Proceedings of International Conference on Islamic Education (ICIED)
Building an Inclusive and Sustainable Educational System
Volume 11, 2026 (p-ISSN 2477-3638 / e-ISSN 2613-9804)

Individual Differences and Adaptive Learning Towards Education That is Responsive to Students' Needs

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Abstract

Each student has unique characteristics that influence how they learn, including differences in learning styles, intelligence, and sociocultural backgrounds. This individual diversity demands an adaptive learning approach, which tailors methods, materials, and learning environments to each student's needs. Adaptive learning plays a crucial role in creating an inclusive and effective learning environment, particularly in a love curriculum that emphasizes independence and differentiation. This article discusses the importance of understanding individual differences and implementing adaptive learning to improve the quality of education. Adaptive learning also supports the development of values such as independence, mutual cooperation, and critical thinking. By tailoring learning to students' needs, this approach helps students develop the competencies necessary to become well-rounded and competent learners. This literature review highlights how education that is responsive to the unique needs of each student can be realized through strategies that accommodate diversity, thus creating a more meaningful and relevant learning process, and preparing students to face real-world challenges with appropriate skills. Implementing adaptive learning in schools requires careful planning and commitment from all relevant parties. The first step is to assess students' individual needs and characteristics, including learning styles, interests, and ability levels. After identifying student needs, educators can design tailored learning strategies, such as using a variety of teaching methods, providing varied materials, and providing constructive feedback.

Keywords:
Individual Differences; Learning Styles; Adaptive Learning

A. INTRODUCTION

Effective education must accommodate the diversity of student characteristics. Individual differences, such as learning styles, intelligence, and socio-cultural backgrounds, influence how students receive and process information. However, conventional education systems often ignore this diversity. They employ a uniform approach that is not always effective for all students. Adaptive learning emerges as a solution to address this challenge. By tailoring learning methods and materials to individual needs, adaptive learning can improve student engagement and learning outcomes. In the context of the Love Curriculum, this approach aligns with the principles of independence and differentiation of learning. This article aims to explore the relationship between individual differences, adaptive learning, and its implications for creating an education that is responsive to the unique needs of each student. Through a literature review, this article will discuss the theories underlying adaptive learning and strategies for its implementation in the Indonesian educational context.

The Love Curriculum emphasizes one thing: the success of education. Education is crucially determined by the presence of teachers. The presence of teachers is essential, especially those with a sincere spirit and a sense of values. Its implementation requires teachers to employ a deep learning approach that is reflective, contextual, and rooted in students' life experiences.

Learning in elementary education plays a crucial role in shaping students' academic abilities, character, and independence from an early age. In practice, each child has a different learning pace, interests, and needs, making a uniform learning approach often ineffective. Therefore, personalized and adaptive learning are important alternatives for creating more meaningful learning experiences tailored to each student's individual needs. Adaptive learning dynamically adjusts the material or learning flow, while personalized learning allows for student interests, choices, and learning goals.

B. METHODS

This research uses a literature review method to collect and analyze information from various relevant sources. According to Nevi Yarni, a literature review is an effective method for understanding previously developed concepts and theories and identifying gaps in existing research.

The literature review process begins with identifying the main topic, namely individual differences and adaptive learning. Next, the author collects relevant sources, including scientific journals, books, and articles that discuss the topic. Afterward, the information from these sources is analyzed and synthesized to form a comprehensive understanding of the topic.

During the analysis process, the author identifies key themes emerging from the literature, such as the definition of individual differences, the concept of adaptive learning, and strategies for its implementation in educational contexts. Furthermore, the author compares various approaches and perspectives in the literature to gain a broader perspective.

The results of this literature review are expected to provide in-depth insights into the importance of understanding individual differences in learning and how adaptive learning can be implemented effectively to meet the unique needs of each learner. Thus, this literature review method enables the author to develop a deep understanding of the topic discussed, as well as to provide recommendations based on existing evidence and theory.

C. RESULT & DISCUSSION

The Concept of Individual Differences in Education

Individual differences refer to the variations in characteristics possessed by each student, including cognitive, affective, and psychomotor aspects. These differences include differences in intelligence, learning styles, motivation, interests, and socio-cultural background (Wahidah, 2020:54). Understanding individual differences is crucial for creating an inclusive and effective learning environment. Individual differences in learning encompass various important aspects. Intelligence relates to the ability to think, understand, and solve problems. Each individual has different levels and types of intelligence. Consequently, some students grasp material quickly, while others require more time or a different approach.

Learning styles influence how individuals most effectively receive and process information. They are generally divided into: Visual (through images, diagrams), Auditory (through sound, discussion), and Kinesthetic (through hands-on practice). Consequently, the same teaching method may not be effective for all students.

Motivation is an internal or external drive to learn. There are two main types: intrinsic (from within, such as curiosity) and extrinsic (from outside, such as grades or

rewards). Consequently, students with high motivation tend to be more active and persistent than those with low motivation.

Interest is a person's attraction to a particular field or activity. Interest significantly influences focus and engagement in learning. Consequently, students will more easily understand material that aligns with their interests. Socio-cultural background includes family environment, economics, culture, language, and lifestyle habits. Consequently, ways of thinking and communicating can differ. Access to learning resources also differs, and values and attitudes toward education can vary.

In the educational context, individual differences influence how students receive, process, and apply information. For example, students with a visual learning style find it easier to understand information through pictures and diagrams, while students with an auditory learning style learn more effectively through discussions and oral explanations. Therefore, a uniform learning approach is not always effective for all students. Furthermore, individual differences also include emotional and social aspects, such as motivation levels, self-confidence, and the ability to interact with others. These factors influence student engagement in the learning process and the outcomes achieved. By understanding these differences, teachers can design learning strategies that better suit each student's individual needs.

The importance of understanding individual differences is also emphasized by Howard Gardner's theory of multiple intelligences. This theory states that each individual possesses various types of intelligence, such as linguistic, logical-mathematical, musical, kinesthetic, interpersonal, and intrapersonal. By identifying students' dominant intelligences, teachers can tailor learning methods to optimize their potential.

In practice, teachers can use various assessment tools to identify individual student characteristics, such as learning style tests, interest questionnaires, and behavioral observations. The information obtained from these assessments can be used to design more personalized and effective learning. Therefore, understanding the concept of individual differences is a crucial first step in creating education that is responsive to the unique needs of each student. This forms the foundation for implementing effective and inclusive adaptive learning.

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Principles and Characteristics of Adaptive Learning

Adaptive learning is an approach that adapts the learning process to the needs, abilities, and characteristics of individual students. According to Irham Hosni, adaptive learning involves modifying methods, materials, and learning environments to meet the specific needs of students, including those with special educational needs. Adaptive learning involves the use of technology and pedagogical strategies to provide personalized learning experiences (Anam, 2023: 67). The goal is to increase learning effectiveness by adjusting the material, pace, and teaching methods to suit individual characteristics.

The main principles of adaptive learning are flexibility and personalization. Flexibility means that the learning process can be tailored to the student's circumstances and needs, while personalization means that learning is designed to meet the unique needs of each individual. Thus, adaptive learning enables each student to learn in the way that is most effective for them.

Characteristics of adaptive learning include: (1) adjusting learning methods and strategies to suit the student's learning style; (2) using technology to provide materials appropriate to the student's ability level; (3) providing specific and constructive feedback; (4) flexible learning schedules; and (5) emotional and social support tailored to the student's needs. The implementation of adaptive learning requires teachers to actively participate in designing and implementing appropriate learning strategies. Teachers must be able to identify students' needs and characteristics and select appropriate methods and tools to support learning. Furthermore, teachers need to continuously monitor and evaluate the learning process to ensure its effectiveness.

Technology plays a crucial role in adaptive learning. By using digital learning platforms, teachers can provide materials tailored to students' abilities and interests.

Furthermore, technology enables the collection of data on student learning progress, which can be used to adjust learning strategies in real time. Adaptive learning also supports the development of 21st-century skills, such as critical thinking, creativity, collaboration, and communication. By providing relevant and challenging learning experiences, students can develop the skills necessary for future success.

Overall, adaptive learning is an effective approach to accommodating individual differences in education. By applying the principles and characteristics of adaptive learning, teachers can create an inclusive learning environment that is responsive to the unique needs of each student.

Integrating Learning Theories in Adaptive Learning

Effective adaptive learning requires the integration of various learning theories to tailor the approach to the individual needs of students. Constructivism, behaviorism, connectionism, and social learning theories play a crucial role in developing a curriculum that is responsive to student needs (Syahputra, 2023: 95). Constructivism theory emphasizes that students construct knowledge through experience and social interaction.

In the context of adaptive learning, the constructivist approach encourages students to be active participants in the learning process, enabling them to relate new information to existing knowledge. Meanwhile, behaviorism theory focuses on observable behavioral changes resulting from stimulus and response. In adaptive learning, behaviorist principles can be used to reinforce positive behavior through appropriate reinforcement and feedback.

Connectionism theory, developed by Thorndike, emphasizes the importance of the relationship between stimulus and response, which is strengthened through practice and repetition. In adaptive learning, connectionism can be applied by providing exercises tailored to the individual student's ability level. Social learning theory, developed by Bandura, highlights the importance of observation and imitation in the learning process. In adaptive learning, this theory supports the use of relevant models or examples to help students understand concepts through observation.

The integration of these four theories allows for the development of curricula and learning strategies that are more flexible and responsive to individual student needs. By understanding and applying the principles of various learning theories, educators can create learning environments that support students' academic, social, and emotional development. Therefore, it is crucial for educators to have a deep understanding of various learning theories and how to integrate them into adaptive learning practices. This will ensure that each student receives a learning experience tailored to their needs and potential.

Implementing Adaptive Learning in Schools

Implementing adaptive learning in schools requires careful planning and commitment from all relevant parties. The first step is to assess students' individual needs and characteristics, including learning styles, interests, and ability levels. After identifying student needs, educators can design tailored learning strategies, such as using a variety of teaching methods, providing varied materials, and providing constructive feedback. The use of technology can also support adaptive learning by providing platforms that enable personalized learning. Furthermore, it is important to create an inclusive and supportive learning environment, where each student feels valued and supported in their learning process. This can be achieved through effective communication between teachers and students, as well as between schools and parents.

Training and professional development for teachers are also crucial aspects of implementing adaptive learning. Teachers need to be equipped with the knowledge

and skills to design and implement learning strategies that are responsive to individual student needs. Regular evaluation and reflection are also necessary to assess the effectiveness of adaptive learning and make adjustments if necessary. This way, the learning process can be continuously improved to optimally meet student needs. The implementation of adaptive learning must also be supported by school policies and organizational structures that support flexibility and innovation in learning. This includes providing adequate resources and support from school leaders.

With a comprehensive and collaborative approach, implementing adaptive learning in schools can improve the quality of education and ensure that every student has the opportunity to develop according to their potential.

Benefits of Adaptive Learning for Learning Outcomes

Adaptive learning brings various significant benefits to student learning outcomes. By tailoring learning methods and materials to individual needs, this approach can improve comprehension and retention of information. Furthermore, adaptive learning can increase student motivation and engagement in the learning process. When students perceive that learning is relevant and tailored to their needs, they tend to be more motivated to learn. This approach also allows students to learn at their own pace, which can reduce stress and increase self-confidence. Thus, adaptive learning can create a more positive and supportive learning environment.

Adaptive learning can also help identify and address gaps in student understanding. With ongoing monitoring, educators can provide additional support to students who need it. Furthermore, this approach can help students develop independent learning skills and critical thinking skills, which are essential for future academic and professional success.

Adaptive learning can also improve learning efficiency by reducing time spent on material already mastered and focusing on areas that require more attention. Finally, by providing a more personalized and relevant learning experience, adaptive learning can increase student satisfaction with the learning process and the outcomes achieved.

Challenges and Solutions in Adaptive Learning

While adaptive learning offers many benefits, its implementation in the field is not without challenges. One major challenge is limited resources, both in terms of time, manpower, and facilities needed to design and implement learning tailored to individual student needs. Furthermore, teachers' lack of understanding and skills in applying adaptive learning principles also poses a barrier. Many teachers are unfamiliar with this approach and require training and support to develop the necessary competencies.

Another challenge is resistance to change, from teachers, students, and parents. Changing learning approaches requires adjustments and adaptations that are not always easy for everyone. To overcome these challenges, a comprehensive strategy is needed, including providing training and professional development for teachers, providing adequate resources, and effective communication with all stakeholders to build understanding and support for adaptive learning. The use of technology can also be a solution to overcome resource limitations and support personalized learning.

Digital learning platforms can provide materials tailored to student needs and enable teachers to monitor learning progress in real time. Furthermore, collaboration between schools, the government, and the community is crucial to creating a supportive environment for the implementation of adaptive learning. Government policy and funding support, along with active community participation, can strengthen schools' efforts to implement this approach.

By identifying and addressing existing challenges and capitalizing on available opportunities, adaptive learning can be effectively implemented to improve the quality of education and meet the unique needs of each student.

Implications of Adaptive Learning for the Love Curriculum

The Love Curriculum implemented in Indonesia emphasizes student-centered, flexible, and contextual learning. This approach aligns with the principles of adaptive learning, which adapt the learning process to the individual needs of students. In the Love Curriculum, teachers are given the freedom to design learning that aligns with students' characteristics and needs. This allows for more effective implementation of adaptive learning strategies, taking into account individual differences in learning styles, interests, and abilities.

Adaptive learning also supports the development of values such as independence, mutual cooperation, and critical thinking. By tailoring learning to students' needs, this approach helps students develop the competencies necessary to become well-rounded and competent learners.

The relationship between the Love Curriculum and adaptive learning is mutually reinforcing. The Love Curriculum serves as a value and philosophical foundation that humanizes the learning process, while adaptive learning provides a concrete strategy for adapting learning to student diversity, in keeping with the curriculum's spirit of love.

Aspect	Love Curriculum	Adaptive Learning	Relationship
Main Focus	Values of compassion, empathy, spirituality, and character building	Adapting methods, media, and approaches based on students' abilities, interests, and needs	The Love Curriculum provides moral motivation to differentiate: adapting learning is a tangible form of love for students.
Teacher Approach	Teaching with sincerity, value awareness, and a deep learning approach	Differentiating to respond to the diversity of student learning profiles	Teachers who are "in love" will naturally be adaptive because they see students as unique individuals who need to be accommodated.
Education Ecosystem	Building a religious, critical, and adaptive ecosystem	Learning that is contextual and rooted in students' life experiences	"Adaptive" is explicitly one of the goals of the Love Curriculum
Final Destination	A human being who is empathetic, has morals, loves life	Humanizing education for Golden Indonesia 2045	Both are moving towards education that humanizes students as a whole (academic, emotional, moral)

The implementation of adaptive learning within the Love curriculum also encourages the use of technology and innovation in learning. Teachers can utilize various digital resources to provide customized materials and support more

interactive and engaging learning. However, to ensure the successful integration of adaptive learning within the Love curriculum, adequate support is required, including teacher training, the provision of sufficient resources, and policies that support flexibility in learning.

Evaluation and monitoring are also crucial for assessing the effectiveness of adaptive learning within the Love curriculum. The data obtained can be used to make necessary improvements and adjustments to enhance the quality of learning. With effective integration, adaptive learning can strengthen the implementation of the Love curriculum and ensure that each student receives a learning experience tailored to their needs and potential.

D. CONCLUSION

Adaptive learning is an approach that adapts the learning process to the unique needs, characteristics, and potential of each student. By integrating learning theories such as constructivism, behaviorism, connectionism, and social learning theory, educators can design more responsive and effective learning strategies. This enables the creation of an inclusive learning environment and supports students' academic, social, and emotional development.

The implementation of adaptive learning in schools faces various challenges, including limited resources, lack of teacher understanding, and resistance to change. However, with appropriate policy support, training for educators, and the use of technology, these challenges can be overcome. Collaboration between schools, the government, and the community also plays a crucial role in creating an adaptive and inclusive education system.

The integration of adaptive learning into the "Love" curriculum strengthens efforts to realize student-centered education. With a flexible and contextual approach, the "Love" curriculum allows educators to tailor learning to individual students' needs. Indonesia can become more responsive to the diversity and potential of each student.

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