

MICROLEARNING USING IT TOOLS – CONCEPT AND BENEFITS

Todor Atanasov, Todorka Terzieva

Abstract. *This research presents the results of a study on the concept of microlearning through the application of information technologies. Microlearning is a way of teaching and delivering content to learners in small parts of the teaching material to achieve targeted and specific learning outcomes. This article focuses on the nature and characteristics of microlearning and analyzes the advantages and limitations of this learning approach. Good practices for educational approaches using software tools that apply microlearning principles are presented.*

Key words: Microlearning, Digital tools for teaching, Artificial intelligence.

1. Introduction

The increasing volumes of information produced, its active use in various fields of human activity, the creation of a modern information and communication infrastructure are the main factors for the growing need to develop an information society with specific digital skills. The modern information-education environment supports all popular technological forms of communication within the developed educational portals, e-learning platforms, personalized social networks, etc. According to the National Strategy for the Effective Implementation of ICT in Education and Science, the implementation of e-learning significantly changes the nature of the work of educators, the main function of which becomes the creation of e-learning materials and conducting consultations with learners. The teacher creates conditions for the learning process through appropriate teaching methods and by structuring the learning content to achieve the desired results. Research by various authors has shown that the effectiveness of ICT-enhanced learning depends on the way teachers organize the learning process and integrate technology into the teaching and learning process.

Microlearning has emerged as one of many innovative teaching meth-

ods developed in response to recent global events, including the COVID-19 pandemic. These disruptions have accelerated the adoption of digital learning strategies, as educational institutions and organizations sought more flexible and accessible approaches to deliver education and training. Microlearning delivers educational content in short, targeted units designed to meet specific learning objectives, making it particularly well-suited for these challenging times.

This paper aims to explore the possibilities, limitations, and potential benefits of integrating microlearning into Bulgarian secondary education. By analyzing its application in other contexts and examining relevant academic literature, this study seeks to identify strategies for effectively implementing microlearning in schools to enhance learning outcomes and address existing educational challenges.

2. Nature and Characteristics of Microlearning

The academic interest in microlearning has grown substantially, with numerous studies examining its implementation in various contexts. For instance, recent research highlights its potential to improve learner engagement and information retention through short, focused learning sessions [1, 2]. Similarly, Thalheimer and Mayer emphasize its learner-centric approach, offering flexibility and personalization, which aligns with the needs of modern education [5, 6]. Microlearning is a way of teaching and delivering content to learners in bite-sized (3–5 minutes) bursts at the point of need, with a focused and specific learning outcome. The learner is in control of what and when they are learning, and can complete their training at a time and place that suits their busy schedule [8]. Microlearning content harnesses this behavior by replicating your existing habits, allowing you access to short bursts of information that are more engaging and easily digestible. The concept of microlearning is based on the Hermann Ebbinghaus forgetting curve, which demonstrates that when people take in large amounts of information, retention of what was learned tends to degrade over time. In fact, people typically lose 80% of the knowledge they learn within a month. Microlearning combats the forgetting curve by breaking information down into bite size chunks and allowing learners to revisit training over time, improving retention of key points and enabling them to incorporate this into their daily workflow. Microlearning content can take many different forms. The one non-negotiable, unsurprisingly, is

that it must be short and succinct.

In Bulgaria, microlearning has found its way into business environments, where companies implement it for employee training and professional development. A notable example is SAP, a global leader in enterprise software with offices in Sofia. SAP utilizes its own learning management platform, SAP Litmos, to deliver microlearning modules, which include short videos, quizzes, and scenario-based exercises. These modules are accessible on-demand, allowing employees to build skills at their own pace and apply new knowledge quickly and effectively. SAP's use of microlearning in its Bulgarian office underscores the method's success in corporate settings, where just-in-time knowledge and flexible learning are essential to workforce development.

However, despite its success in corporate settings, microlearning has yet to be widely adopted in Bulgarian schools. Given the unique challenges faced by the Bulgarian education system, including varying student engagement levels and outdated teaching methods, introducing microlearning could offer substantial benefits.

Microlearning is characterized by its distinctive approach to delivering educational content in small, digestible units. These features make it a powerful tool for modern learning environments, particularly in contexts requiring flexibility and adaptability. Below are the defining characteristics of microlearning, supported by real-world examples and relevant research. Microlearning modules are designed to target specific learning outcomes through brief, concentrated lessons. These lessons typically range from a few minutes to under 15 minutes, allowing learners to grasp core concepts without overwhelming cognitive load.

For example, SAP Litmos delivers training content in small bursts through interactive videos and scenario-based exercises, enabling employees to quickly acquire necessary skills (Fig. 1). This approach ensures that learners focus on the most relevant information, improving retention and comprehension. One of the hallmarks of microlearning is its reliance on digital platforms for content delivery. These platforms ranging from mobile apps to Learning Management Systems (LMS) allow learners to access content anytime, anywhere. Platforms like Coursera and Udemy incorporate microlearning principles by offering short, modular courses that learners can complete at their own pace. These platforms include multimedia content such as videos, infographics, and interactive quizzes, providing

diverse learning modalities.

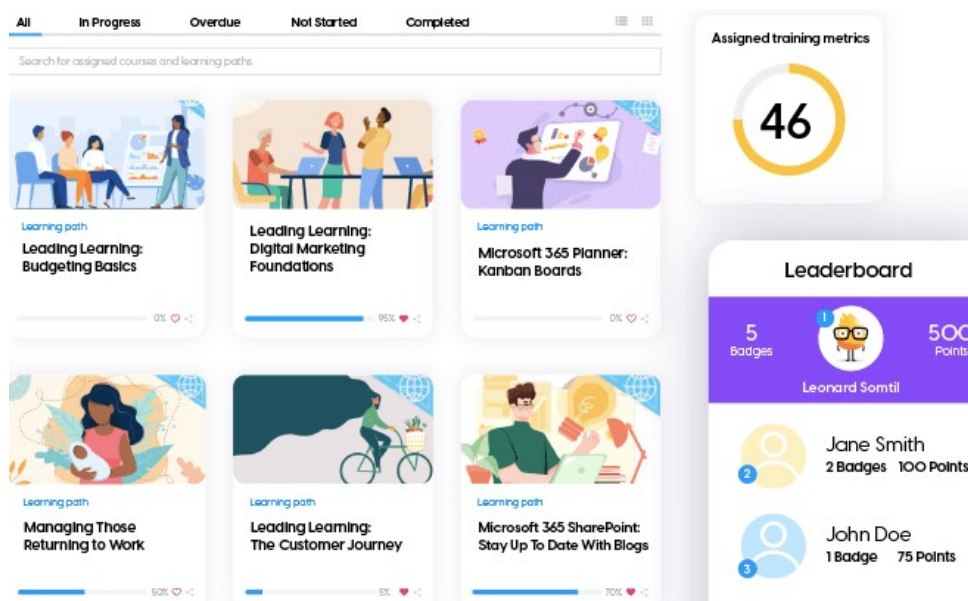


Figure 1. SAP Litmos. Microlearning for Corporate Training.

Microlearning provides learners the flexibility to engage with content at their own convenience, making it ideal for busy professionals or students balancing multiple responsibilities. Learners can access content on-the-go, using mobile apps or web platforms.

For instance, in Bulgaria, TELUS International has implemented microlearning for employee development. Employees use mobile applications to complete short, focused training sessions during breaks or downtime, demonstrating how microlearning fits seamlessly into a corporate workflow.

To keep learners engaged, microlearning often includes interactive elements such as quizzes, gamified activities, and multimedia content. These elements not only reinforce learning but also make the process enjoyable and motivating. An example is the language-learning platform Duolingo, which uses microlearning principles to teach users new languages through gamified lessons and quizzes. Learners earn points, unlock levels, and receive instant feedback, keeping them motivated and improving their retention rates.

Academic studies confirm the effectiveness of these characteristics in improving learner outcomes. For instance, Mayer highlights the role of multimedia in enhancing learning experiences [5], while Thalheimer emphasizes the importance of brief, focused content for knowledge transfer [6].

These characteristics collectively make microlearning a versatile and effective educational approach. Whether in corporate settings like SAP or TELUS International, or through global platforms like Duolingo, microlearning demonstrates its value in diverse learning environments. In this paper we explore how these characteristics can be adapted to Bulgarian schools to address specific educational challenges and improve learning outcomes.

3. Benefits and Limitations of Microlearning

Microlearning offers a wide range of advantages, particularly in the modern, fast-paced world where learners often juggle multiple responsibilities. This section delves into its key benefits with real-world examples, supporting research, and visuals. Microlearning's concise lessons cater to the reduced attention spans of modern learners, allowing them to focus on specific concepts without becoming overwhelmed. Research shows that breaking information into smaller chunks improves cognitive processing and retention [5, 8].

One of the key benefits of microlearning is that it allows for self-paced learning, enabling learners to complete (and revisit) training as and when suits them. This added flexibility increases completion rates and ensures that training is an opportunity to learn, rather than an unwelcome interruption of their workflow. Traditional LMS courses are often rigid in structure, and overlook the fact that everyone learns differently and at their own pace.

The way that we prefer to consume information has fundamentally changed. When you consider more from 68% of all global website visits in 2020 came from mobile devices, it's no surprise that microlearning and mobile-friendly training is on the rise. It is for this reason that mobile learning and microlearning are so closely connected, and often appear in tandem. While microlearning breaks information down into short 2–5 minute bursts, mobile learning enables us to deliver that information through the devices that Millennials and society at large use. The microlearning method significantly increases retention of key training. In fact, research shows that microlearning improves focus and supports long-term knowledge retention by up to 80% [9].

Microlearning enables learners to access content on-demand, making it ideal for those with limited time. This flexibility is particularly benefi-

cial in professional settings, where employees need to balance their work and learning commitments. Workers can engage with microlearning content during commutes or breaks, which allows for seamless integration of learning into their daily routines. This approach enhances accessibility and ensures consistent skill development [11].

Microlearning excels in delivering specific information or skills at the moment they are needed. This approach is invaluable in contexts such as on-the-job training or technical support, where learners must quickly acquire knowledge to solve immediate problems.

TELUS International uses microlearning modules to train customer service representatives on new product features. These just-in-time lessons allow employees to quickly learn and apply the necessary information when responding to customer queries, improving efficiency and customer satisfaction [12].

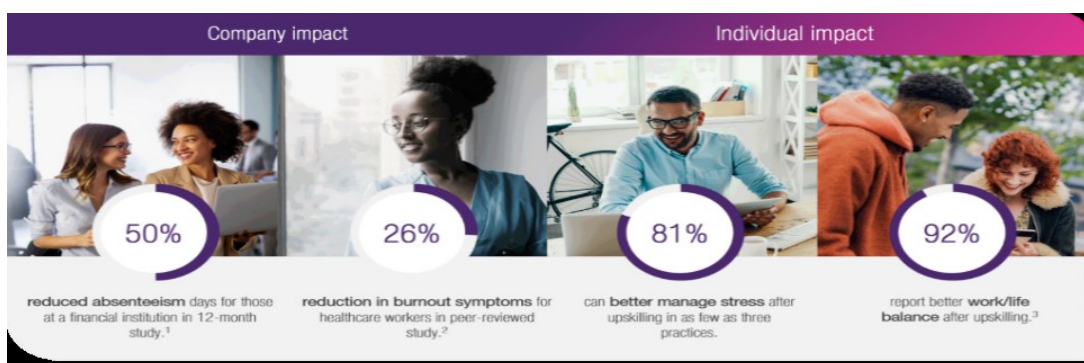


Figure 2. TELUS International. Enhancing Customer Support with Microlearning

Despite its advantages, microlearning has limitations that need to be considered to maximize its effectiveness.

While microlearning is excellent for delivering targeted content, it may fall short in subjects that require deep exploration or complex understanding. Learners tackling such topics often need supplemental resources or traditional learning methods. In medical education, microlearning modules are effective for reviewing specific procedures or symptoms. However, understanding comprehensive topics like human anatomy requires traditional, in-depth coursework supplemented by detailed textbooks and hands-on practice [6].

Microlearning’s segmented structure can lead to fragmented understanding. Learners may struggle to connect individual lessons, limiting

their ability to form a holistic view of the subject. Compliance training often uses microlearning to cover regulations in small modules. However, employees sometimes fail to see the bigger picture, such as how individual rules interact within the broader regulatory framework [2].

Microlearning often places the responsibility of progress on the learner. Without intrinsic motivation or external support, some learners may lose momentum or engage only superficially. Platforms like Duolingo or Memrise rely heavily on learner motivation. While gamification helps, users often drop out if they do not set clear personal goals or maintain a consistent routine [1].

4. IT Tools in supporting Microlearning

Information technology (IT) tools are integral to the success of microlearning, enabling the delivery, customization, and monitoring of learning experiences. These tools empower educators and organizations to create tailored content that meets learners' specific needs and preferences, enhancing engagement and outcomes. LMS platforms are essential for organizing, managing, and delivering microlearning content. They provide centralized systems where learners can access modules, track their progress, and complete assessments. LMS tools often support multimedia content and interactive activities. Moodle, a popular open-source LMS, allows educators to design and deliver microlearning modules that include videos, quizzes, and forums. The platform's robust analytics capabilities enable instructors to monitor learner progress and adapt content as needed.

Duolingo, a language-learning platform, uses short, interactive lessons to teach vocabulary and grammar. By gamifying the learning process through quizzes and instant feedback, it ensures users remain engaged and consistently return to the app. Studies highlight that learners using Duolingo retain new words more effectively compared to traditional language courses [10].

Mobile apps make microlearning content highly accessible, allowing learners to engage with material anytime, anywhere. These apps provide convenience and flexibility, making learning seamless even for busy professionals or students. Khan Academy is a widely recognized platform that offers short video lessons and interactive exercises help learners quickly grasp key concepts and practice their skills, whether they're commuting or taking a break. Khan Academy's mobile app offers microlearning lessons

in subjects like mathematics, science, and history. It allows students to learn at their own pace, reinforcing concepts through practice and quizzes.

AI-driven tools enhance microlearning by personalizing content and optimizing the learning journey. These tools analyze learner behavior and performance to recommend tailored content, adjust difficulty levels, and provide real-time feedback. EdApp uses AI to deliver personalized microlearning experiences. Its AI-driven analytics identify gaps in learner understanding and suggest relevant modules to address those gaps, ensuring learners receive the most effective training.

Gamification involves incorporating game-like features into learning platforms to boost engagement and motivation. Points, badges, and leaderboards create a competitive environment, encouraging learners to complete modules and achieve higher scores. Classcraft gamifies learning by turning educational content into interactive challenges. Learners earn points for completing microlearning modules and can track their progress on leaderboards. This approach increases motivation and fosters a sense of accomplishment.

These IT tools demonstrate the versatility and impact of technology in supporting microlearning. By leveraging platforms like LMS, mobile apps, AI-driven systems, and gamified experiences, educators and organizations can deliver engaging and effective learning tailored to the needs of diverse audiences.

5. Conclusion

Microlearning, supported by IT tools, presents an innovative and flexible approach to education, offering numerous benefits such as increased learner engagement, flexibility, and just-in-time learning. However, it also faces limitations, including a lack of depth and potential knowledge fragmentation. Understanding and implementing good practices in microlearning learners. As IT tools in education continue to evolve, microlearning is poised can help educators design effective learning experiences that meet the needs of today's to play an increasingly vital role in both formal and informal learning environments.

This paper serves as a foundation for further research on the potential integration of microlearning into Bulgarian secondary education. The subject of our further research is conducting a pedagogical experiment with

the aim of developing a methodological toolkit for combining and applying good practices from microlearning in traditional approaches for education. The obtained results will be presented in subsequent publications.

Given the unique challenges faced by the Bulgarian education system, such as varying levels of student engagement and ineffective teaching methods, this study aims to explore how microlearning can address these issues. Future research will involve pilot projects and case studies in Bulgarian schools, assessing the practical implications, benefits, and limitations of implementing microlearning strategies in this context.

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