


Chapter 7

Advancing Inquiry– Based Learning Through Generative AI–Enabled Assessments

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ABSTRACT

This chapter explores the transformative impact of generative artificial intelligence on inquiry-based learning in educational assessment. Generative AI technologies have revolutionized traditional assessment methods, enabling dynamic, individualized learning experiences that meet individual student needs. By harnessing the power of artificial intelligence, teachers can create assessments that promote critical thinking, conceptual understanding, and deeper engagement with content. The chapter begins with an overview of the theoretical foundations of generative artificial intelligence and its integration into educational frameworks such as constructivism and technology-enhanced learning. It discusses practical applications of artificial intelligence in creating dynamic assessment environments. Examples include tools like Knewton and MATH from Carnegie Learning, which adapt learning methods based on student performance.

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INTRODUCTION

The advancement of technologies has emphatically transformed educational paradigms into different phases of education by consistently incorporating high technologies in the dissemination of knowledge and assessments. One of the more recent exciting technologies is generative AI. One category of AI is generative, which implies creating new content from given materials, and has shown great promise in a wide range of disciplines, including the assessment of students' knowledge. It can be observed that where traditional approaches to the assessment of students' performance have previously entailed a stereotype and rather rigid set of measures that include examinations, there has been a gradual shift toward more dynamic and individual approaches made possible by the algorithmic use of machine learning (Cheng & Wang, 2023). The skills of generative AI enable the creation of assessments that not only avert the formalized approach but also are closer to the learning style and requirements of the learner. Such a transition from a more generalized method to a more specific approach may improve the prognosis and prediction quality. Another advantage that is typical of generative AI is that it can select or create questions and scenarios or problems that may be based on the responses given and performance of the learner, so that it will be easier to develop a more extensive assessment of a student's grasp and proficiency (Ding & Choi, 2024).

Furthermore, by employing generative AI in assessments, the inclusion of realistic problems and cases in the evaluation procedure is possible, thus making the assessments more interesting and real life oriented. This is in accordance with the trends of the current day learning outcomes, which include analysis, synthesis, and evaluation, and the disposition to use ideas and concepts in various circumstances. In addition, since generative AI enables continuous and adaptive assessment, educators can obtain a more comprehensive consequence of a student, his or her strong side, and the points of weakness, which helps to choose the right approaches to improve the situation. Blending Generative AI into the Inquiry-Based Learning Settings. Therefore, the concept of IBL is educational learning that focuses on the learning abilities of a learner in posing questions, searching for, and discovering meanings in a certain concept. Credited to a cross between behaviorist and cognitivist theories, this pedagogical method ensures that students master as many concepts as possible in their areas of specialization, besides developing skills, including critical thinking and creativity, as well as values such as teamwork. The convergence of AI in IBL learning environments makes it possible to improve educational results by offering more interactive, student-centered, and facilitative learning (Cheng & Wang, 2023). Thus, one of the essential areas in which generative AI contributes to IBL is the development of individual learning sequences. This is specifically true as students are working on enquiry-based learning undertakings; it is possible for

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