



Research from the Office of RIDIL

The Use of Artificial Intelligence for Prediction Purposes in Higher Education

This white paper provides a summary of a section of the work from:

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Research Authors Bios

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Overview

There has been a rise in the capabilities and the use of artificial intelligence (AI) in higher education since 2016. AI is being used to conduct tasks and provide new types of information for higher education instructors, students, and administrators. One of those tasks is the use of AI for prediction purposes.

Purpose of the Research

The purpose of the research was to conduct a systematic review to examine extant publications on how AI has been used in higher education teaching and learning from 2016-2022. The main question of this study was: What are the applications of AI in higher education? One of the applications that was revealed is how AI is being used for prediction purposes in higher education and this is the focus of this white paper.

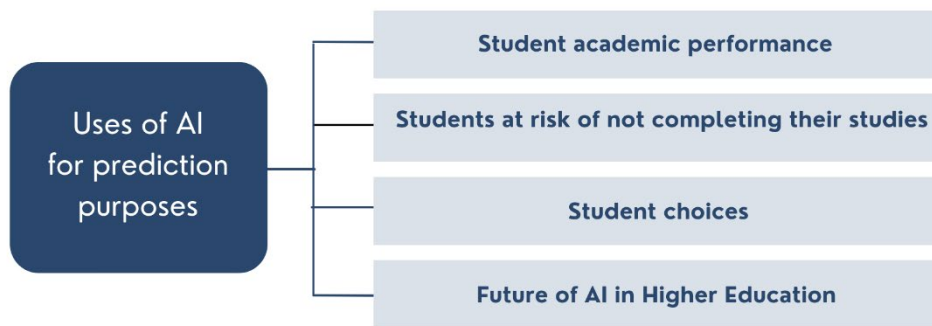
Method

A PRISMA systematic review methodology was used to determine the articles that would be included in this systematic review. Then a grounded coding approach revealed the trends in the use of AI in higher education. One of those trends was in the use of AI for prediction purposes.

Findings and Discussion

Predicting was found to be the third most frequent use of AI in higher education with 21 of the 138 original studies focused on the use of AI in higher education for prediction purposes. These purposes included predicting student performance, predicting students at risk of not completing their studies, predicting student choices, and predicting the future of higher education, see Figure 1. Many of the areas were often overlapping; however, each provided distinct affordances.

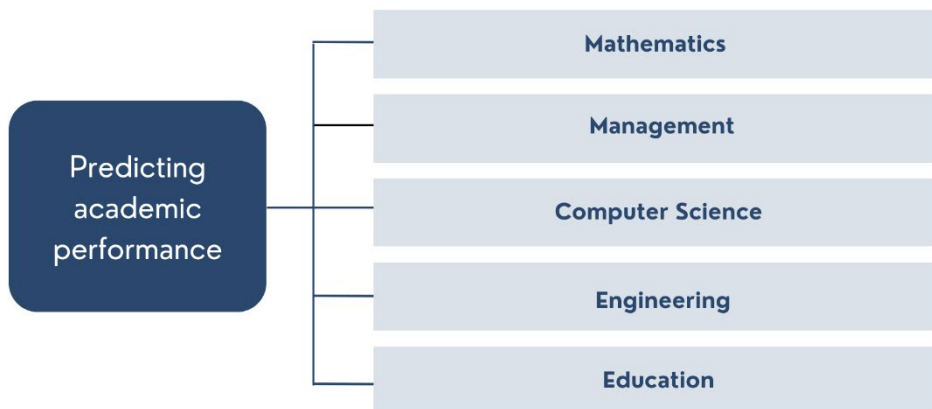
Figure 1. Uses of AI for prediction purposes



Uses of AI for predicting student performance

The most frequent use of AI was in predicting student academic performance. Nine research articles investigated how AI could be used to predict student academic performance and provide the opportunity to introduce timely interventions based on student profiles. This research was conducted in a variety of academic disciplines, see Figure 2. A study by Lu et al., (2018) used an AI system to identify students’ performance early in a calculus class. The results showed that students’ final academic performance could be predicted when only one-third of the semester had elapsed.

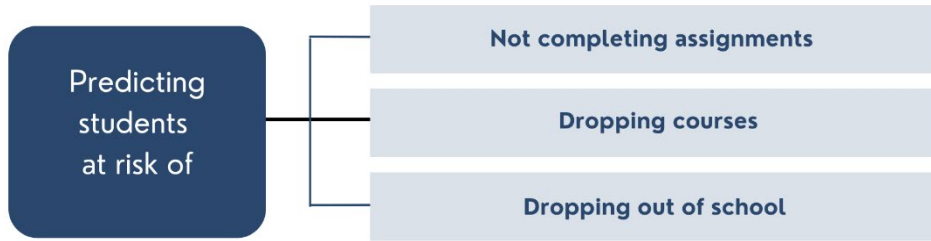
Figure 2. Academic disciplines where student performance was predicted



Uses of AI for predicting students at risk of not continuing their studies

The second most frequent use of AI was in predicting students at risk of not continuing their studies, see Figure 3. Four studies focused on this area. An example is the study by Qian et al. (2021). These researchers examined students taking a MOOC course. Qian et al. used AI to predict students’ future grades by inputting 17 different learning features, including past grades into an artificial neural network. The findings were able to predict students’ grades and highlight students at risk of dropping out of the course.

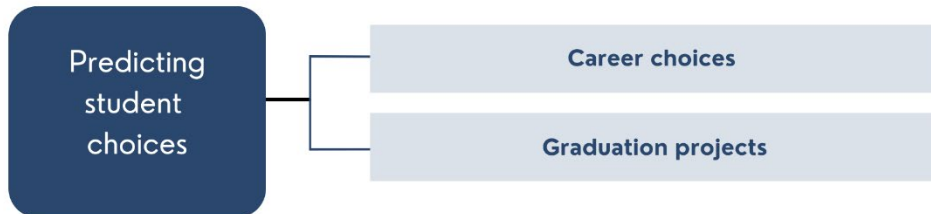
Figure 3. Predicting students at risk



Uses of AI for predicting student choices

Some of the other areas using AI for prediction purposes revealed in this study included predicting student choices, see Figure 4. One illustration is the study by Yang et al. (2021) who used predictive models to determine the career decisions of students by considering their demographics, mathematical ability, and overall learning performance.

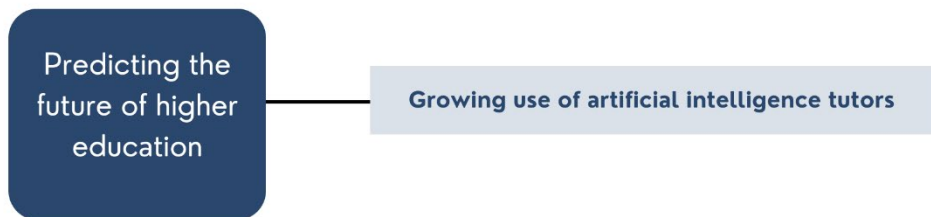
Figure 4. Predicting student choices



Uses of AI for predicting the future of AI in higher education

While the previous examples of the use of AI in higher education are used for predicting student behaviors, one final study (Hemachandran, et al. 2021) attempted to predict the future of higher education by analyzing the problems faced by faculty, students, changing government rules, and regulations in the educational sector.

Figure 5. Predicting the future of higher education



Conclusion

This systematic review of the state of the field regarding the use of AI in higher education from 2016-2022 revealed a variety of ways in which AI was used for prediction purposes. Some of these included predicting student performances, students at risk, student choices, and the future of higher education. As the use of AI in higher education grows, prediction will become a powerful resource to impact student success and increase the capacity of higher education to continue to be a significant force in the growth of human potential.

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