



Research from the Office of RIDIL

The Use of Artificial Intelligence in Assessment and Evaluation 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 for higher education instructors, students, and administrators. One of those tasks is the use of AI for assessment and evaluation.

Purpose of the Research

The purpose of this 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 uses that was revealed was how AI is being used for assessment and evaluation. This white paper reports on those findings.

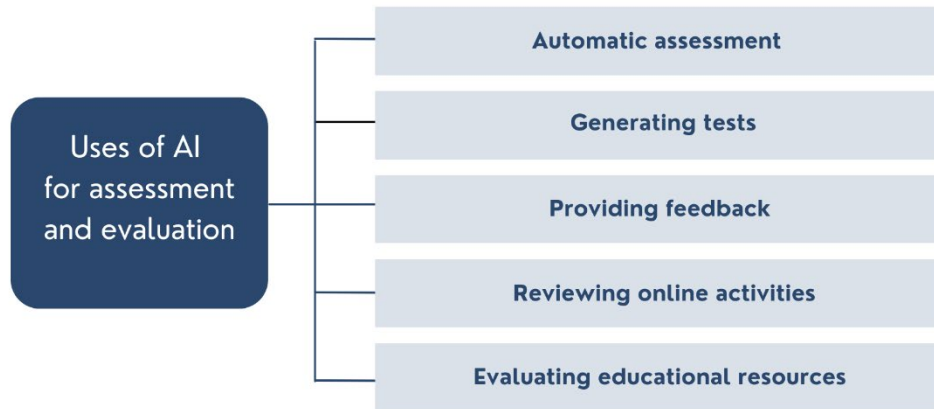
Method

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 assessment and evaluation.

Findings and Discussion

Assessment and evaluation was the second most common use of AI in higher education with 46 of the 138 articles focusing on this topic. There were five areas in which AI was used for assessment and evaluation are shown in Figure 1. These included automatic assessment, generating tests, providing feedback, reviewing online activities, and evaluating educational resources.

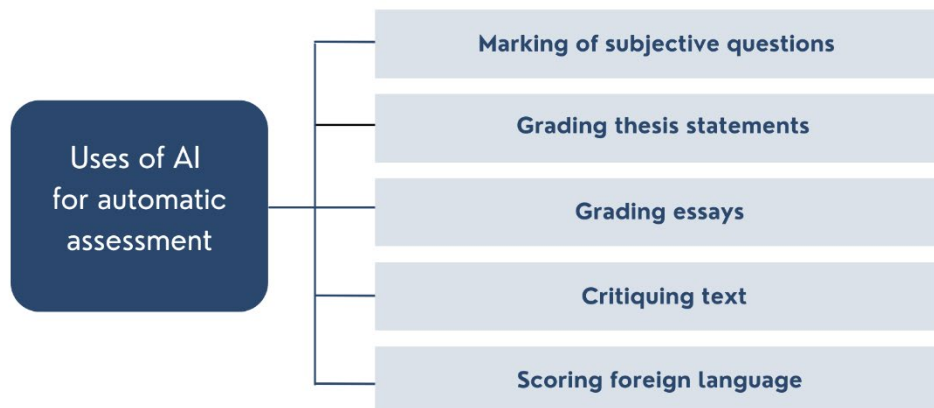
Figure 1. Uses of AI for assessment and evaluation



Uses of AI for automatic assessment

The most common use of AI in assessment and evaluation was in automatic assessment. Figure 2 presents the five areas in which AI was used in automating assessment. AI can reduce the time it takes for instructors to grade (Rutner, & Scott, 2022) and can be used for a variety of students with diverse needs. For example, Zhang & Xu, (2022) graded the essays of Uyghur ethnic minority students living in China using an automated writing assessment AI tool. Another study (Fu, et al., 2020) used an automatic scoring application that provides feedback and assessment on the pronunciation of Chinese foreign language learners.

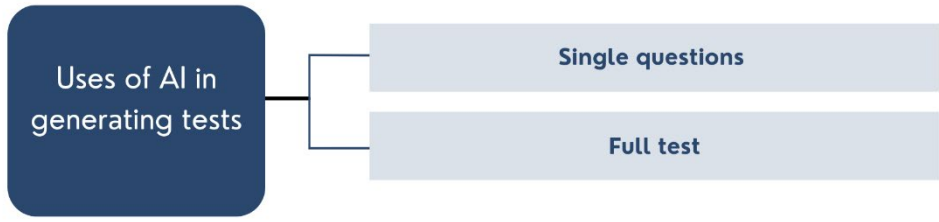
Figure 2. Uses of AI for automatic assessment



Uses of AI for generating tests

AI supports instructors in generating questions and creating multiple-question tests, see Figure 3. For example, Lu et al. (2021) used natural language processing to create a system that automatically created tests. These researchers found that AI technologies can generate highly realistic short-answer questions. The ability for AI to develop multiple questions is a highly valuable affordance as tests can take a great deal of time to create. However, it is important for instructors to always confirm questions provided by the AI to ensure they are correct and that they match the learning objectives for the class, especially in high-value summative assessments.

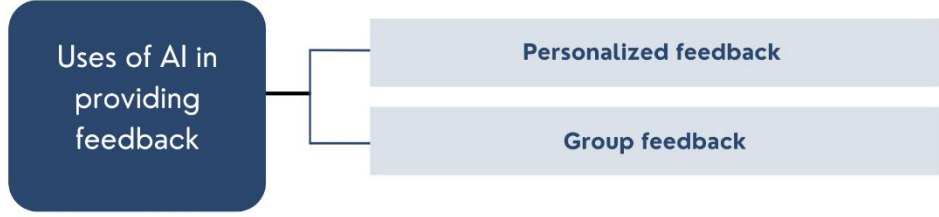
Figure 3. Uses of AI in generating tests



Uses of AI for providing feedback

Providing both personalized and group feedback was often used in the AI studies, see Figure 4. Mousavi et al. (2020) developed a system to provide first-year biology students with an automated personalized feedback system tailored to the student’s specific demographics, attributes, and academic status. As AI can analyze multiple data sets involving a variety of different students, AI can also be used to assess and provide feedback on students’ group work (viz., Ouatik et al., 2021).

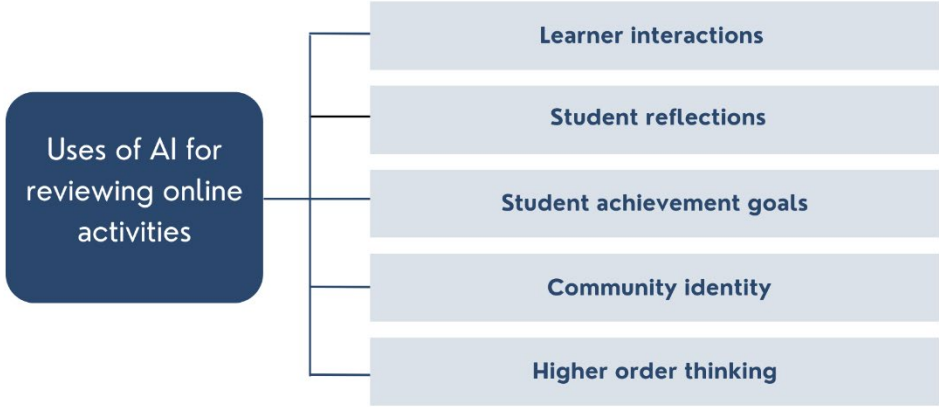
Figure 4. Uses of AI in providing feedback



Uses of AI for reviewing online activities

As online learning becomes a more prevalent method of learning, it is important to assess and evaluate the online learning activities that students are engaged in. In our study, we found five uses of the use of AI to review online activities, see Figure 5. For example, a study by Liu, et al. (2020) investigated learner interactions to better understand how collaborative learning occurs in asynchronous online discussions. Another study (viz. Huang et al., 2021) explored the relationships between achievement goals, online community identification, and student reflection, to assist instructors in improving pedagogical strategies.

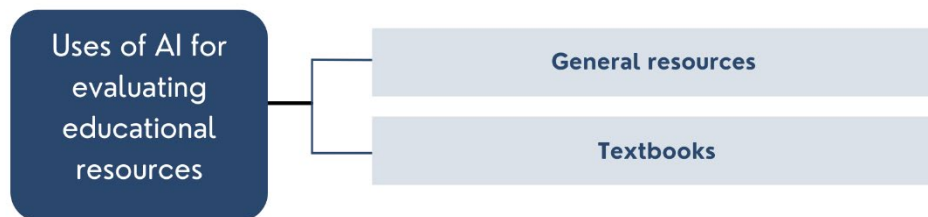
Figure 5. Uses of AI for reviewing online activities



Uses of AI for evaluating educational resources

Three studies used AI to evaluate educational materials, see Figure 6. This included evaluating general resources and textbooks (viz., Koć-Januchta, 2022). It is interesting to see the use of AI for the assessment of educational products, rather than educational artifacts developed by students. While this process may be very similar, this use of AI provides another tool for instructors to use.

Figure 6. Uses of AI for evaluating educational resources



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 assessment and evaluation. As assessment and evaluation are critical components of successful student learning and an important faculty skill, the use of AI in this area plays a critical role in higher education.

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