



Research from the Office of RIDIL

The Use of Artificial Intelligence to Support Learners 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 to assist or support learners in a variety of ways.

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 to support or assist learners in higher education. 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 to support or assist learners.

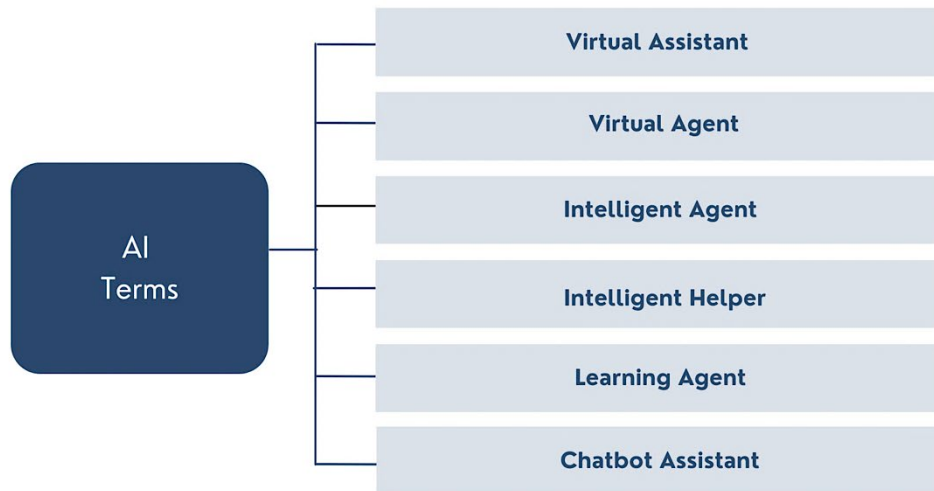
Findings and Discussion

The use of AI to support or assist students was found to be the most frequent use of AI in higher education, with 49 of the 138 original studies focused on the use of AI in higher education in this area. Types of assistance provided included supporting student performance, influencing effort regulation, providing learning hints, increasing accessibility and equity, providing out-of-class support, strengthening student outreach, increasing student autonomy through scaffolding, developing Q&A and self-test systems, providing feedback, offering persuasive intervention strategies, and furnishing conversational agents.

Terms used to describe assistance

Numerous terms were used to describe the assistance provided to students. Figure 1 show the six terms used in the articles.

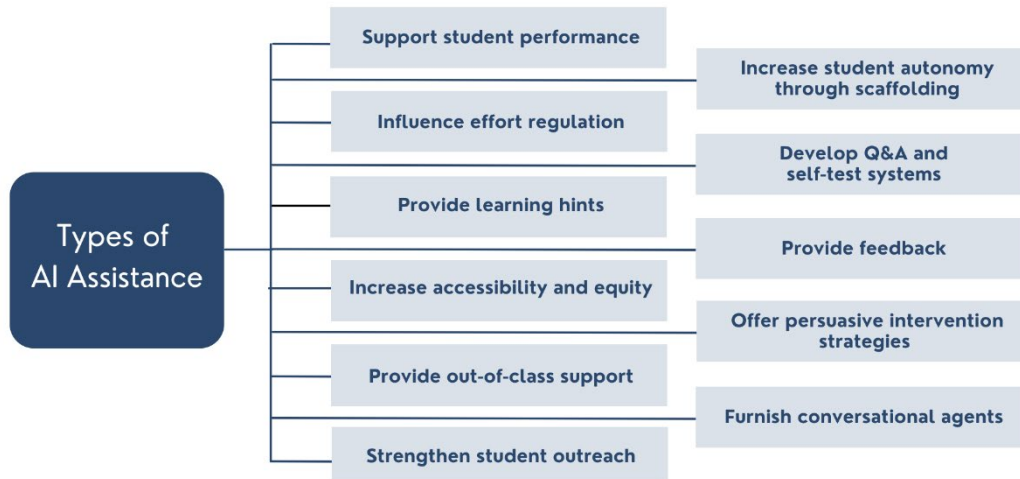
Figure 1. Terms used for AI Assistants



Types of assistance provided

This systematic review revealed 11 different types of assistance that were provided by AI, see Figure 2. Many of these assistants offered multiple supports to students, such as *Alex*, the AI described as a virtual change agent in Kim and Bennekin’s (2016) study. *Alex* interacted with students in a college mathematics course by asking diagnostic questions and giving support depending on student needs. *Alex*’s support was organized into four stages: 1) goal initiation (“Want it”), 2) goal formation (“Plan for it”), 3) action control (“Do it”), and 4) emotion control (“Finish it”). *Alex* provided responses depending on which of these four areas students needed help. These messages supported students to encourage persistence in pursuing their studies and degree programs and improving performance.

Figure 2. Types of Assistance Provided



The role of AI in providing assistance connects back to the seminal work of Vygotsky (1978) and the Zone of Proximal Development (ZPD). ZPD highlights the degree to which students can rapidly develop when assisted. Vygotsky described this assistance often in the form of a person. However, with technological advancements, the use of AI assistants in these studies is providing that support for students. The affordances of AI can ensure that the support is timely without waiting for a person to be available. In addition, AI assistance can consider aspects of students’ academic ability, preferences, and then decide the best strategies for support. These features were evident in Kim and Bennekin’s (2016) study using Alex.

Not all AI assistance to students occurs in the classroom setting. A study by Nurshatayeva et al. (2021) investigated whether the use of a chatbot’s outreach and support to college students reduced summer melt and improved first-year college enrollment. A chatbot was designed to nudge students with reminders relevant to required enrollment and matriculation processes and provided them with timely answers to questions. The findings from this study revealed that proactive chatbot outreach to students is most successful in reducing summer melt among first-generation college students, a population that is the focus of many universities.

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 to provide assistance or support to students. Some of these included supporting student performance, influencing effort regulation, providing learning hints, increasing accessibility and equity, providing out-of-class support, strengthening student outreach, increasing student autonomy through scaffolding, developing Q&A and self-test systems, providing feedback, offering persuasive intervention strategies, and furnishing conversational agents. The ability to personalize student learning experiences through AI will expand opportunities to increase student success.

References

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