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Scratch as an Optimal Learning Media in Microlearning

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Abstract

In the contemporary digital age, conventional pedagogical practices are transforming the microlearning approach, which disseminates content in discrete units to facilitate enhanced comprehension among learners. This article examines the potential of Scratch as an educational tool that can be employed to support the microlearning approach. Scratch is a block-based visual programming platform designed to facilitate beginners' learning of programming interactively. The utilization of Scratch across a range of educational levels has been demonstrated to enhance students' motivation, active engagement and learning outcomes. The findings of this literature review indicate that Scratch has the additional benefit of improving students' logical and creative thinking skills. Nevertheless, there are obstacles to the implementation of Scratch, including restricted access to technology and the necessity for teacher training to comprehend programming concepts. It is therefore evident that support from educational institutions and the government is crucial to realize Scratch's potential fully. By integrating Scratch into the microlearning framework, students can learn enjoyably and efficiently, thereby creating a more dynamic and relevant learning experience that is better suited to the needs of the digital age. This article aims to provide insight into the effectiveness of Scratch as a learning medium in the context of microlearning and to encourage further research on the application of technology in education.

Keywords: Learning Media, Microlearning, Scratch

Introduction

In today's digital era, traditional learning methods are beginning to transform to adapt to technological developments and increasingly dynamic student needs. One innovative approach that is gaining popularity is microlearning, where learning materials are delivered in small, digestible chunks that students can access anytime. This approach facilitates a more flexible learning process, especially for generations accustomed to quick and brief information. However, traditional learning tools often

struggle to meet these evolving demands, as they tend to rely on linear, time-consuming methods. In response to this challenge, innovative tools that combine interactivity and simplicity like Scratch have emerged as effective solutions.

Scratch is a block-based visual programming platform designed to simplify programming learning, particularly for beginners. Using an interactive and intuitive interface, Scratch enables students to learn programming through an enjoyable process without complex technical barriers. Additionally, Scratch provides opportunities for students to develop logical and creative thinking skills, which are crucial in programming.

Several studies show that the use of Scratch across various educational levels, from elementary school to higher education, has a positive impact on learning motivation and student engagement. For example, a study conducted at a university in Ecuador showed that using Scratch increased graduation rates up to four times compared to traditional methods. This emphasizes Scratch's potential as an effective learning tool in various contexts, including when combined with microlearning.

This article aims to discuss how Scratch can be optimally used within the microlearning framework to enhance learning effectiveness, especially in developing computational skills. By integrating Scratch features and microlearning methods, students are expected to learn more efficiently, flexibly, and enjoyably, leading to better learning outcomes in this digital learning era.

Research Methodology

This article uses a literature review as a method to discuss more clearly about Scratch as a microlearning media. The article collects various results from previous research with relevant topics as references. Then, all data and information obtained are collected, analyzed, and concluded to reach literature review conclusions that align with this article.

Literature shows that the use of Scratch at different learning levels not only improves subject understanding but also develops students' logical and creative thinking skills. Furthermore, many studies emphasize Scratch's positive influence on learning motivation, and results show significant improvements in acceptance rates when used in learning contexts. By integrating these two concepts, this literature review argues that Scratch can be optimized within the microlearning framework to

create a more positive, enjoyable, and relevant learning experience in the digital world, enabling students to access and use content effectively to understand materials.

This research data is secondary in nature, obtained through data available on the internet, Google Scholar, and other data sources (Rahayu, Restu, et al., 2022). Primary sources of secondary data involve obtaining, accessing, or requesting data from other parties who have collected it on-site. Researchers only use data that has been available for their research. Secondary data is divided into two types: internal data and external data, which are accessed in more detail. The data collection method used is the documentation method that seeks information from literature related to the research topic.

Findings and Discussion

Microlearning is a learning strategy that focuses on dividing content into smaller segments and reducing cognitive load on learners, making it easier to understand and memorize. With microlearning, material is presented in brief, actionable formats and can be accessed anytime, anywhere. This strategy makes e-learning more effective through content such as short videos, infographics, images, articles, and quotes. Designed with small modules and short learning sessions, microlearning is highly suitable for maximizing brain capacity, avoiding boredom, and preventing the easy forgetting of learning materials (Mayer, R. E., Moreno, R., 2003).

Scratch is a visual programming language and online community developed by MIT Media Lab. Scratch enables the creation of stories, games, animations, and interactive simulations by placing connected graphical blocks like puzzle pieces (Kafai, Y. B., & Burke, Q., 2014). Developed specifically for children and beginners by the Lifelong Kindergarten Group at MIT Media Lab, Scratch provides an intuitive and enjoyable platform for creating interactive digital projects. Scratch is designed to provide a visual approach for children to learn programming and computational skills, helping them understand basic programming concepts without struggling with traditional programming code.

Scratch also offers an active online community, encouraging users to share their projects, learn from others, and collaborate in an environment that supports deep learning and digital creativity. This reinforces the concept of active learning

that aligns with microlearning. The development of Scratch as a learning medium has become a progressive step in the world of education. Scratch's potential can be explored across various educational levels and different subjects.

Benefits of Using Scratch in Microlearning

Research results (Karomah, et al. 2024) show that using Scratch in learning significantly impacts children's interest and learning motivation. The use of Scratch in learning increases the active participation of previously less active children, making them more engaged, frequently asking questions, discussing, and sharing opinions, showing increased curiosity in the learning process. Scratch allows children to experiment with projects without fear of making mistakes, creating intrinsic motivation and active participation in the learning process.

Scratch can be used across various disciplines, in other words, this platform is flexible. For example, in foreign language learning, teachers can create interactive stories, speaking simulations, or language quizzes. In science, teachers can create experimental simulations or visualize scientific concepts. Scratch's ability to adapt to different subjects makes it a flexible and effective tool across various learning fields.

Learning materials in Scratch can be divided into small projects that align with the microlearning model. Each project presents new challenges that can be completed in a short time, accelerating concept understanding. For example, in language learning, teachers can divide material on one topic into small parts that students can access gradually to facilitate understanding and mastery of the topic. An example of implementing this with the topic "Self-Introduction" in French learning can be divided into 5 segments:

* Segment 1: Basic vocabulary for self-introduction (name, age, origin).
* Segment 2: Related grammar (personal pronouns, verb être).
* Segment 3: Practice making simple sentences for self-introduction.
* Segment 4: Cultural introduction (common greetings in France).
* Segment 5: Mini project (create introduction dialogue using Scratch).

Scratch gives children opportunities to explore their imagination through creativity. By creating animations, games, and interactive stories, children can express their thoughts and ideas, enriching the learning experience. These activities not only support imagination but also encourage the development of critical thinking and problem-solving skills. By using various Scratch elements, they learn to

solve challenges logically and creatively, making learning more enjoyable while increasing engagement and deeper understanding.

As freeware, or software that doesn't charge users, it becomes a distinct advantage that this software has fairly complete features to support its use, especially in animation and audio capabilities. Its use is relatively simple and easy to learn compared to other similar software. With all the conveniences offered, this application can greatly help teachers in creating informatics games to support learning (Perkasa, R. A. E., & Wantoro, J., 2024).

In their research (Yanti M, Fitri, 2023) presents five results from previous studies related to Scratch focusing on analyzing student learning interest, learning media development, and utilization of Scratch media to see the effect of using Scratch learning media on increasing student learning interest, and the results of these five studies are the same, showing improvements and good results. This indicates that Scratch is an effective medium as a learning tool.

Challenges in Using Scratch as a Microlearning Media

Every aspect has its positive and negative sides, and the same applies to the utilization of the Scratch platform. Despite the many benefits that can be experienced, there are also challenges faced in implementing Scratch in microlearning, including:

1. Limited Access to Technology

Limited access to devices and internet connectivity is a major challenge in using Scratch as a microlearning media because devices used to access Scratch must be sophisticated with good internet access. Without adequate devices or good connections, both teachers and students cannot use all of Scratch's capabilities such as creating animations or interactive games. Additionally, optimal digital learning through Scratch requires downloading or storing projects online, which is disrupted without internet connectivity. This can hinder students' learning experience.

2. Need for Teacher Training in Using Scratch

The varying abilities of teachers in understanding programming concepts present a significant challenge. One major factor is the generational gap in digital literacy, senior teachers often face greater difficulties in adopting new technologies compared to their younger counterparts. Therefore, providing targeted Scratch programming training is essential to improve teachers' understanding and teaching

skills, ultimately enhancing the quality of instruction. Many teachers still lack programming knowledge, which can lead to less engaging and less interactive lessons. To address this, Scratch training can be implemented in two stages: basic and advanced, covering both foundational elements and more complex applications (Anis, Yunus, et al., 2023).

Conclusion and Suggestion

Scratch facilitates more effective and engaging learning experiences; therefore, teachers play an important role in supporting students to use Scratch correctly. The inclusion of Scratch in education is not only relevant for language teaching but can also be used across various fields, making it a versatile tool in improving learning effectiveness in the digital age. The use of Scratch as a microlearning media has great potential in enhancing the effectiveness of the teaching-learning process in the digital era. By presenting material in simple, brief, and segmented forms, the microlearning method facilitates deeper and more flexible understanding for students, especially generations accustomed to quick information. Scratch, as an interactive and intuitive visual programming platform, enables students from various educational levels to learn enjoyably. The integration between Scratch and microlearning has been proven to increase learning motivation, active participation, and concept understanding across various subjects. However, challenges such as limited access to technology and the need for teacher training must be addressed to maximize Scratch's potential. With this combination, a more dynamic, relevant, and deep learning experience can be created, in line with current educational technology developments.

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