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Improving Individual Learning Effectiveness through Learning Style Adjustment in the Digital Age

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ABSTRACT

The transformation of education in the digital era has significantly changed the way individuals receive and process information. Adapting learning styles has become an urgent need to face these challenges and to ensure that the learning process becomes more effective and personalized. This study aims to examine how adjusting learning styles can improve individual learning effectiveness amid the advancement of educational technology. Using a descriptive qualitative approach, this paper develops arguments based on literature analysis from various relevant academic sources. The discussion reveals that learning effectiveness is strongly influenced by the alignment between teaching strategies and students' learning styles, particularly in the context of digital media usage. Adapting learning styles not only enhances motivation and participation but also encourages a more optimal mastery of the material.

INTRODUCTION

In the world of education, a strategy is a plan for how to utilize and use existing potential and facilities to increase the effectiveness and efficiency of learning (deak, 2021). The development of digital technology has brought a very significant impact in various sectors of life, including education. Not only does it change the way we interact, but it also creates new opportunities in the learning process. In this digital era, technology allows students to access various learning resources in a more flexible and personalized manner. This is especially important given the increasingly complex demands of the world of work and life, which require individuals who not only have technical skills, but also the ability to learn independently and adapt quickly to the changes happening around them.

However, although technology provides many benefits, the biggest challenge in education is how to optimize the learning process itself. Education is carried out so that people who learn can understand and comprehend and what has been learned can be useful for themselves and many people (Deak, 2021). One element that is often overlooked but greatly affects the effectiveness of learning is the individual's learning style. Each student has a different way of absorbing, processing, and remembering information, which makes conventional learning approaches often ineffective. These learning styles, which include preferences such as visual, auditory, reading/writing, and kinesthetic, have a major impact on students' success in understanding the material being taught. Adjusting learning methods based on this learning style not only improves understanding but also helps students stay engaged and motivated to learn.

It is important to note that although these learning styles are widely known, they have not been optimally implemented in everyday teaching. Many teachers and educators still use a one-size-fits-all approach to teaching, which often does not take into account the differences in how students learn. This can result in low student interest in learning and a lack of understanding of the material being presented. In fact, research shows that when material is tailored to the appropriate learning style, students tend to be more likely to understand and remember the information provided. Therefore, it is important for educators to consider learning styles as one of the main factors in designing a more effective learning process.

Along with that, advances in digital technology provide opportunities to overcome these problems. With the availability of various online learning platforms, students now have the opportunity to choose learning methods that suit their learning styles. For example, video-based learning platforms are more effective for students with a visual style, while audio-based exercises can be more beneficial for students with an auditory style. This technology allows the learning process to be more personalized and tailored to the needs of each student. Technological advances have brought major changes in various aspects of life (Deak, The Influence of Social Media Transformation on Congregation, 2025). Advances in digital technology have revolutionized the way humans communicate and form communities (Deak, Theological Basis of Evangelism through Social Media: Answering the Great Commission in a Digital World, 2025). Therefore, this paper will examine how learning style adjustments can improve the effectiveness of individual learning, especially in the context of learning in the digital era.

METHODS

This study uses a qualitative approach with a literature review to understand how learning style adjustments can improve the effectiveness of individual learning in the digital era. The main focus of this study is on existing theories related to learning styles and the application of technology in learning. By examining various relevant sources, this study aims to identify the relationship between individual learning styles and the effectiveness of learning with a technology-based approach. The data collection method in this study is through a literature study, which includes books, journals, and related articles on learning style theories and the use of technology in education. The application of learning theories in

the teaching and learning process not only helps educators design effective teaching strategies but also allows students to actively participate in the learning process (Deak, Learning Theory and Its Application in Learning, 2024). This study also explores the results of previous studies to gain insight into how learning style adjustments can affect student learning outcomes in the digital environment. Implementation is a process, method, action, planning (designing), while learning is a process, method, or effort to "make" people or living things learn. Implementation can be interpreted as a problem-solving process by preparing systematically which will be carried out to achieve certain goals. In relation to the implementation of learning, experts have different opinions even though they have the same goals. Branch, the implementation of learning is a system that contains procedures for developing education in a consistent and reliable manner (Deak, Micro Teaching-Theory and Practice, 2024).

Data analysis was conducted by means of synthesis and interpretation of various existing literature sources to provide a comprehensive picture of the topic discussed. This study did not conduct empirical testing or experiments, but rather focused on theoretical discussions developed through existing literature studies.

RESULTS AND DISCUSSION

In the digital era, technology presents both opportunities and challenges. The presence of digital devices such as laptops, tablets, and e-learning platforms allows teachers to deliver materials in various formats. However, the use of technology without understanding the character of learning styles can actually hinder the effectiveness of learning. Therefore, it is very important to integrate learning approaches that adapt to the individual needs of students.

Teachers must be aware that the teacher's job is not only to come to school, chat, enter the class to provide material without thinking about the main task of educating children in developing character (Deak, Mentoring in Developing Character Development for Students at Smpk Bintang Mulia Mekar Wangi Bandung as One of the Efforts to Strengthen the Calling of Christian Life, 2021). Teachers act as adaptive learning designers. By utilizing technology appropriately, teachers can present material that suits various learning styles. For example, visual students can be facilitated with infographics and learning videos, while auditory students can be helped through podcasts or audio recordings of material explanations. The availability of this media also provides an opportunity to personalize learning more realistically, allowing each student to learn according to the rhythm and way that is most comfortable for them.

In practice, the individual learning process in the digital era faces a number of major challenges. First, differences in learning styles between students are often not considered in designing learning methods, so that students do not get an approach that suits their preferences. Second, the use of digital technology that is not yet directed often causes distraction rather than supporting the learning process. Third, the lack of educator competence in mapping and adjusting learning styles to learning materials is an obstacle to creating an effective learning environment. To answer this challenge, several solutions that can be applied include: implementing learning style assessments from the beginning of the learning process, utilizing digital platforms that provide adaptive features according to student character, and increasing teacher capacity through special training on personalized learning approaches. These solutions enable the realization of a learning process that is more relevant, interesting, and able to increase the effectiveness of individual student learning achievements.

Thus, the integration of learning style approaches, utilization of educational technology, and awareness of learner characteristics becomes the main foundation in creating an effective and responsive learning process in the digital era. The findings of this study underline the importance of a flexible and humanistic approach in technology-based learning, where attention to the uniqueness of each individual's learning not only improves

academic outcomes but also forms a meaningful learning experience.

The Most Effective Strategies in Teaching by Paying Attention to Learning Styles and Their Implications

Teaching with students' learning styles in mind is a very important approach in creating an effective and inclusive learning environment. In this context, teachers need to understand the various learning styles that exist and adjust teaching strategies to achieve them. The learning styles referred to here are Visual, Auditory, Reading/Writing, and Kinesthetic (VARK), which can be applied in different ways. Here are effective strategies in teaching that take these learning styles into account and their implications for the learning process.

Teaching Strategies Based on Visual Style

Visual Style refers to the preference of students who understand material more easily through pictures, diagrams, maps, or videos.

For effective teaching strategies, teachers can use:

a. Visual presentation
   Using visual aids such as PowerPoint, graphs, infographics, and mind maps to convey information.
b. Learning videos
   Show educational videos or demonstrations that show the concepts taught in moving images.
c. Interactive or digital whiteboard
   Create diagrams or images that clarify relationships between concepts.
d. Implications:
   This strategy will help visual learners to more easily understand and remember the information presented. By using visual tools, teachers provide opportunities for students to organize information graphically, which will make it easier for them to remember and analyze complex concepts. Students with a visual style are usually more active in interacting with images and symbols.

Teaching Strategies Based on Auditory Learning Style

Students with an auditory learning style learn more effectively by listening to information. They are able to retain verbally delivered material well and tend to understand lessons more easily through discussions or lectures.

a. Lectures and Presentations
   Use a clear and rhythmic speaking style to explain concepts verbally, ensuring that students can follow and absorb the information through listening.
b. Discussions and Q&A Sessions
   Engage students in discussions or question-and-answer sessions to give them opportunities to listen to different perspectives and verbal exchanges.
c. Use of Podcasts or Audio Recordings
   Provide learning materials in audio format, such as podcasts or recorded lectures, to support students who benefit from hearing information.
d. Implications:
   Auditory learners are more drawn to sound- and speech-based teaching methods. This approach enhances their listening and speaking abilities, while also developing their verbal communication skills. Learning through discussions can also improve their comprehension and critical analysis skills.

Teaching Strategies Based on Reading/Writing Learning Style

The Reading/Writing learning style refers to students who prefer to learn through reading texts and writing down information. These learners often rely on written content to absorb knowledge and feel more comfortable expressing understanding through writing.

a. Textbooks and Articles
   Provide students with extensive and in-depth reading materials to help broaden their understanding of the subject matter.
b. Writing Summaries or Notes
   Encourage students to write summaries or reviews of the learning content to reinforce comprehension through written expression.
c. Written Assignments
   Assign essays or articles related to the lesson topics to allow students to engage with and analyze content through writing.
d. Implications:
   This strategy enables students to better grasp information through reading and writing. Teachers need to create opportunities for students to explore learning materials by taking notes or writing reflections. Text-based learning is highly effective for improving literacy skills and enhancing analytical thinking.

Teaching Strategies Based on Kinesthetic Learning Style

Students with a Kinesthetic learning style prefer hands-on learning and physical experiences. They learn best when they can feel, manipulate, or engage directly with physical objects or real-world activities.

a. Experiments and Demonstrations
   Utilize laboratory experiments or physical demonstrations to illustrate scientific or mathematical concepts in a tangible way.
b. Educational Games and Simulations
   Incorporate educational games or simulations that help students grasp theoretical concepts through interactive and enjoyable experiences.
c. Physical Activities
   Engage students in physical activities such as educational drama or role-playing to deepen their understanding of lesson topics.
d. Implications:
   Kinesthetic learners benefit greatly from learning approaches that involve movement and real-life application. They tend to retain and understand information better when it is linked to practical experiences. This approach encourages students to be active and directly involved in the learning process. Another implication is that kinesthetic learners are typically more productive when they are allowed to move, making this strategy highly suitable for flexible and dynamic learning environments.

General Implications of Using Learning Style-Based Strategies

a. Personalized Learning
   Adapting teaching methods to suit individual students' learning styles creates a more personalized and meaningful learning experience. This enhances student engagement and motivation to learn.
b. Enhanced Cognitive Skills
   These strategies help students develop a wide range of cognitive abilities, including visual analysis, verbal communication, and practical kinesthetic skills.
c. Improved Learning Outcomes
   When instructional designs are aligned with students' learning preferences, learning outcomes tend to improve. Style-based instruction allows students to better understand and retain material.

Before the Digital Era

Before the rapid advancement of technology, learning styles heavily relied on traditional methods, which were limited to face-to-face interaction, physical books, and conventional classroom activities. Students had to depend on the available media at the time such as blackboards, textbooks, and handwritten notes.

Visual Learning – Pre-Digital Era

Visual learning was mostly restricted to illustrations in textbooks or drawings on the blackboard. Diagrams and charts were scarce and often difficult to access.

Example: Teachers would draw diagrams or concept maps on the blackboard, and students had to either reproduce or memorize them through their own notes.

Auditory Learning – Pre-Digital Era

Auditory learning depended greatly on live lectures, oral explanations, and face-to-face discussions in the classroom. Audio media such as tapes or voice recordings were rarely used for educational purposes.

Example: Teachers delivered verbal lessons directly, interacting with students through spoken explanations and Q&A sessions.

Reading/Writing Learning – Pre-Digital Era

This style relied on printed textbooks and handwritten notes. Students spent a significant amount of time reading materials and rewriting information to enhance their understanding.

Example: Reading printed textbooks and writing summaries or notes based on the lessons taught.

Kinesthetic Learning – Pre-Digital Era

Students who preferred hands-on or physical engagement often struggled to find sufficient opportunities to interact directly with learning materials. Practical activities were limited in conventional classroom settings.

Example: Participating in physical educational games or conducting experiments in a science lab, but only when resources were available.

After the Digital Era

The development of digital technology—especially the internet, educational apps, online learning platforms, and interactive devices—has transformed the way students learn. It has provided broader access to diverse learning styles as defined by the VARK model. Students today can engage with a variety of rich and personalized educational resources that align more closely with their individual learning preferences.

Visual Learning – Digital Era

Students now have access to a wide range of visual content, including videos, infographics, animations, interactive diagrams, and digital whiteboards.

Example: Watching an animated video that explains scientific processes or using an interactive concept map on a learning platform.

Auditory Learning – Digital Era

Auditory learners benefit from podcasts, recorded lectures, voice notes, and AI-based virtual assistants. These tools allow students to listen and re-listen at their own pace.

Example: Listening to a podcast episode on historical events or using a text-to-speech tool to convert reading material into audio format.

Reading/Writing Learning – Digital Era

Digital platforms support reading/writing learners through e-books, articles, digital annotation tools, and cloud-based note-taking apps.

Example: Reading academic articles online and summarizing them using apps like Notion or Microsoft OneNote.

Kinesthetic Learning – Digital Era

Hands-on learners can now use virtual simulations, educational games, interactive experiments, and even augmented/virtual reality (AR/VR) to practice and explore subjects more dynamically.

Example: Conducting a chemistry experiment virtually or engaging in a gamified learning platform that requires problem-solving through movement or interaction.

Visuals After the Digital Age

Visual learning is now richer with educational videos, interactive graphics and digital presentations. Platforms such as YouTube, TED-Ed and Khan Academy allow students to access materials accompanied by graphics or animations to facilitate understanding of more complex concepts.

Example: Using learning videos, infographics, or digital mind maps that allow students to see how information is connected in a dynamic visual format.

Auditory After the Digital Age

Auditory learning is now more accessible through podcasts, online lectures, and audiobooks that can be listened to anytime and anywhere. With the advent of social media, students can listen to lectures or discussions hosted by experts in their field.

Example: Accessing educational podcasts, learning videos, and online lectures on platforms such as Coursera or edX.

Reading/Writing After the Digital Age

Students with this style can now access e-books, academic articles and educational blogs directly on their devices. In addition, they can also write or take notes using digital tools such as Google Docs and other note-taking apps.

Example: Reading materials from educational websites, rewriting notes using word processing applications, or participating in online discussions in academic forums.

Kinesthetic: After the Digital Age

Students can now experience practice-based learning with the help of virtual simulations, technology-based educational games, and virtual labs. With devices such as virtual reality (VR) and augmented reality (AR), students can experience hands-on learning even in a digital space.

Example: Taking part in online simulations of experiments, participating in interactive educational games, or taking part in virtual labs that allow them to interact with the subject matter without having to be in a physical location.

The digital age has brought a very significant transformation in the way students learn, particularly in terms of the VARK learning style. With technology allowing greater access to learning materials in various formats, students can now choose methods that suit their learning style. This provides convenience, efficiency and flexibility in the teaching and learning process.

CONCLUSION

In today's digital era, the challenges and opportunities in education are evolving rapidly. This change demands a learning approach that is more adaptive to individual needs. One approach that has proven to be relevant and effective is to pay attention to each student's learning style. Learning styles, as described in the VARK model (Visual, Auditory, Reading/Writing, and Kinesthetic), indicate that each individual has different preferences in absorbing and processing information.

Understanding these learning styles allows teachers to design more personalized, meaningful and effective learning strategies. Strategies that suit students' learning styles can improve their engagement, motivation and learning outcomes. In practice, the integration of digital technology also enriches the method of delivering material according to various learning styles, ranging from interactive visual media, audio learning, to practical application-based simulations.

Through the analysis of learning style characteristics and the application of appropriate strategies, it can be concluded that learning style adjustment is an important factor in improving the effectiveness of individual learning in the digital era. The application of these principles not only provides space for the optimal growth of students' potential, but also encourages the creation of a more inclusive, responsive and learner-oriented education system.

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