



PERSONALIZED LEARNING EXPERIENCE THROUGH ADAPTIVE TESTING USING BLOOMS TAXONOMY

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Abstract

Technology is advancing quickly in the modern world, and we daily are exposed to innovations. Artificial intelligence is one of the rapidly developing fields of computer science that is poised to usher in a new era of technological advancement through the development of intelligent machines. Artificial intelligence is now pervasive in our world. It is currently engaged in a wide range of subfields like Mathematics, Biology, Psychology, Sociology, Computer Science, Education etc. The study of this paper focuses on the application of AI with Adaptive testing using Bloom's taxonomy [1] for effective teaching and learning process. The study emphasizes the importance of Bloom's Taxonomy [2] that is used setting the learning objectives for the students integrated with the benefits of adaptive testing which enables the student work on the areas they are weak with. For improved accessibility for students and teachers, the suggested method might be implemented as a feature of an LMS or an Android application.

Keywords: Bloom Taxonomy, Artificial Intelligence, Adaptive Testing.

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Introduction: Teaching and learning process post-pandemic has transformed immensely. The traditional method of chalk duster teaching has been significantly replaced with the educational software and videos present in the market whether paid or open source. This paper is discussing the benefits of the advancement in technology that will let the student go ahead in their academics with clear conceptual ideas. In order to set specific goals for each student's framework and determine the intellectual level at which they can work, Bloom's Taxonomy can be used. By adjusting the complexity of the questions and helping students advance up the

hierarchical scale, instructors may better comprehend the objectives of the classroom.

Adaptive testing, on the other hand, is a testing method that adjusts the difficulty of questions based on the student's performance. The goal of adaptive is to provide a more accurate assessment of a student's knowledge by presenting questions that are tailored to their abilities.

List of Problems Faced by Students During Studies:

1. **Misunderstanding:** Students may misunderstand key concepts, leading to confusion and difficulty in retaining information.

2. **Weakness in foundation skills:** students may



struggle with the foundation skills, which may impact their ability to succeed in more advanced subjects

3. **Difficulty in problem solving:** students may struggle with problem solving and critical thinking, making it challenging them to apply their knowledge in new situations.
4. **Learning styles:** students may have different learning styles, and may struggle to learn effectively using traditional teaching methods.
5. **Lack of engagement:** students may become disengaged from the learning process, which can influence their motivation and ability to retain information.

These conceptual problems can have a significant impact on student's academic success, and it is important to address them in order to support students to succeed. This can involve providing targeted instructions using hands-on and interactive learning activities, and providing opportunities for students to practice and apply their knowledge in real world situations.

Proposed Solution: As different student has different level of understanding ability, the solution proposed encompasses these varied needs. Also, the solution should cater the problem as mentioned in the above section so that it does not impact student's confidence that may eventually lead to lack of motivation and disinterest in the subject.

Hence the proposed system has three modules

1. **Question bank based on the Bloom's Taxonomy:** Bloom's Taxonomy is a framework for categorizing educational goals and objectives into levels of complexity and specificity. It can be used to design test questions that assess students' understanding of a subject at different

levels of thinking, from simple recall to complex analysis.

The key consideration when creating the questions is to keep in mind how students can be instructed to think in a way that will allow them to advance to the higher level of Bloom's pyramid from the lower level of taxonomy.

Questions could be subject specific /topic specific, but the nature of questions should cover all the elements from the foundational skills to the specific level the instructor desired for the student.

2. **Topic specific test:** Topic specific test is integrated with AI based adaptive testing that will enable student a personalized learning environment.

The test will be administered to the student, and the questions will be drawn from the instructors' question bank.

Here, AI-based adaptive assessment will be crucial for the student's training.

All students will be given questions at the same proficiency level to begin the test.

3. **AI based Adaptive Testing Module:** Adaptive testing [3] is a type of assessment that adjusts the difficulty of the test questions based on the student's performance. By using test, banks prepared using Bloom's Taxonomy; adaptive testing systems can assess students' understanding of a subject at different levels of thinking and adjust the difficulty of the questions accordingly.

For example, if a student answers a series of questions correctly, the adaptive testing system may present more challenging questions that assess higher-level thinking skills. Conversely, if the student struggles with a particular question,

the adaptive testing system may present easier questions or provide additional support.

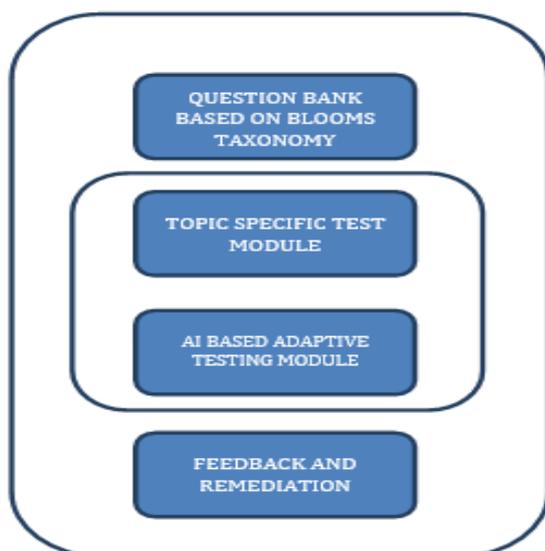
The understanding of the idea being taught can be evaluated at home or in the classroom.

4. Feedback and Remediation: It is a crucial module for both the student and the instructor.

This module provides valuable feedback to students and teachers about the areas where students need additional support. By identifying the concepts that students are struggling with, teachers can provide targeted remediation to help students overcome their difficulties and to improve their overall understanding of the material. The additional support may include

- Brief up of the concepts where students are lagging.
- Recorded video lecture series provided to aid the student.
- Peer teaching strategies could be utilized

Figure 1: Modules of Adaptive testing using Bloom's taxonomy



Conclusion: By using test banks prepared using Bloom's Taxonomy, adaptive testing systems can provide a more personalized and effective assessment experience for students. It can also help instructors to better understand the strengths and weaknesses of their students and adjust their teaching strategies accordingly.

References:

- Rahman, S. A., & Manaf, N. F. A. (2017). A Critical Analysis of Bloom's Taxonomy in Teaching Creative and Critical Thinking Skills in Malaysia through English Literature. *English Language Teaching*, 10(9), 245-256.
- Nkhoma, M. Z., Lam, T. K., Sriratanaviriyakul, N., Richardson, J., Kam, B., & Lau, K. H. (2017). Unpacking the revised Bloom's taxonomy: developing case-based learning activities. *Education+ Training*.
- Barker, T. (2010). An automated feedback system based on adaptive testing: Extending the model. *International Journal of Emerging Technologies in Learning (iJET)*, 5(2), 11-14.

Cite This Article:

Mistry S. Z. M., (2023). Personalized Learning Experience through Adaptive Testing Using Blooms Taxonomy, *Electronic International Interdisciplinary Research Journal*, XII, Issue – I(a), Jan-Feb, 2023, 142-144