

Learning and Instructional Principles in the Perspective of 21st-Century Education: A Conceptual Review and Theoretical Synthesis

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ABSTRACT

The transformation of 21st-century education demands a paradigm shift in learning from a teacher-centered approach to student-centered learning. In this context, learning principles remain an important foundation in designing effective learning, but they require reinterpretation according to the development of contemporary education theory. This article aims to analyze the principles of learning and learning through the synthesis of classical and modern theories and explain their implications for 21st century learning practices. The research uses a library research method with a systematic conceptual review approach to various national and international literature published in the 2021-2026 period. The results of the study show that the principles of attention and motivation, activeness, direct involvement, repetition, challenge, and individual differences remain relevant in modern education, but need to be understood integratively through the perspectives of student-centered learning, active learning, experiential learning, and differentiated instruction. This study offers a conceptual model that connects various learning principles as a system that supports the development of high-level thinking skills, learning independence, and 21st century competencies. These findings confirm that the effectiveness of learning is not determined by the application of a single principle in isolation, but rather by the integration of various principles in an adaptive and inclusive learning environment.

Keywords: learning principles, 21st century learning, student-centered learning, active learning, differentiated instruction

ABSTRAK

Transformasi pendidikan abad ke-21 menuntut perubahan paradigma pembelajaran dari pendekatan yang berpusat pada guru menuju pembelajaran yang berpusat pada peserta

didik. Dalam konteks tersebut, prinsip-prinsip belajar tetap menjadi fondasi penting dalam merancang pembelajaran yang efektif, namun memerlukan reinterpretasi sesuai perkembangan teori pendidikan kontemporer. Artikel ini bertujuan menganalisis prinsip-prinsip belajar dan pembelajaran melalui sintesis teori klasik dan modern serta menjelaskan implikasinya terhadap praktik pembelajaran abad ke-21. Penelitian menggunakan metode studi kepustakaan (library research) dengan pendekatan systematic conceptual review terhadap berbagai literatur nasional dan internasional yang diterbitkan pada periode 2021–2026. Hasil kajian menunjukkan bahwa prinsip perhatian dan motivasi, keaktifan, keterlibatan langsung, pengulangan, tantangan, dan perbedaan individu tetap relevan dalam pendidikan modern, tetapi perlu dipahami secara integratif melalui perspektif student-centered learning, active learning, experiential learning, dan differentiated instruction. Kajian ini menawarkan model konseptual yang menghubungkan berbagai prinsip belajar sebagai suatu sistem yang mendukung pengembangan keterampilan berpikir tingkat tinggi, kemandirian belajar, dan kompetensi abad ke-21. Temuan ini menegaskan bahwa efektivitas pembelajaran tidak ditentukan oleh penerapan satu prinsip secara terpisah, melainkan oleh integrasi berbagai prinsip dalam lingkungan belajar yang adaptif dan inklusi.

Kata Kunci: prinsip belajar, pembelajaran abad ke-21, student-centered learning, active learning, differentiated instruction

INTRODUCTION

Education is a systematic process that aims to develop all students' potential through planned and sustainable learning activities. In the context of modern education, the goal of education is no longer limited to the mastery of knowledge, but also includes the development of critical thinking skills, creativity, communication, collaboration, and the ability to adapt to rapidly changing social and technological changes. This condition places learning as the core of the educational process that determines the success of student competency development.

Although various learning innovations have developed, educational practices in various countries still face challenges in the form of dominance of teacher-centered learning approaches that tend to place students as passive recipients of information. As a result, the learning process is often not able to develop the high-level thinking skills, independent learning, and problem-solving skills that are the main demands of 21st-century education.

Various classical learning theories have explained the importance of attention, motivation, activeness, direct involvement, repetition, challenges, and individual differences in determining learning success. However, most studies on learning principles are still descriptive and normative by placing each principle separately. In fact, the development of recent research shows that the success of learning is determined by the interconnectedness between these components in a holistic learning system.

Gap Analysis

Previous studies have generally focused on conceptual explanations of learning principles without integrating the development of contemporary theories such as *Self-Determination Theory*, *Active Learning*, *Experiential Learning*, and *Differentiated*

Instruction. In addition, there are still limited studies that link classical learning principles with the needs of 21st century competency development.

Novelty Articles

This article is new in three main aspects:

1. Integrate classical learning principles with contemporary learning theories.
2. Compile a conceptual synthesis of the relationship between learning principles in 21st century learning.
3. Offers an adaptive learning conceptual model that connects motivation, activeness, learning experiences, challenges, and learning differentiation as a single system.

Based on this background, this article aims to analyze the relevance of learning principles in the perspective of contemporary education as well as their implications for the development of 21st century learning.

METHODS

This article uses the library research method with a systematic conceptual review approach. Data was obtained through a search of reputable international scientific articles, academic books, and education policy documents relevant to the theme of learning and learning principles.

The source criteria used include:

1. International journal articles published in 2021–2026.
2. Articles that discuss learning motivation, active learning, student-centered learning, experiential learning, and differentiated instruction.
3. Classical literature that has conceptual relevance to the development of modern learning theory.

Data analysis is carried out through the stages of literature reduction, theme categorization, theoretical synthesis, and critical interpretation to produce a comprehensive conceptual model.

RESULTS AND DISCUSSION

The Relevance of Learning Principles in Contemporary Education

The principles of learning are a set of psychological and pedagogical foundations that explain how individuals acquire, process, and construct knowledge. In the classical perspective, these principles serve as a guideline for teachers in designing learning. But in a contemporary perspective, learning principles are no longer seen as a set of rules that stand alone, but rather as components that interact with each other to form a learning ecosystem.

The paradigm shift from *teacher-centered learning* to *student-centered learning* expands the meaning of learning principles from just classroom management to strategies to build meaningful and sustainable learning experiences.

Critical Synthesis of the Principles of Mindfulness and Motivation

Traditional theories view motivation as an internal drive that determines the intensity of learning. However, recent research based on *Self-Determination Theory* shows that intrinsic motivation develops when learners acquire:

1. autonomy in learning;

2. a sense of competence;
3. positive social relationships.

The findings show that students' attention is not enough to be built through external control, but rather through learning that provides space for active participation and academic freedom.

Critically, it can be argued that the learning approach that relies only on rewards and punishment has limitations in maintaining long-term motivation. Therefore, motivation needs to be built through meaningful learning experiences that are relevant to students' lives.

Active Activity and Direct Involvement in Active Learning

The principles of activeness and direct involvement have their roots in constructivist theory that places learners as knowledge builders.

Recent research shows that *active learning* methods consistently improve:

1. conceptual understanding;
2. knowledge retention;
3. critical thinking skills;
4. collaborative skills.

Nevertheless, activeness should not be understood as just physical or verbal activity. True activeness is cognitive engagement that allows learners to connect new experiences with pre-existing knowledge structures.

Thus, the success of learning is not determined by the number of classroom activities, but by the quality of the students' intellectual involvement during the learning process.

Repetition and Challenges as a HOTS Developer

In behavioristic theory, repetition serves to reinforce the learning response. However, 21st-century learning places repetition as a reflective process that helps learners transfer knowledge to various contexts.

Effective repetition is done through:

1. reflection;
2. discussion;
3. case studies;
4. application of the concept in real situations.

Meanwhile, the principle of challenge is closely related to the development of *Higher Order Thinking Skills* (HOTS). Challenges that are designed proportionally are able to create conditions of *productive struggle*, which are situations when students are encouraged to think critically without experiencing frustration.

These findings suggest that repetition and challenge should be viewed as complementary pairs. Repetition strengthens understanding, while challenges expand thinking capacity.

Individual Differences and Learning Differentiation

The diversity of students is an increasingly complex reality in modern education. Differences in abilities, learning styles, social backgrounds, and learning experiences require educators to implement flexible learning.

The *Differentiated Instruction approach* offers solutions through customization:

1. learning content;

2. learning process;
3. learning products;
4. learning environment.

Recent studies have shown that differentiation of learning contributes to increased motivation, participation, and heterogeneous learning outcomes of students.

Critically, differentiation does not mean giving different treatment in a discriminatory manner, but providing various learning paths so that all students have the same opportunity to achieve learning goals.

Synthesis of Learning Principles and Their Implications in 21st Century Learning

Table 1. Synthesis of Learning Principles and Implications of 21st Century Learning

Learning Principles	Classic Perspective	Contemporary Perspectives	Implications of 21st Century Learning
Attention and Motivation	Drivers of learning activities	Self-determination and learner autonomy	Project-based learning, personal learning
Activeness	Participation in learning	Active learning and engagement	Inquiry learning, collaborative learning
Direct Engagement	Learning by doing	Experiential learning	Practicum, simulation, authentic project
Repetition	Memory strengthening	Reflective learning	Reflection, portfolio, formative evaluation
Challenge	Thinking exercises	Productive struggle and HOTS	Problem solving, STEM, design thinking
Individual Differences	Variation in students' abilities	Differentiated instruction	Personalized learning and adaptive learning

Integrative Conceptual Model of Learning Principles

The principles of learning do not work in isolation, but form a system that influences each other.

Attention and Motivation



Optimal Learning Outcomes
Individual Differences
(Learning Differentiation)

The model shows that learning success is the result of the interaction of various principles that are implemented in an integrated manner in learning.

CONCLUSION

The principles of learning and learning remain of strong relevance in 21st century education. However, these principles need to be reinterpreted through a contemporary learning perspective that emphasizes learning autonomy, active engagement, authentic experience, reflection, development of higher-level thinking skills, and differentiation of learning.

This study shows that attention and motivation play a role as early drivers of learning, activeness and direct involvement build meaningful learning experiences, repetition and challenges in developing high-level thinking skills, while learning differentiation ensures that all learners get equal learning opportunities.

Thus, the effectiveness of learning is not determined by the application of one principle separately, but by the integration of all principles in an adaptive, inclusive, and competency-oriented learning environment for the 21st century.

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