are crucial improvements in the educational paradigm and IT professionals with the cooperation with educators are now fully responsible for this challenge.

## 5 Conclusion

The author of the paper claims that the use of electronic platforms with the implementation of computational linguistics and deep learning is not at all sufficient and is rather a misunderstanding of modern technological tools which equip us with so many opportunities. They are merely used as a classic pen and paper tests and simple electronic communication tools. If we do not move forward, both designers and creators of these course in favour of artificial intelligence and computational linguistics, we can never succeed and it will present a potential threat to our global competitiveness and sustainability.

The paper attempts to show the absolute lack of the use of artificial intelligence and computational linguistics in our universities e-Learning platforms and claims that it is one of the biggest problems in the further development of educational processes. It also ought to stimulate professionals who are in IT industry such as the creators of various apps and platforms to enhance the need to implement artificial intelligence into these tools.

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