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A STUDY ON THE USAGE OF M-LEARNING APPLICATIONS WITHIN BULGARIAN SCHOOLS

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Abstract

The transformation of the educational model is directly linked to the key participants in the educational process. Modern pupils cannot imagine life without the usage of various digital technologies such as mobile devices. Moreover, today's learners spend more time preparing for school using interactive mobile applications. That defines the purpose of this article: to explore the usage of m-learning applications in the educational process within Bulgarian schools. To achieve that it has been created a survey that consists of 11 questions and was distributed to 140 participants (pupils from Bulgarian schools). The results have shown that 54.28% of respondents use m-learning applications within the classroom and 72.86% of them use m-learning applications for self-study. Additionally, 60% of respondents believe that using such applications would enhance the educational process. This provides ample justification for directing efforts from all stakeholders (educational institutions, educators, and learners) toward wider and more comprehensive integration of these applications in the educational process. From the perspective of future research, there could be endeavors to conduct a more extensive and representative study by trying to utilize cluster sampling in order to overcome the limitations posed by the current research methodology.

Key words:

M-learning applications, mobile learning, mobile applications, education.

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1. Introduction

The integration of information and communication technologies into the educational process has been a topic covered in scientific literature since the 1980s. In contemporary conditions, the trend toward their increasing usage is associated with the emergence and acceptance of new pedagogical approaches, as well as the updating of the essence of knowledge. In this context technologies are often presented as a set of tools that are most used to solve various educational problems. Furthermore, businesses require personnel who possess knowledge, skills, and competencies to meet the demands of the new social ecosystem. In this context, the modern educational environment should provide opportunities for collaborative and individual work for both educators and learners, tailored to their needs, potential, and interests.

The transformation of the educational model is directly linked to the key participants in the educational process. Modern pupils cannot imagine life without the usage of various digital technologies. Devices such as smart TVs, laptops, smartphones, tablets, and smartwatches have become an integral part of their daily lives. Mobile devices allow for quick and immediate access to diverse information. Consequently, today's learners spend more time preparing for school using interactive mobile applications rather than relying solely on paper textbooks. For instance, they can prepare by listening video lectures from teachers or by watching historical films, physical or chemical experiments on platforms like YouTube. Moreover, all of this often takes place using mobile devices and mobile internet while pupils are on the move.

That's why it could be said that mobile learning (also known as m-learning) has a significant impact on the educational process. Over the past 4 years, this effect has become even more pronounced, especially due to the COVID-19 pandemic. The pandemic necessitated a temporary shift to fully electronic learning, which, for many learners, was primarily facilitated with mobile devices (such as smartphones and tablets) and mobile internet. In this way, we have witnessed an even greater applicability and importance of mobile learning in the modern educational process.

As a result of everything discussed so far, the purpose of this study has been defined. The article aims to explore the usage of m-learning applications in the educational process within Bulgarian schools.

2. Literature Review

A review of the scientific literature reveals that, as a relatively new field of study and witness to some technological breakthroughs in its early existence, the earliest definitions of mobile learning were proposed as early as the beginning of the 21st century. One of the first publications on the topic dates back to 2000. In that work, Quinn (2000) defines mobile learning as "e-learning through mobile computaional devices". Subsequently, Georgiev, Georgieva, and Smrikarov (2004) characterize mobile learning as a natural consequence of the evolution of e-learning. Even at a later stage, newer definitions continue to position mobile learning as a "teaching method that has the intersection between mobile computing and e-learning" (Chee, Yahaya, Ibrahim & Noor Hassan, 2017). In a more recent definition, the focus slightly shifts, describing mobile learning as "the use of mobile technologies to make educational materials accessible and effective at a time and place convenient to the learner" (e-Learning Centre, 2021).

From the discussed definitions it becomes clear that the focus of mobile learning are the mobile technologies and more precisely the mobile devices (such as smartphones and tablets) and the mobile internet. From technological point of view the application software used on these mobile devices is called a mobile application or simply an app. On the other side from the perspective of mobile learning, mobile applications that are used to facilitate some form of education are referred to as m-learning applications.

Given that various m-learning applications can be used in the educational process, it is important for this article to categorize them into groups. After reviewing the scientific literature, it becomes clear that finding specific classifications for m-learning applications is a challenging task. However, a relatively general classification proposed by Brown (2014) is suitable for the present study. According to this classification, the following groups of m-learning applications can be distinguished:

- Science Educational Apps: These applications cater to different academic disciplines (such as physics,

biology, mathematics, etc.).

- Apps for Language Learning: Designed to assist learners in acquiring foreign languages.
- Apps for Students with Specific Learning Disabilities: Tailored to support students with unique learning needs.
- Apps for Classroom Education: Aimed at enhancing the educational process within the classroom.
- Apps for Educators: Developed to aid teachers in their teaching practices.
- Apps for Kids and Elemetrary School: Geared toward children and learners in the early stages of their education.

According to Shahabadi and Uplane (2015), two of the main types of e-learning are synchronous and asynchronous learning. Here, e-learning is mentioned because as it was discussed in the definitions above mobile learning has its applicability within the context of e-learning. Therefore, it can be said that mobile learning has been successfully applied in both synchronous and asynchronous learning contexts. Through mobile devices, access to electronic resources on e-learning platforms is significantly facilitated, allowing learners to engage in learning either according to a pre-announced schedule in real time or at their convenience (self-paced learning), regardless of their location.

Based on what has been discussed so far, it can be determined that the object of the current research should be m-learning applications that support the learning process (for conducting online classes in real time and for providing access to educational materials), as well as those that are for self-study (specialized in specific subject and including materials on various disciplines).

Considering the scientific literature there are articles that explore m-learning applications. Some of them are directed towards the effect (Demir & Akpinar, 2018; Savin & Dumitriu, 2021) and the impact (Sizova, Sizova & Adulova, 2020; Johannsen, Knipp, Loy et al., 2023) that these applications have on the learning process. Others (Singh & Suri, 2022; Hattie, Sahlberg & Comer, 2023) are making a literature review on articles concerning m-learning applications.

Regarding publications in Bulgaria on the topic, the study by Rangel-de Lazaro and Duart (2023) indicates that their number is relatively low. Naturally, there are articles from various periods that address the topic of m-learning applications (Dochev & Hristov, 2006; Gourova, Asenova & Dulev, 2013; Kasakliev & Ruseva, 2018; Zhelyazkova, 2023). However, none of them specifically discuss the usage of mobile applications in school. This also justifies the purpose of the current article.

3. Material and Methods

To achieve the study's goal, it has been created a survey using Google Forms [1]. The survey method, which is used, is the most common quantitative method for collecting social information about the subjective world and behavior of the surveyed individuals. Simultaneously, the survey was anonymous, meaning no personal data of the pupils were used.

The conducted survey comprises 11 questions, with 10 of them being closed-ended questions, and 1 being an open-ended question. Among the closed-ended questions, there are different types, including demographic, drop-down, ranking, and Likert-scale questions. In the ranking questions the participants have the possibility to choose from a group of m-learning applications. These applications have been selected from platforms for their distribution (App Store and Google Play), with the criteria for their selection being the number of downloads achieved by users. Since this information is not explicitly published on the AppStore, it is calculated using a method presented in a study by Garg and Telang (2013).

The most straightforward way to select participants for the survey is through probabilistic sampling methods, specifically the simple random sampling method. With this method, all units of the entire population have an equal chance of being included in the research sample. Consequently, the sample's structure accurately

[1] An application by Google used for administering surveys and research.

reflects that of the entire population, ensuring the representativeness of the information obtained.

Unfortunately, it was not possible to use these methods in this survey due to the inability to access data containing the names and contact information of such a large number of participants (according to data from the Bulgarian Telegraph Agency as of the beginning of the 2023-2024 academic year, the pupil count is 702000 [2]). This limitation would have prevented the implementation of both the simple random sampling method and other probabilistic sampling methods.

Therefore, for the study, it was employed a non-probabilistic sampling method, specifically a combination of convenience and snowball sampling methods. This approach yielded responses from 140 participants (pupils from Bulgarian schools). Despite the potential limitations for the survey by using this method, it provided significant results that could be used as a foundation for further research.

4. Results and Discussion

The research results are presented in 9 figures.

On Figure 1 it is observed a balance between male and female participants in the survey: 57.14% are male, while 42.86% are female.

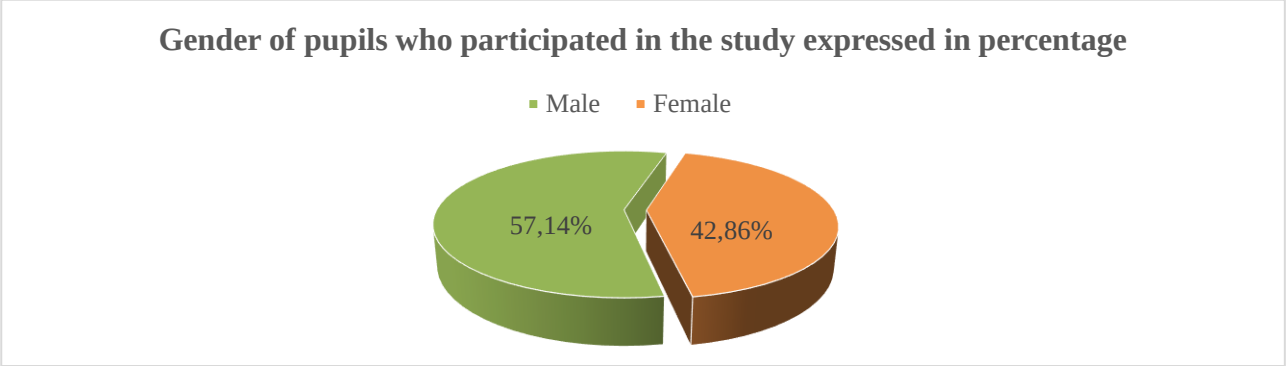


Fig. 1. Gender of pupils who participated in the study expressed in percentage
Source: Own research

Figure 2 displays the number of pupils who participated in the survey, distributed across different grades. Notably, responses come from pupils in various grades, which may provide insights into whether the class level impacts their answers to other questions.

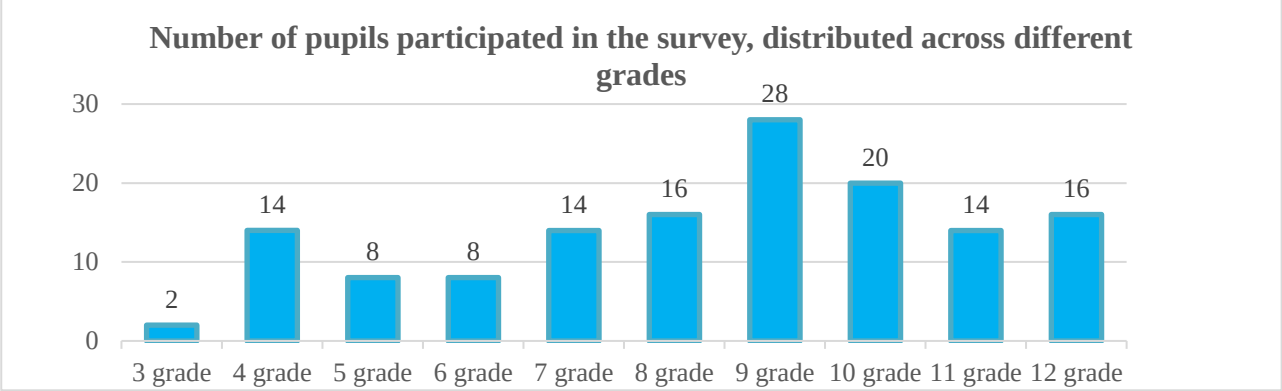


Fig. 2. Number of pupils participated in the survey, distributed across different grades
Source: Own research

[2] https://www.bta.bg/bg/news/lik/522980-novata-uchebna-godina-zapochva-v-2349-uchilishta-v-stranata-702-000-sa-uchenits

The third question in the survey aims to understand whether pupils use m-learning applications during class time. The results are presented in Figure 3.

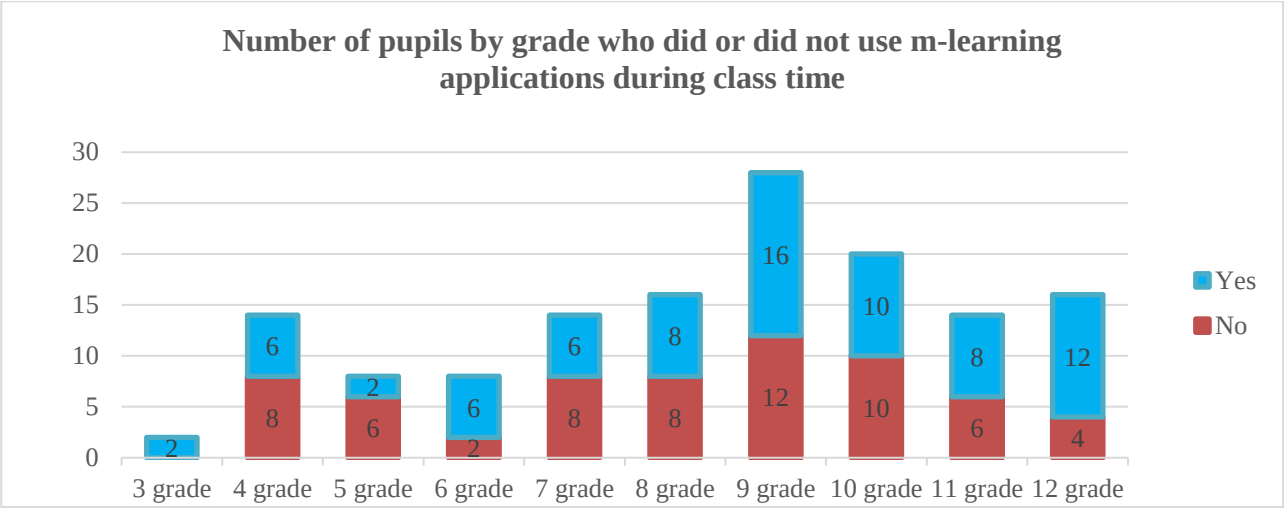


Fig. 3. Number of pupils by grade who did or did not use m-learning applications during class time
Source: Own research

The aggregated data shows that 54.28% of the surveyed pupils use m-learning applications in the classroom. Additionally, from Figure 3, it is observed that as pupils progress to higher grades, the usage of these applications increases, and overall, the trend is positive.

On an open question about what m-learning applications pupils are using, they primarily point out Google Classroom and Microsoft Teams. These results are obvious since these apps specifically facilitate online access to materials directly related to the educational process. On the other hand, pupils have also indicated using m-learning applications for self-study, such as Ucha.se, Photomath, Kahoot, Roblox, and YouTube.

The dominance of Google Classroom and Microsoft Teams as primary mobile applications for providing online access to educational materials is further confirmed by the data in Figure 4. 50.57% of respondents mention using Google Classroom, while 41.38% use Microsoft Teams during the electronically based learning due to the COVID-19 pandemic.

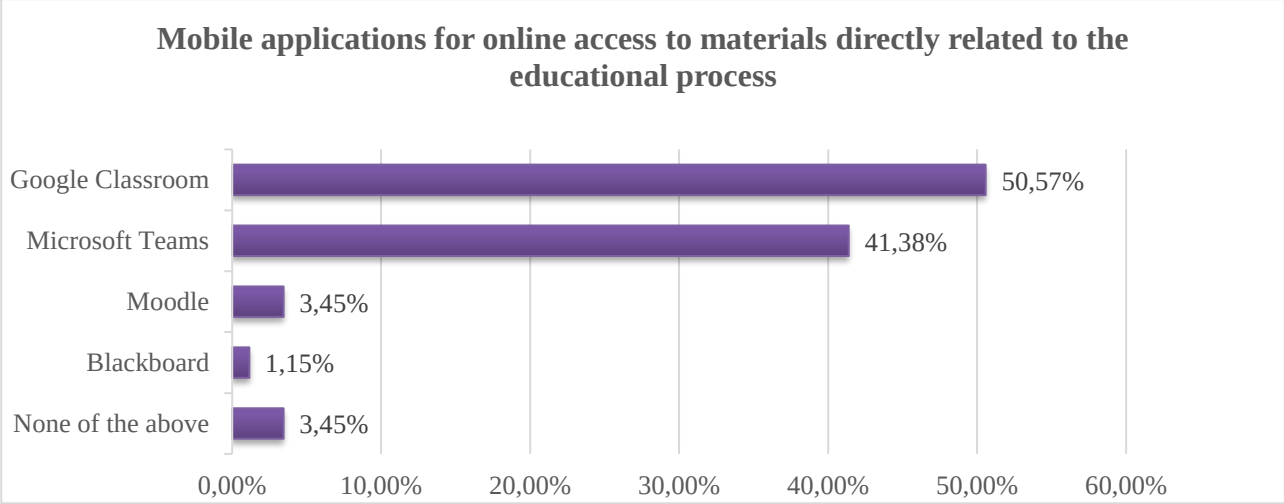


Fig. 4. Mobile applications for online access to materials directly related to the educational process
Source: Own research

Continuing with the context of electronically based learning, Figure 5 presents the relative share of mobile applications used for conducting real-time online classes. From the results, it could be seen that 2.4% of respondents have not used such applications on their smartphones or tablets, which suggests they might have relied on laptops or desktop computers for this purpose.

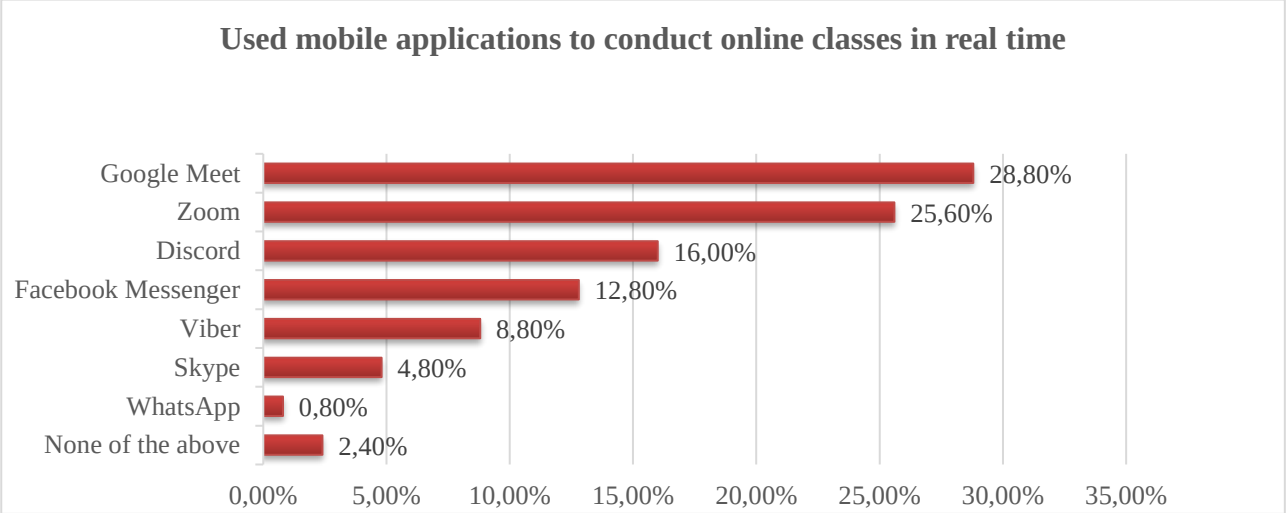


Fig. 5. Used mobile applications to conduct online classes in real time
Source: Own research

Up to this point, the results from the survey that have been discussed are primarily related to m-learning applications that support the educational process. The data to be presented in the following figures pertains to m-learning applications used for self-study by pupils outside the classroom. The aggregated data shows that 72.86% of respondents use such applications, and it is evident that the frequency of usage increases among pupils in higher grades. Consequently, Figure 6 and Figure 7 depict the most commonly used m-learning applications for self-study, categorized into two groups: those specialized in specific subjects and those encompassing materials from various disciplines. The leaders in each category are as follows: Photomath, Chemistry, Duolingo and Codecademy (specialized subject applications) and Ucha.se and Khan Academy (applications covering various disciplines).

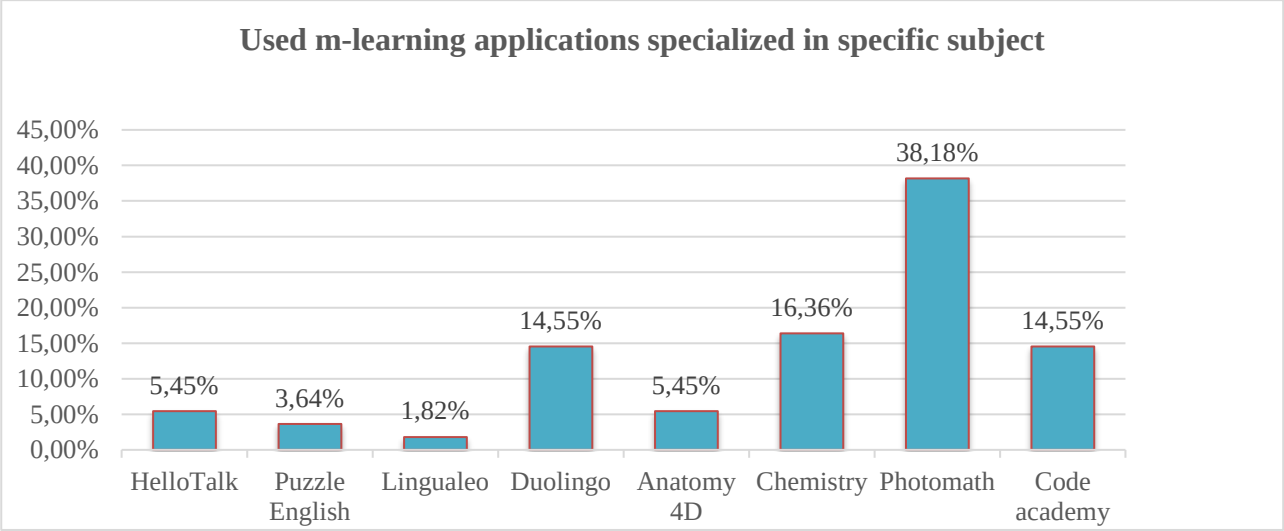


Fig. 6. Used m-learning applications specialized in specific subject
Source: Own research

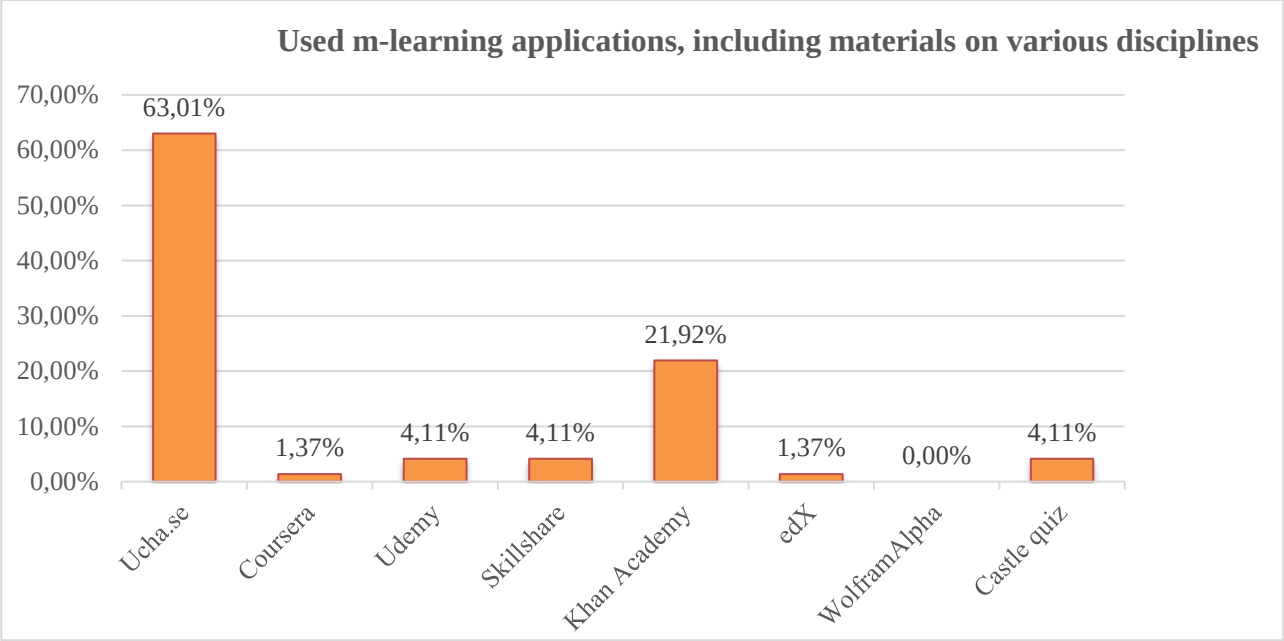


Fig. 7. Used m-learning applications, including materials on various disciplines
Source: Own research

The positive attitude of pupils toward m-learning applications is further confirmed by Figure 8, where 60% of respondents believe that using such applications would enhance the educational process. To further increase this percentage and reduce the number of pupils who have no opinion on the matter, efforts should be directed toward popularizing this relatively new method of learning.

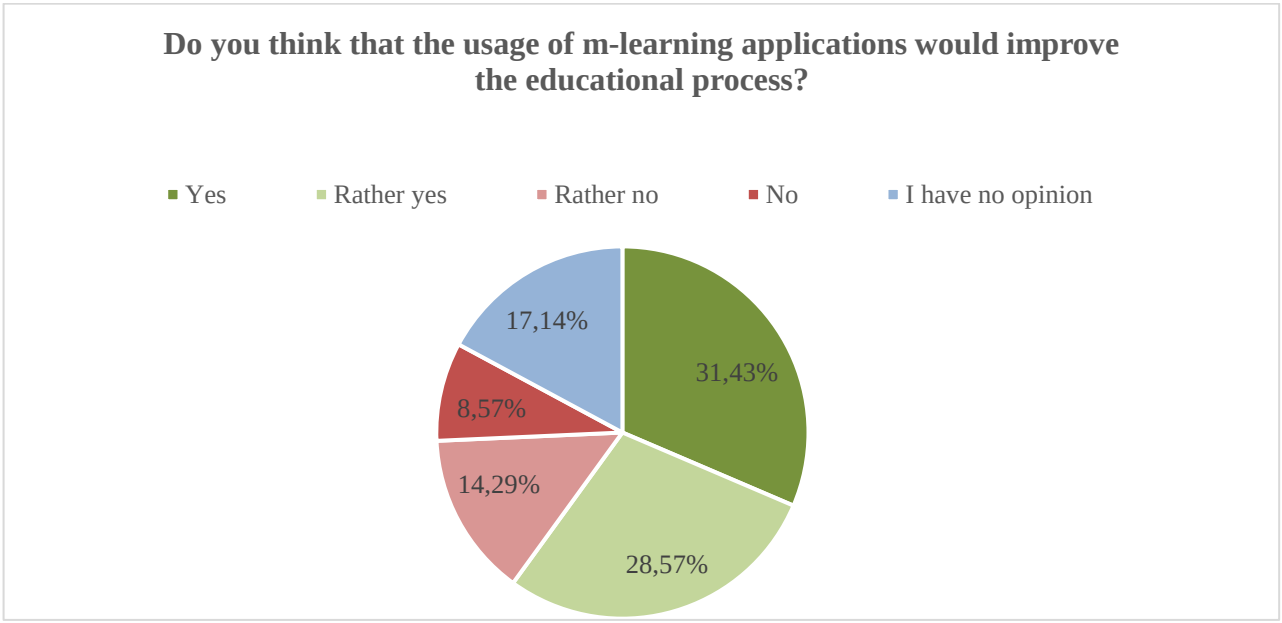


Fig. 8. Attitude toward the usage of m-learning applications
Source: Own research

In addition to the results presented above, Figure 9 reveals that despite the positive perception of mobile learning and the associated with them m-learning applications, the laptop remains the most preferred device for educational purposes.

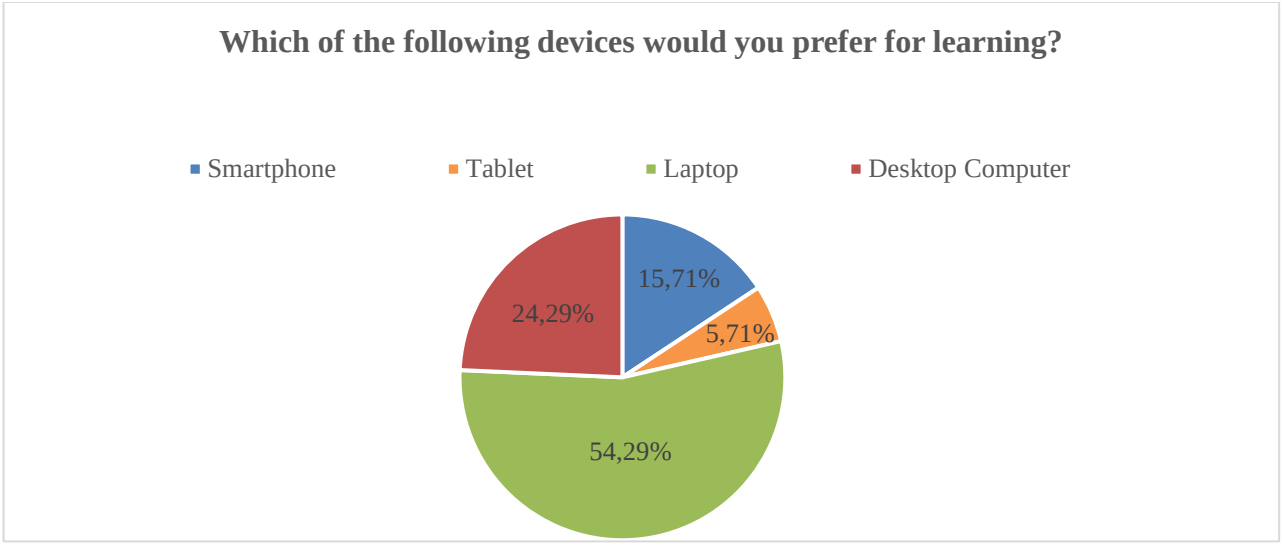


Fig. 9. Preffered devices for learning
Source: Own research

5. Conclusion

In conclusion, it could be said that mobile learning is a contemporary trend in education with broad applicability and numerous advantages. This is evidenced by the positive attitude of pupils toward m-learning applications as revealed by the conducted survey. On one hand, 54.28% of respondents use m-learning applications within the classroom. On the other hand, the percentage is even higher (72.86%) regarding the usage of m-learning applications for self-study. Additionally, 60% of respondents believe that using such applications would enhance the educational process. This provides ample justification for directing efforts from all stakeholders (educational institutions, educators, and learners) toward wider and more comprehensive integration of these applications in the educational process. By doing so, more good practices could be established in order to facilitate greater utilization of m-learning applications and overcome the existing challenges at this stage. From the perspective of future research, efforts can be directed toward addressing the limitations of the current study related to the choice of sampling method. Specifically, there could be endeavors to conduct a more extensive and representative survey by trying to utilize cluster sampling. This approach will aim to overcome the limitations posed by the current research methodology.

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