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**The Potential of Artificial Intelligence in Higher Education**

*El potencial de la inteligencia artificial en la educación superior*

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Artificial Intelligence (AI) is seeping into many aspects of our everyday lives, with common internet applications, smartphones and even household appliances. Within education, AI is a rapidly emerging field and there is a strong potential for AI to greatly extend and enhance teaching and learning in higher education (Crompton et al., 2020). AI is defined as “computing systems that are able to engage in human-like processes such as learning, adapting, synthesizing, self-correction and use of data for complex processing tasks” (Popenici & Kerr, 2017). In the Horizon Report 2020 report (Brown et al., 2020), AI is listed as one of six technologies with the potential for high impact in higher education. The Horizon Report (2020), is an annual publication that examines the major trends in educational technology that are shaping global higher education. This paper will highlight some of the ways AI is supporting both students and faculty members

including bespoke learning, intelligent tutoring systems, facilitating collaboration, and automated grading. This is followed by a section on ethical implications.

### **Bespoke Learning**

For many years, scholars have advocated for learning pertinent to the individual learner. There have been many variations of this with individualized learning, differentiated learning, and the most recent, personalized learning. It is important for learning to be fit to the needs of the learner, not the learner fit to the needs of the system. One way that AI provides bespoke learning to students is in presenting content fitting for that specific learner. By observing a student's behavior in a course, AI systems are able to provide specific recommendations for reading material and activities.

### **Intelligent Tutoring Systems**

Adaptive AI systems, intelligent agents, intelligent e-learning systems, and intelligent teaching systems are all systems that suggest or provide learning materials based on what they have “learned” from the student as they gather information on the behaviors. It could be a level of questioning based on prior answering, or suggested reading material based on what the student has searched for before. Huang & Chen (2016) described the different aspects of intelligent tutoring systems in higher education as:

- 1) Student model: Information on the student's knowledge, cognitive level, learning motivation and style.
- 2) Teacher model: Analysis of students, strategies, and methods.
- 3) Domain model: The knowledge representation of teachers and students collectively
- 4) Diagnosis model: When the AI system evaluates mistakes and defects of the intelligent model.

## **Facilitating Collaboration**

Faculty members can spend a lot of time organizing students into collaboration groups and ways to instigate discussion. AI can be used for adaptive group formation to use great speed and accuracy to group students (Luckin et al., 2016). AI can use knowledge of the students to provide matched or differentiated groups depending on the learning need, as well as grouping students by interest. A time-consuming task for faculty in higher education is in reading and moderating discussion forums. AI systems can take on this role of examining the discussions and keeping the faculty member informed of students going off-topic or of misconceptions.

## **Automated Grading**

One of the most familiar uses of AI is in automated grading. This is going beyond multiple-choice tests to really harness the use of AI for grading more complex student text submissions. Essay scoring is a great benefit to faculty who can spend hours grading lengthy papers. The time saved can then be used for more one-to-one faculty and student interactions. AI Automated Essay Scoring Systems, such as CyWrite, WriteToLearn, and Research Writing Tutor, can be used to provide in-depth feedback and most importantly it can be used by students to examine ways they can revise a paper before handing it in for grading. These are empowering tools for students that can offer prompts for revisions as well as detailed tutorials to explain how those revisions should be conducted.

## **Ethical Implications**

With great power, also comes great responsibility. While AI has a strong potential for supporting both the learner and the faculty member in higher education, it is important to also consider what student information is needed to drive this intelligence. For AI to be powerful, it needs to collect information about that student to understand the cognitive level, as well as personal likes and dislikes. Faculty need to be cognizant of where that data is going and in keeping the student's data protected where necessary.

## Conclusions

AI has a vast potential to support teaching and learning in higher education. This paper provides a few examples of that potential, such as bespoke learning, intelligent tutoring systems, facilitating collaboration, and automated grading. Faculty members are encouraged to explore these new tools that will provide accurate, timely, support and content for students, as well as free time for faculty members to focus on students.

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