AI IN EDUCATION AND STUDENT ASSESSMENT

AIEdutrack: AI-Based Student Assessment and Progress Tracking Application – A Literature Review

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Abstract

Students today use digital platforms to access study materials, practise questions and check their learning progress. However, these activities are often managed through different platforms, which can make learning and classroom management less convenient. This paper reviews research on the use of Artificial Intelligence in education, focusing on student assessment, automatic question generation, personalized learning and learning analytics. The reviewed studies discuss techniques such as machine learning, deep learning, natural language processing and large language models. They explain how these techniques can support learning analysis and the preparation of assessment questions. The studies also highlight challenges related to question quality, data availability and the need for human review of AI-generated content. Based on this review, the paper presents AIEdutrack, a proposed application that brings PDF-based study materials, flashcards, quick tests, live quizzes and result tracking together with classroom features. These features include class creation, notes, assignments and announcements. The application also aims to support AI-assisted quiz generation. The proposed system requires further testing in an actual educational environment to evaluate its usefulness for students and teachers.

Keywords: artificial intelligence; student assessment; learning analytics; automatic question generation; e-learning; classroom management

1 Introduction

Digital tools have become an important part of modern education. Students use online platforms to access study materials, watch learning videos, practise questions and check their results. These tools support learning, but classroom activities and study resources are sometimes managed through different platforms. As a result, students and teachers may need to use multiple tools for their regular academic activities.

Artificial Intelligence (AI) is being explored as a way to support different educational activities. Machine learning techniques can analyse patterns in educational data. Natural Language Processing (NLP) and Large Language Models (LLMs) can assist in preparing questions from learning content. Learning analytics can help teachers understand assessment results and students' learning activities.

Automatic question generation is one important area of educational research. It focuses on preparing questions from text and other learning resources. Another area is student assessment, where researchers study different methods of evaluating students' understanding. Research on personalized learning explores ways to provide learning materials and recommendations according to students' learning needs.

This paper reviews research from these areas and discusses their relevance to AIEdutrack. AIEdutrack is designed as an integrated platform for students and teachers. It includes PDF-based learning materials, flashcards, quick tests, live quizzes, result tracking and classroom management features. Teachers can create classrooms, share notes, upload assignments and post announcements. The application also aims to support AI-assisted quiz generation. The proposed system requires implementation and further testing to evaluate its usefulness in an actual educational environment.

2 Literature review

This section summarizes research related to student performance, personalized learning, automatic question generation and assessment.

2.1 Research on student performance and learning analytics

1. **Zhang et al. (2024) [8]:** Zhang and the other researchers combined an educational knowledge graph with collaborative filtering to estimate student grades. Their approach uses links between learning concepts and student information. The study shows one way educational data can be used to study academic results. Its findings should be checked on larger and different student datasets before being applied more widely.
2. **Qin et al. (2023) [9]:** Qin et al. studied an early-warning approach that uses both subjective and objective information about students. They used neural-network methods and cost-sensitive learning to identify students who may need academic support. The approach depends on having suitable and reliable student data.
3. **Khan et al. (2023) [1]:** Khan et al. examined machine-learning methods for analysing student performance from Learning Management System (LMS) activity logs. The study considered information such as resource views, gaps in activity and earlier academic results. It shows that records from a digital learning platform can be useful for analysis. However, the quality of the results depends on the LMS records that are available.
4. **Alhazmi and Sheneamer (2023) [11]:** This study looked at early prediction of student performance in higher education using educational data mining and machine-learning methods. It considered information such as admission scores and early course results. The work shows how academic records can be used to identify performance patterns, although the analysis is limited by the input features selected for the study.
5. **Chen et al. (2023) [2]:** Chen et al. proposed a student-performance prediction method that combines relationship-matrix techniques, Louvain clustering and a hybrid neural network. The paper reports an accuracy of 93.1% and an F1-score of 90.45% on its dataset.
6. **Rizwan et al. (2025) [13]:** Rizwan and co-authors reviewed research on factors linked to student academic performance and engagement in Massive Open Online Courses (MOOCs). Their review discussed demographic information, student behaviour and learning activities, along with the use of deep learning. Since the review focuses on MOOCs, its findings may not apply in exactly the same way to every college environment.
7. **Pérez-Suay et al. (2024) [15]:** Pérez-Suay et al. studied student performance using Moodle activity logs in a higher-education setting. They used Gaussian Process methods to examine how student interactions with the learning platform relate to academic performance. The study highlights the possible value of LMS activity records, while also depending on the availability and quality of those records.

2.2 Research on personalized learning

8. **Murtaza et al. (2022) [10]:** Murtaza et al. discussed AI-based personalized e-learning systems and the issues involved in developing them. The paper covers areas such as learner information, adaptive learning and recommendation systems. It explains how AI may help make learning more responsive to student needs, while pointing out that data and system integration remain challenges.

9. **Qiu et al. (2024) [14]:** This review examined recommendation methods used in e-learning systems. It discussed approaches such as collaborative filtering, content-based recommendation and machine learning. These methods can help suggest learning resources, but their usefulness may be affected when little information is available about a learner or when courses differ considerably.

10. **Pradeesh et al. (2025) [12]:** Pradeesh et al. presented an approach to personalized learning and remedial recommendations based on evaluating students' understanding of individual concepts. The work connects AI-supported question generation with identifying areas where a learner may need more support.Further testing in different institutions would help show how well the approach works in other settings.

2.3 Research on automatic question generation and assessment

11. **Das et al. (2021) [3]:** Das et al. surveyed methods for automatic question generation and answer assessment. The survey discussed generating questions from text and pictorial learning resources. It also highlighted the need to evaluate both generated questions and answers. This work is relevant to systems that use learning materials as a starting point for assessment.

12. **Hadifar et al. (2023) [4]:** Hadifar et al. introduced EduQG, a multi-format multiple-choice question dataset for educational use. The dataset supports research on question generation, answers and distractors. It provides a resource for developing and evaluating question-generation methods, although a dataset by itself does not guarantee that generated questions will be suitable for every subject or class.

13. **Awalurahman, Aji and Budi (2025) [5]:** This systematic review examined the use of transformers and large language models for automatic multiple-choice question generation. It discussed approaches such as fine-tuning, prompt engineering and retrieval-augmented generation. The review also noted challenges in evaluating generated questions and aligning them with learning objectives.

14. **Elkins et al. (2024) [6]:** Elkins and co-authors explored how teachers can use large language models and Bloom's Taxonomy when preparing educational quizzes. Their work considers how AI can assist with quiz preparation. It also supports the importance of teacher involvement in checking whether generated questions are suitable for the intended lesson.

15. **Mulla and Gharpure (2023) [7]:** Mulla and Gharpure reviewed automatic question-generation methods, datasets, evaluation measures and applications. Their paper provides an overview of the different approaches used in this area and the challenges involved in assessing question quality. This review is useful background for planning and evaluating an educational question-generation feature.

3 Comparison of reviewed studies

Table 1 compares the main focus and contribution of the studies discussed in this review.

Table 1. Comparison of the reviewed studies.

Study	Main focus / method	Contribution
Khan et al. (2023) [1]	Machine learning; LMS logs	Studies links between platform activity and student performance.
Chen et al. (2023) [2]	Clustering and neural networks	Presents a data-mining approach to performance prediction.
Das et al. (2021) [3]	Question generation survey	Reviews question generation and answer assessment.
Hadifar et al. (2023) [4]	Educational MCQ dataset	Provides data for multiple-choice question-generation research.
Awalurahman et al. (2025) [5]	Transformers and LLMs	Reviews approaches to automatic MCQ generation.
Elkins et al. (2024) [6]	LLMs and Bloom's Taxonomy	Discusses AI-assisted quiz preparation with teacher involvement.
Mulla and Gharpure (2023) [7]	Question-generation review	Summarizes methods, datasets and evaluation challenges.
Zhang et al. (2024) [8]	Knowledge graph and collaborative filtering	Combines educational relationships and recommendation methods.
Qin et al. (2023) [9]	Neural networks; mixed factors	Studies early warning of student performance.
Murtaza et al. (2022) [10]	Personalized e-learning	Discusses AI personalization and implementation challenges.
Alhazmi and Sheneamer (2023) [11]	Educational data mining	Examines early performance prediction in higher education.
Pradeesh et al. (2025) [12]	Concept-based evaluation	Connects assessment with concept-level learning needs.
Rizwan et al. (2025) [13]	MOOC engagement review	Reviews factors used in performance and engagement prediction.
Bin et al. (2024) [14]	E-learning recommendations	Reviews approaches for recommending learning resources.
Pérez-Suay et al. (2024) [15]	Gaussian Processes; Moodle logs	Studies links between LMS interactions and performance.

4 Research gap

Existing studies discuss different uses of Artificial Intelligence in education, such as student assessment, personalized learning, learning analytics and automatic question generation. These studies provide useful methods for improving digital learning activities.

However, students and teachers also need a common platform to manage classroom activities. In many learning environments, classroom communication, study materials, assignments and online quizzes may be handled through separate tools. This can make it difficult to access and manage all learning activities in one place.

Another important requirement is the connection between classroom learning and assessment. Students need access to notes, revision materials and quizzes related to their subjects. Teachers need

simple ways to create classrooms, share learning materials, upload assignments, post announcements and review quiz results.

AIEdutrack aims to address these requirements through an integrated student and teacher platform. It combines classroom management, PDF notes, assignments, announcements, flashcards, quick tests, live quizzes, results and teacher analytics. It also aims to support AI-assisted quiz preparation, with teacher review of generated questions.

Therefore, the main research gap addressed by this project is the need for a single platform that brings classroom management and AI-supported learning and assessment activities together.

5 Proposed work: AIEdutrack

AIEdutrack is designed as a web-based educational application for students and teachers. It provides separate dashboards according to the user's role.

5.1 Student module

The student dashboard provides access to the main learning activities. Students can join a classroom using a code shared by their teacher and view the classrooms they have joined.

Students can use these sections to access learning activities, practise questions, revise topics and review their quiz results.

5.2 Teacher module

The teacher dashboard helps teachers organize classroom and assessment activities. Teachers can create classrooms by entering a classroom name and subject. A classroom code is provided so that students can join the class.

5.3 Classroom management

Inside a classroom, teachers can share its class code with students. The classroom also provides separate sections for Notes, Assignments and Announcements.

In the Notes section, teachers can enter a title and description and upload a PDF file. This allows students to access subject-related study material.

In the Assignments section, teachers can provide an assignment title, instructions, due date and an assignment PDF. This helps students find assignment information within their classroom.

The Announcements section is intended for sharing important classroom updates with students.

5.4 Quiz and learning activities

AIEdutrack includes quick tests, live quizzes, flashcards and result viewing. These features are intended to support revision and provide students with opportunities to practise what they have learned.

AI-assisted quiz generation is also part of the proposed workflow. Generated questions should be checked by the teacher for correctness, relevance and difficulty before being shared with students.

5.5 Teacher analytics

The teacher dashboard displays summary information such as average score, best score, number of attempts and pass rate. These details can help teachers review quiz activity. The accuracy and usefulness of these analytics should be verified using actual test data.

Overall, AIEdutrack aims to bring classroom activities, learning resources and assessment features together in one application.

6 Conclusion

This paper reviewed research on AI in education, including student assessment, learning analytics, personalized learning and automatic question generation. The studies show that AI methods can support different parts of the learning process. They also point to practical concerns, such as the quality of generated questions, the availability of reliable data and the need to check AI-generated content. Based on the review, AIEdutrack is proposed as a platform that brings learning materials, flashcards, quiz activities and result tracking together. The application is intended to support students' practice and help teachers organize assessment activities. Its usability and usefulness will need to be examined through actual testing.

7 Future scope

In the future, AIEdutrack can be improved by adding more features to make learning and classroom activities easier for students and teachers. The quiz generation feature can be improved so that teachers can create questions from uploaded PDF materials with better accuracy. Teachers can also be given the option to review and edit AI-generated questions before sharing them with students.

The platform can include more types of quizzes, such as fill-in-the-blanks, true or false, and short-answer questions. Flashcards can also be improved to provide students with more ways to revise important topics. In addition, the live quiz feature can be enhanced to support more students at the same time.

AIEdutrack can also be developed as a mobile application so that students and teachers can access their learning materials and classroom activities more easily. Other improvements may include better result reports, a simple user interface, and support for multiple languages.

Overall, future development will focus on improving the platform's features, making it easier to use, and testing its performance in real classroom environments.

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