Chapter 1
Artificial Intelligence and Machine Learning in Higher Education

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ABSTRACT

Artificial intelligence and machine learning have the potential to address many of the problems that have emerged in higher education due the rapid and haphazard transition to online learning brought about by the coronavirus pandemic. These problems include students' struggle to self-regulate their learning, the increase in curriculum planning and administrative workload for teachers, and the loss of personalized interaction between students and teachers. This chapter explores how artificial intelligence can be used to help students and teachers to adapt to the new realities of online learning, and how these technologies could further transform higher education in the future. By providing more personalized, flexible, inclusive, and engaging learning experiences, artificial intelligence has the potential to re-invigorate students and teachers both and to make virtual classrooms more meaningful and productive.

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INTRODUCTION

Throughout history, education has been done face-to-face. This form of education has generally been successful, and it was a reliable method of teaching since teachers were able to monitor their students and analyze their progress on the spot. With the onset of Covid-19 in 2020, the education sector had to transition online for the safety of all parties involved. This transition has created many problems such as lower attention spans and increased procrastination. However, some issues could be solved with the use of technology, more specifically AI.

The majority of higher education institutions have been forced to rely almost exclusively on online learning management systems (LMS) to reach students, and due to the speed of change necessitated by COVID-19, their transitions to online learning have often been haphazard. Moreover, online LMS applications have often been overlooked in previous discussions of technology in higher education, with many institutions using them only as "simple repositories" for course material (Villegas-Ch et al., 2020, p. 2). But now that LMSs have become the primary—and in many cases only—way that students interact with their peers and teachers, it is crucial to reimagine the role that these online platforms play in shaping students' learning. If institutions are able to combine LMS and AI successfully, online education, and even education as a whole, can be personalized and improved.

Many online courses are presented as a static collection of weekly modules accompanied by asynchronous video lessons or tutorials. The intention with these courses is to allow students the flexibility of moving through material at their own pace. However, this course design isn't always the most effective for all learners and has been shown to result in high dropout rates and low academic effectiveness (Villegas-Ch et al., 2020). This model may have been appropriate when online LMSs functioned as a supplement to traditional higher education, but in their current application as stand-alone solutions, LMSs are not enough to support all learners through their education. But with the enhancement of AI, this type of teaching could be made just as effective as face-to-face teaching.

One exciting possibility for improving online learning is the development of AI based learning technologies. The global pandemic has already forced students to rely on technology for their education in unprecedented ways, and these technologies could be vastly improved by AI and machine learning algorithms. Virtual tutors and other AI-generated study aides could help students manage their coursework independent of any teacher intervention. AI could help teachers personalize a course curriculum for each student based on their unique skills and weaknesses. It could be used to develop more complex and engaging methods of student evaluation