MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

Effective Adaptive Learning: Strategies and Challenges Toward Leading and Effective Education

Dr. Hadjira Chebli

Department of Philosophy, Institution: Mohamed Lamine Debaghine University of Setif 02 (Algeria), h.chebli@univ-setif2.dz

Received 12.03.2025, Accepted:13.08.2025, Published:15.12.2025

Abstract:

This article addresses a contemporary issue related to *effective adaptive learning*, as existing educational systems are witnessing a series of developments by adopting various strategies, approaches, and options within e-learning models. These advancements stem from the outcomes of educational technology and the integration of artificial intelligence (AI) applications into the education sector. In this context, *effective adaptive learning* emerges as one of the innovative strategies designed to meet learners' needs. This approach considers the characteristics and learning styles of each student individually, utilizing modern technology and advanced tools to design personalized learning environments tailored to each student's needs. Consequently, it enhances and improves learning outcomes, distinguishing itself from traditional education systems while offering advantages not present in conventional e-learning models.

Building on this premise, the article aims to shed light on *adaptive learning*, examining its components, criteria, and unique features. It also discusses its challenges and obstacles before presenting a set of recommendations and proposals to overcome these barriers and expand its applications. The ultimate goal is to develop higher education and address contemporary students' learning difficulties, transforming technology into a positive and effective educational asset.

Keywords: Artificial intelligence, adaptive learning environment, traditional education, content model, learner model.

INTRODUCTION

The education sector is currently undergoing significant qualitative reforms affecting all levels of education in general, and higher education in particular. This sector has experienced profound changes in its systems, curricula, programs, and objectives, driven by the immense digital revolution brought about by artificial intelligence (AI) applications. These technologies have achieved unprecedented success across various fields, and stakeholders in higher education aspire to harness this knowledge and technological revolution to advance educational technology and learning, benefiting both teachers and students alike.

Numerous modern approaches and strategies have emerged, aiming to integrate advanced technologies into digital e-learning. This integration has opened promising new horizons for

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

developing the educational process while also offering effective alternatives to overcome the limitations of traditional learning methods. Examples of e-learning approaches include blended learning, knowledge expeditions, problem-solving techniques, and *adaptive learning*—which is the primary focus of this study.

However, despite the advent of e-learning, which has facilitated flexible learning opportunities anytime and anywhere, it has not effectively addressed the core issues of traditional education systems. These conventional systems remain rigid, offering standardized educational content (such as lectures and guided activities) delivered uniformly to all students, without accounting for individual differences in cognitive abilities and preferred learning styles. As a result, students often become disengaged, reluctant to attend in-person classes, and hesitant to utilize the available pedagogical resources at their university. Consequently, poor academic performance becomes evident, leading many students to rely on remedial exams to avoid failure.

This is where *adaptive learning*—also referred to as *personalized learning*—emerges as a solution to meet students' diverse learning needs. This approach underscores the importance of customizing education and prompts us to explore the nature and uniqueness of this flexible learning model, which considers individual learner differences. The effectiveness and relevance of *adaptive learning* lie in its core principle: there is no single educational strategy, learning path, or instructional material that suits everyone. In this context, Hiyam Hayek wrote, *"Personalized education marks the end of the 'one-size-fits-all' model,"* a critical and satirical title that encapsulates the shortcomings of traditional learning systems while simplifying the essence of *adaptive learning*, which accommodates each student's uniqueness and provides tailored educational content suited to their specific needs.

Based on this premise, this study aims to explore *adaptive learning* in alignment with the advancements in educational systems driven by AI applications. It seeks to leverage all available resources to support learners in their educational journey, guiding them toward academic success while respecting and accommodating their physical, psychological, and cognitive differences. This will be achieved by examining the concept of *effective and intelligent adaptive learning*, identifying its components, defining its characteristics, and highlighting the challenges and obstacles that hinder its implementation. This leads us to the following key questions:

- What distinctive features make *effective adaptive learning* unique?
- How does learning take place within an *adaptive learning environment*?

1. The Nature of Adaptive Learning

1.1 The Concept of Adaptive Learning and the Context of Personalized Education

With the rapid advancements in technology, lifelong learning has become both a necessity and an essential demand. E-learning has provided numerous opportunities for managing asynchronous learning anytime and anywhere. Today, university students can utilize their personal computers, tablets, or even smartphones to engage in various pedagogical activities offered by their institutions simply by connecting these devices to the internet, whether on campus or remotely. However,

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

despite this digital transformation, electronic learning content has largely remained similar to traditional teaching methods, failing to achieve the desired evolution that aligns with the speed, diversity, and richness of the digital generation. More importantly, it has not been tailored to meet the individual needs and preferences of learners.

To address these challenges, adaptive e-learning systems have emerged as a solution. Over the past two decades, developing adaptive learning content has become a fundamental aspect of designing intelligent and advanced learning platforms.

Before delving into the definition of adaptive learning, it is essential to acknowledge that this concept is dynamic and constantly evolving with technological advancements. Unlike rigid educational models, adaptive learning is flexible, adapting to multiple generations of technological developments. Broadly speaking, *adaptive learning*—also referred to as *personalized learning*—is a learning process in which the presentation of content is adjusted based on the individual responses of each student.

A digital learning system is considered adaptive when it makes real-time adjustments to optimize learning pathways based on data collected during the learning process, rather than relying solely on pre-existing information such as gender, age, or prior academic performance. Adaptive learning systems leverage real-time data to modify instructional methods, adjust content complexity, personalize problem-solving sequences, and refine feedback mechanisms. This dynamic responsiveness enhances the learning experience by ensuring that the educational journey aligns with each student's unique needs and learning pace (Al-Mallah, 2017, p. 04).

1.1.1 The Core of Adaptation in Adaptive Learning

Adaptation occurs in the way content is delivered to learners. If ten students study the same material through an adaptive learning environment, and each has a different learning style, the system will present the same content in ten different ways to match their individual needs.

The adaptation process focuses on two key aspects:

- Content Adaptation: Adjustments are made to the content to accommodate learners with different styles, such as visual, auditory, kinesthetic, sequential, or holistic (simple or complex).
- Presentation Adaptation: The adaptive system offers multiple ways to present content, ensuring that it aligns with the diverse learning styles of students engaging with the adaptive learning environment.

1.1.2 Objectives of Adaptive Learning

- In general, adaptive learning environments aim to support learners in acquiring knowledge and skills within a specific domain. The goal is to enhance individualized learning by improving speed, accuracy, quality, and quantity of learning. Various flexibility mechanisms are employed in adaptive learning systems, which store learner-specific information in personalized models (Awad & Al-Tamami, 2021, p. 13).

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

- Adaptive learning seeks to help each user find suitable content by presenting it in an appropriate manner, at the right time, based on their previous interactions.
- It also aims to reduce social comparison among students. Instead of comparing themselves to others, students are encouraged to focus on their own strengths, self-improvement, and personal goals. This fosters self-confidence and helps develop a positive educational identity (Mohamedi & Metwally, 2021, pp. 350–351).

Additional Benefits of Adaptive Learning:

- Reducing dropout and failure rates.
- More effective than traditional systems in achieving learning outcomes.
- Enhancing efficiency by enabling students to achieve results faster (Hayek, 2015).
- Relieving faculty members from constant supervision by allowing them to provide assistance based on students' actual needs.
- Accommodating a wide range of students with different learning styles.
- Supporting students with special needs.
- Catering to both gifted students and those with learning difficulties.
- Delivering educational content through intelligent teaching methods.
- Quickly adapting to diverse and changing educational environments.
- Saving time by efficiently identifying learning styles and facilitating content comprehension (Al-Mallah, 2017, p. 05).

1.1.3 Importance of Adaptive Learning

The significance of adaptive learning technology lies in its status as an advanced tool that enables educators to perform their tasks with greater effectiveness, accuracy, and fairness. It allows them to excel in their roles and enhances their ability to assess students using technology-driven evaluations.

Adaptive learning also facilitates a shift in the role of educators from traditional instructors to guides and facilitators of the learning process. It enables them to tailor teaching methods, curricula, and classroom programs to better suit students' needs. This fosters closer engagement between teachers and students while maximizing the efficient use of time.

Additionally, adaptive learning provides educators with comprehensive data necessary to assess and improve both their own performance and that of their students swiftly and effectively (Mohamedi & Metwally, 2021, p. 350).

2.1 Definition of the Adaptive Learning Environment

Adaptive learning environments have been defined from various perspectives, depending on their components and the classification variables associated with them. Below are some key definitions:

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

The adaptive e-learning environment is defined as an "intelligent e-learning system that customizes and adapts the learning experience according to learners' needs, characteristics, and learning styles, with the aim of providing appropriate learning for each student based on their inputs and the information collected about them" (Mohamed & AbouZeid, 2021, pp. 500–501).

It can also be described as a "web-based adaptive educational environment that delivers instructional content tailored to each student's nature and educational characteristics. This is determined through a set of diagnostic questions posed to the learner to identify their suitable learning style, thereby providing interactive interfaces and diverse learning resources."

Another definition states that it is an "electronically designed, interactive learning environment based on artificial intelligence tools, where the presentation of educational content changes according to the learner's cognitive responses. It considers the learner's preferred style and approach to learning and delivers content accordingly."

Adaptive e-learning environments are characterized by flexibility in delivering educational content based on individual learners' needs, considering their differences and unique characteristics. These environments aim to enhance learning outcomes for students (Al-Sharif & Al-Mazroui, 2023, pp. 56–57).

2.1.1 Learning Methods in Adaptive Environments

Learning in adaptive environments occurs through two main methods (Mohamed & AbouZeid, 2021, p. 501):

- **First Method:** The system requests specific information from the user, such as applying assessments and questionnaires. Adaptation occurs from the beginning based on the collected data.
- **Second Method:** The system automatically tracks the user's actions and performance without requiring any input. It analyzes learning patterns, models the user's performance, and then adapts the content accordingly.

2. Adaptive Learning: Strategies, Characteristics, and Types

2.1 Adaptive E-Learning System

An adaptive e-learning system is designed with the ability to autonomously adjust to learners' characteristics and attributes. It is considered intelligent because it responds automatically, using advanced algorithmic technology, to learners' actions, skills, and readiness without their direct intervention. This response occurs based on actions taken during learning progress, information collected from learners before learning begins, or data gathered through tracking their performance and cognitive levels. Adaptation can thus occur at the start of learning or as the learner progresses.

In an intelligent adaptive learning system, the initiative comes from the system itself rather than the learner. The system determines the user interface, content selection, presentation order, and navigation style based on the information it gathers from the learner before and during the learning process.

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

2.2 Nature of Adaptive E-Learning Environment

Adaptive intelligent learning takes place in an environment that can adjust educational content, interaction interfaces, and learning paths based on learners' needs, preferences, and prior experiences. It continuously tracks responses and generates a personalized learning profile, allowing for customized learning experiences tailored to individual inputs and assessment results.

This environment, known as an intelligent adaptive learning environment, is primarily driven by artificial intelligence (AI) technology and offers several key advantages (El-Sayed, 2021, pp. 62–63):

- **Personalized learning:** Adjusts to each learner's pace, time, and location preferences.
- **Knowledge-based learning:** Tailors instruction according to prior knowledge and personal goals.
- **Learner autonomy:** Empowers learners to make self-directed learning choices.
- **Continuous assessment:** Builds an evolving mental model of the learner.
- **Data-driven personalization:** Uses assessment data to customize instruction, updating the learner's profile as their knowledge grows.
- **Efficiency:** Allows students to focus on difficult concepts outside the classroom, enabling teachers to design deeper learning activities and high-level discussions.

2.3 Characteristics of Adaptive Learning

Adaptive learning is defined by several key characteristics derived from intelligent system technologies and AI capabilities:

- **Intelligence:** Utilizes AI tools to predict and analyze learner behavior.
- **Adaptability:** Modifies all aspects of the learning environment based on learners' pace, abilities, and learning styles, including content format, sequence, and difficulty level.
- **Autonomy:** Ensures independent functionality of various system components, facilitating easy updates, deletions, and additions.
- **Integration:** Maintains coherence between different system models (domain model, learner model, adaptation model, and group model), ensuring a seamless experience.
- **Inference and reasoning:** Supports problem-solving and decision-making in learning, such as selecting appropriate teaching methods, determining learning sequences, providing feedback, and offering guidance.
- **Multi-directional communication:** Enables direct interaction between teachers and the system, learners and the system, and between learners themselves.
- **Speed:** Provides instant access to information, regardless of location.

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

- **Ease of use:** Features intuitive navigation, file uploads, and compatibility with various user inputs.
- **Tracking:** Continuously monitors learner actions, cognitive states, and weaknesses, offering both qualitative and quantitative assessments (Mahmoud & Ragab, 2019, pp. 57–58).
- **Response generation:** Delivers unlimited questions, examples, and explanations at varying difficulty levels, presenting multiple solution pathways.
- **Continuity:** Maintains progress across multiple learning sessions, allowing learners to resume from where they left off.
- **Diversity:** Offers varied content suited to different learning preferences.
- **Interactivity:** Requires active learner engagement with the system for assistance.
- **Easy updates:** Ensures dynamic, easily updatable content.
- **Feedback mechanism:** Responds to learners' actions with adaptive feedback.
- **Predictive capability:** Anticipates learners' future behaviors and learning needs (Mohamed & AbouZeid, 2021, pp. 501–503).

3. Adaptive Learning Environments – Elements and Standards

3.1 Elements and Components of the Adaptive Learning Environment

Despite the diversity in the forms of adaptive learning environments and the various models proposed by studies and research to explain their components, most of these models share a common structure. Each model represents an independent unit with specific characteristics, which are ultimately integrated into a final structure that constitutes the adaptive learning system or environment. Based on this, the adaptive learning environment consists of the following elements (Jouda, 2018, p. 134):

- **Domain Model:** This model includes the educational content, encompassing all topics within the course structure, including general units, sub-sections, topics, learning objectives, and the resources allocated to each objective. Each resource consists of a variety of metadata and associated tags.
- **User Model**: This model pertains to the learner and includes all information and knowledge related to the user. It describes statistical data about learners, which is collected through their responses to surveys and assessments or by analyzing their browsing behavior within the system.
- **Adaptation Model**: This model is responsible for adaptation mechanisms within the adaptive learning environment. It controls the selection and presentation of learning objects in a way that aligns with learners' preferences, prior experiences, learning objectives, and preferred learning methods.
- **Interaction Interface Model**: Also referred to as the adaptive learning platform, this model defines the interaction between the user and the system. The interaction interface represents

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

the part of the system that the user perceives and directly interacts with. It serves as a communication gateway between the learner and the adaptive learning system, facilitating interaction with the system's various models.

3.2 Standards for Developing Adaptive E-Learning Environments:

Many studies indicate that there are important requirements related to the development of adaptive e-learning environments, which should be taken into account, and which can be divided into four main standards (Awad & Al-Tamami, 2021, pp. 16-17):

- **The standard of adapting learning processes**: It addresses three methods for developing the adaptation of the learning process, namely process adaptation, instructional sequence adaptation, and adaptation through providing additional guidance. Therefore, the requirements of this category are mainly related to the three sub-requirements of the previously mentioned pillars of the adaptive learning environment.
- **The standard of learning content**: This standard generally includes sources or primary elements related to academic content, for example: images and texts, learning objects, all digital resources used to support learning and suitable for different concepts and situations. It can be detailed into the following elements: identifying different types of assets: texts, images, sounds, video clips, hyperlinks, links to specific concepts, as well as supporting different types of learning elements: content, exercises, training, assessments, or more than one of these elements, in addition to providing different levels of detail for learning elements in order to address different levels and types of educational objectives; as well as separating academic content from its method of presentation and visual representation.
- **Pedagogical standards**: These are the standards that should be available for handling the student profile, as well as managing and updating student attributes in real-time, including ‘storage’, deletion, and updating, in addition to supporting student modeling and tracking, an example of this is monitoring and observing the learning process, learning path and different learning elements, and creating a learning element map to clarify the student's characteristics.
- **Instructional guidance standards**: They include the basic standards that describe learning objectives and activities, instructional sequences, and defining instructions related to achieving educational goals, in addition to determining the appropriateness of instructions for students and evaluating learning progress according to specific mastery levels. It can be detailed into the following elements: the possibility of changing the order of instructional sequences, providing different types of instructional follow-up (‘linear learning, conditional learning, generative learning, iterative learning’), in addition to allowing the insertion of new instructions for the instructional sequence, defining prerequisite and post-requisite conditions, and assessing the level of students' mastery to apply the appropriate activities.

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

3.3 Adaptive Content Presentation Patterns: The Foundation of Learning

Content is considered the cornerstone of any educational environment; based on the nature of this content, the characteristics, features, and capabilities of the educational environment that can deliver this content most effectively are determined. Consequently, adaptation within the educational environment is not limited to the nature of the environment itself but is fundamentally based on the content within it. When discussing adaptive learning, it is essential to understand that adaptation primarily pertains to educational content. Providing adaptive educational content ensures that the learning environment itself exhibits adaptability in presenting the available information. Therefore, the nature of adaptive e-content is founded on the premise that the learning environment possesses capabilities enabling the content to change and modify its presentation according to the learner's identified pattern.

The purpose of adaptive presentation is to modify how page content is displayed based on the user's goals, knowledge, and other information, such as their preferred learning style, which is stored in the learner model. In systems based on adaptive presentation, the pages displayed to the learner are not static but are dynamically assembled in different forms. For example, more experienced users receive additional details and in-depth information, while beginners receive additional explanations or are presented with more text or images according to their preferred learning style. Based on this, adaptive presentation became the foundation of adaptive learning, where adaptation in learning initially meant merely changing the presentation style to suit the learner's preference. However, it later became essential to extend adaptation to all aspects of the educational process.

A page's content can be adapted through Adaptive Text Presentation or Adaptive Multimedia Presentation when presented to the student by hiding details that are not relevant to their current interests. These adaptations take several forms:

- **Conditional Text**: A concept within the course is divided into text segments, each linked to a condition that indicates the type and level of the student (beginner, intermediate, expert).
- **Stretch Text**: Used to provide the student with additional clarifications related to a specific topic by clicking on hot words or active links.
- **Diverse Pages**: Different pages are linked to a particular concept in the course, with each set of pages displayed based on the student's type, knowledge level, or learning style.
- **Fragment Variants**: Each page is divided into multiple fragments, and various content versions are prepared for each fragment, with the appropriate content displayed according to each student's attributes.
- **Frame-Based**: A course concept is displayed in a structured frame, where each link is associated with different content for the same concept or other frames, with the appropriate link selected and displayed based on the student's characteristics.

From the above, it is evident that adaptive presentation patterns rely on modifying the user interface in alignment with the learner's learning style and cognitive level. Each presentation pattern has

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

characteristics that relate to the learner's attributes, the nature of the content, and its elements. Adaptive presentation is realized in adaptive learning systems by adjusting content components so that educational content elements (content, exercises, examples, assessments) are not displayed uniformly for all students but instead adapt according to the learner's profile, which is determined in advance through a learner profile questionnaire (Jouda, 2018, pp. 135-137).

In light of the above, researchers summarized the characteristics of adaptive content as follows (Al-Mubareedi, 2024, p. 05):

- Achieving individualized learning.
- Promoting active learning.
- Providing a learning environment rich in interactive multimedia.
- Enhancing learning flexibility.
- Aligning with different learning styles.
- Developing students' skills.

4. Adaptive Learning: Advantages and Challenges

4.1 Comparison Between Adaptive Learning, Traditional Education, and E-Learning

To assess the effectiveness of adaptive learning, a comparison is made between adaptive learning, traditional education, and e-learning. This allows us to evaluate the efficiency of these systems in enhancing productivity within the educational framework, enabling the selection of the most effective approach (Al-Mallah, 2017, p. 08).

Table (01): .....

Comparison Aspect	System Traditional	System Electronic	System Adaptive
Characteristics	Rigid	Flexible	flexible Intelligently
Delivery	if directed Presented as to a single student	if directed Presented as to multiple students	individually for each student Presented based on their learning style
Role Learner's	and rote Memorization ("Passive role") learning	and Exploration interaction ("Interactive role")	interaction, participatory and Adaptive adaptive role
Role Teacher's	dictation Lecture and	mentor Guide and	facilitator Learning
Environment Nature	and natural Traditional	Digital	flexible, and adaptive digital ,Smart environment
Focus	content and Focuses on knowledge acquisition	content and Focuses on the student	content, the student, Focuses on environment, and learning nature
Content Presentation	lecture-based Traditional delivery	presentation Multiple methods	presentation for each student Tailored according to their learning style
Adaptability	students as if Treats all they were one	to students Adapts only with high technological skills	students by addressing Adapts to all their different learning patterns

Source: ....

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

4.2 Adaptive Learning: Challenges and Limitations

- Smart adaptive learning environments provide suitable conditions for rapid, high-quality, and effective education. However, this approach faces several challenges, as implementing this type of learning requires establishing logistical conditions and educational infrastructure, providing necessary equipment and applications, training teachers through both initial and continuous professional development, ensuring the active involvement of parents and guardians, and preparing learners from the early stages of education for this learning model (Al-Issawi, 2024, p. 131).
- While smart adaptive learning focuses on the learner and the educational content to personalize and adapt education for each individual within the classroom, it simultaneously limits the benefits of peer interaction and teacher-student engagement. In adaptive learning environments that rely on technological tools, human interactions—characteristic of traditional education systems—are significantly reduced. As a result, classroom interaction between the student and teacher, as well as among students themselves, is diminished. Classroom interaction fosters communication, exchange of opinions, and the transfer of ideas, contributing to intellectual development and refining students' cognitive abilities in alignment with their developmental stage.
- The absence of classroom interaction also weakens essential life skills necessary for learners to integrate smoothly into their daily lives and society, such as communication, collaboration, critical thinking, and acceptance of others. The structured interaction between teacher and student provides opportunities for learners to practice developing their ideas under the guidance and supervision of the instructor. Additionally, classroom interaction helps students develop positive attitudes toward others, respect diverse opinions, and cultivate a positive self-concept regarding their abilities and characteristics—whether physical, social, emotional, or intellectual.
- Another criticism of smart adaptive learning is its potential limitation on creativity. This approach may not provide sufficient space for students to showcase their unique and creative aspects. Learning that does not encourage the exploration and expression of individual creativity is inherently flawed, potentially becoming an obstacle to both personal developmental growth and broader human advancement (Al-Issawi, 2024, pp. 126-127).

CONCLUSION

In conclusion, adaptive learning, which takes place in a dynamic learning environment, represents an innovative form of e-learning that has gained popularity in educational settings. This is due to its ability to accommodate learners regardless of their academic level, comprehension skills, analytical abilities, and reasoning capacities. Adaptive learning considers individual student preferences and customizes educational content accordingly. Ultimately, each learner acquires the desired knowledge in a manner tailored to their needs, thereby enhancing learning quality and success. This advancement marks a true revolution in education, as it fosters student engagement and prevents

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

disinterest in traditional theoretical lessons, where teachers traditionally transferred knowledge as if all students shared the same readiness. Unlike conventional e-learning methods, where content is uploaded to a platform for students to passively consume as static text without motivation or consideration of individual differences, adaptive learning offers a more personalized approach.

The success of adaptive learning depends largely on the "user model," which involves an in-depth analysis of the learner's characteristics to enable the system to deliver appropriately customized content. This ensures a flexible learning experience rather than a rigid framework of prepackaged information that disregards the learner's individuality.

To enhance the advantages of adaptive learning, we propose the following recommendations:

- Regular training updates for teachers on how to design and implement adaptive learning environments, ensuring they stay current with advancements in educational technology and artificial intelligence applications.
- Encouraging the adoption of adaptive e-learning environments to provide equitable learning opportunities for all students.
- Maintaining classroom activities and collaborative projects, such as group research assignments in tutorial sessions, to promote positive peer interaction. Over-reliance on digital learning platforms may lead to student isolation, whereas fostering teamwork nurtures a sense of belonging to both the educational community and society at large.

To further deepen the understanding and integration of adaptive learning in higher education, we also suggest the following proposals:

- Conducting more in-depth research on adaptive learning through workshops and study sessions, as its applications and possibilities extend far beyond what this study can comprehensively address.
- Exploring various approaches to designing adaptive learning environments, which vary based on educational content, target audience, learning objectives, and learner characteristics. This requires dedicated workshops to grasp its intricacies and effective implementation.
- Conducting studies on assessment methods in adaptive learning environments to gather statistical insights on learning outcomes and evaluate the effectiveness of adaptive learning strategies.

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 35 Issue 2, 2025, Pages: 528-540

Bibliography

Al-Issawi, A. A.-B. (2024, 04). *Smart Adaptive Learning for Effective and Leading Education*. Retrieved from Educational Notebooks Journal.

Al-Mallah, T. A.-M. (2017). *Adaptive Learning: An Upcoming Educational Revolution.* Arab Republic of Egypt.

Al-Mubareedi, A. M. (2024). *The Impact of E-Content Adaptation Patterns on the Development of Achievement and Interactive Book Production Skills Among Education Faculty Students*. Retrieved from Palestinian Journal of Open Education and E-Learning.

Al-Sharif, I. F., & Al-Mazroui, E. I. (2023, 10). *The Classification Variables Related to Designing the Learner Model in Adaptive Learning Environments: A Bibliometric Study from 2017–2023*. Retrieved from Journal of Educational and Human Sciences.

Awad, A. M., & Al-Tamami, S. A. (2021, 10). Standards for Designing an Adaptive E-Learning Environment in Light of the Preferred Learning Style of Education Faculty Students to Develop E-Storytelling Skills. *Journal of the Faculty of Education – Damietta University*.

El-Sayed, Y. M. (2021). *Competencies of the Smart Adaptive Learning Teacher*. Retrieved from International Association for E-Learning.

Hayek, H. (2015, 01 05). *Adaptive Learning Declares the End of the 'One Size Fits All' Principle – A Case Study*. Retrieved 03 13, 2025, from Naseej Academy Blog: https://shorturl.at/CEeJ8

Jouda, M. I.-S. (2018, 10). *Designing an Adaptive Learning Environment Based on Different Content Presentation Styles to Develop Immediate and Delayed Achievement Among Students of the Family Counseling Course at Arabian Gulf University*. Retrieved from Journal of Special Education Research – Mansoura University.

Mahmoud, W., & Ragab, A.-F. (2019, 06). *Developing Adaptive E-Learning Environments in Light of Learning Analytics Technology*. Retrieved from Peer-Reviewed Scientific Journal.

Mohamed, A., & AbouZeid, A. (2021). *A Program Designed According to Smart Adaptive Learning in Biochemistry to Develop Molecular Representation Skills and Visual Thinking Among Education Faculty Students*. Retrieved from Journal of the Faculty of Education in Educational Sciences,.

Mohamedi, M., & Metwally, A. (2021, 07). Building an Adaptive Learning Environment and Measuring Its Impact on Developing Computational Thinking Skills Among Preparatory Stage Students. *Reading and Knowledge Journal*.