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## MIKSIKE: USE OF ESTONIAN ONLINE TOOLS IN UKRAINIAN SCHOOLS

*The analysis presented in this article is drawn from a broader qualitative study examining the experience of using online tools of the educational platform MIKSIKE (Estonia) in the EU, focusing especially on the Baltic countries, as well as its implementation in the Ukrainian schools. The authors highlight the literature review (Bykov & Ovcharuk, 2013; Hurevych & Kademiia, 2014; Morze & Vorotnikova, 2016; Mukan, Noskova & Baybakova, 2017; Patarkin, 2017a, 2017b; Robert, 2008, 2010; Vorotnikova & Kovalchuk, 2017; Zhaldak, 2005 etc.) as well as methods (theoretical methods: comparative analysis, logical and systemic analyses; applied methods: examining, inquiry, and conversations) used in this study. The researchers focus on the advantages of MIKSIKE online tools and their usage in the educational process. The dynamics of development and national expansion of the Project are presented. The authors analyse possibility to compare the results of different users, describe the selection of arranged mathematical exercises and problems, define the opportunity to create, store and use didactic materials on various school subjects. They determine the tool for creating test tasks of different complexity with the integrated conversion system of the obtained points into school grade.*

***Key words:*** *Pranglimine instructional training program, interactive exercises, teaching community involved in the project, educational reform, educational institution, educational online tools.*

### Introduction

The reform of the Ukrainian system of education, which has been going on for the last few years and is still in the phase of active transformations, opens opportunities for a Ukrainian teacher to master and actively use innovative methods, techniques and pedagogical tools in the educational process. On Education (2017), the new law of Ukraine is revolutionary in terms of its content and core, which is breaking established rules, introducing new approaches to education and studies and providing the environment to implement these transformations. The nine key components of the new Ukrainian school declared in the conceptual principles for the secondary school reform (Hryshchenko, 2016) delineate the main policies of the development of Ukrainian school and urge teachers to take a more active position in terms of not only implementing transformations but also discussing them. Everyone may become an agent of change and join the formation of a new modern school, where both children and teachers learn from each other.

### The aim of the study

The aim of the article is to reveal the peculiarities of applying online tools of the MIKSIKE educational platform (as the example of Ukrainian and Estonian educational project) in the educational process of public educational institutions of Ukraine, their benefits and the ways of their usage in the process of learning school subjects and extracurricular activities, providing the environment for the development of teachers' professional community and efficient cooperation between teachers and educational institutions of Ukraine in the framework of this project.

**Theoretical framework and research methods**

Using Internet services in educational process, their methodical and didactic capabilities are being researched by national and foreign scholars: Bykov & Ovcharuk, 2013; Hurevych & Kademiia, 2014; Morze & Vorotnikova, 2016; Mukan, Noskova & Baybakova, 2017; Patarkin, 2017a, 2017b; Robert, 2008, 2010; Vorotnikova & Kovalchuk, 2017; Zhaldak, 2005, etc. The experience of information technologies implementation into the educational process of foreign countries has become the subject of research of several scholars such as Ovcharuk & Soroko (2015). The development of technologies and reformation of educational systems of numerous countries around the world encourage scholars to broaden the boundaries of their research.

According to the aim and objectives of our research, we used theoretical methods to form the research database, to study normative and legislative documents as well as academic documentation in the schooling (programs, curricula, syllabuses, etc.). We used the comparative analysis of quantitative and qualitative data for determining common and distinctive features of the phenomenon under research. The logical and systemic analyses are the well-established approaches to assessing and outlining the advantages and disadvantages of the learning process in the online environment. Among applied methods, there are examining the organisation of educational process in the MIKSIKE project in Ukraine and Estonia, inquiry, and conversations with school teachers and parents.

**Results**

The European vector of the Ukrainian educational system development encourages educational institutions of Ukraine to search for positive practices and connections with educational institutions and organizations of the EU countries with the aim of sharing experience, learning and implementing innovative teaching methods into the organization of educational process. A positive example of such lasting and mutually beneficial cooperation is a MIKSIKE in Ukraine, the Ukrainian and Estonian project, which is successfully carried out in national schools with the support of the Ministry of Science and Education of Ukraine, postgraduate education institutions and the Academy of Continuing Education of Ukraine.

The project was initiated by MIKSIKE, the Estonian company founded in 2014–2017 by the Program of Development of the Ministry of Foreign Affairs of Estonia.

MIKSIKE is an online environment for teachers, school students and their parents, established in 1994 in Estonia as the place for implementing teachers' creative ideas, producing innovative didactic materials, carrying out educational online competitions, developing mental mathematical calculations and logical thinking with the help of online exercises etc. MIKSIKE has been successfully used in educational institutions of Estonia for over 20 years. Besides Estonia MIKSIKE online tools have also been used for a long time in the schools of Latvia, Lithuania and Slovenia.

By November 1, 2017 over 144,100 members from all regions of Ukraine have been registered on the MIKSIKE site (MIKSIKE in Ukraine, 2017), 17,000 of whom are actively using the tools and the capabilities of MIKSIKE program in the educational process (see Fig. 1). There is an official site of the project (MIKSIKE in Ukraine, 2017), as well as its availability in social networks, i.e. Facebook (MIKSIKE in Ukraine Facebook group, 2017). Students and teachers from more than 4 thousand educational institutions of Ukraine learned about the project at regional and district workshops and via social networks and as a result registered on the site. The project is actively implemented in 1472 educational institutions of the state among which there are rural and urban public schools, low population schools, educational complexes, schools with an in-depth study of certain subjects, gymnasiums, collegiums, lyceums, specialized educational establishments for children with disabilities, specialized educational institutions etc. All the activities of the MIKSIKE project are free of charge.
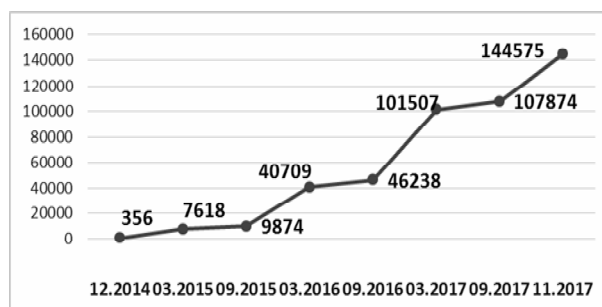


*Fig. 1. Dynamics of the MIKSIKE users' site growth (December 2014 – November 2017)*

MIKSIKE educational platform offers its users a range of online educational tools such as an instructional training program for mental calculations, a set of interactive exercises related to the school subjects, tools for creating interactive exercises (7 types) and carrying out educational quizzes, competitions, tests, contests etc. This training program for the developing mental calculations is recommended to be used by educational institutions of Ukraine in the process of learning Mathematics in 2016–2017 (Metodychni rekomendatsii shchodo vykladannia matematyky u 2016–2017 navchalnomu rotsi, 2016). These recommendations are extended to 2017–2018. The advantages of the MIKSIKE educational online tools, their continual work and availability have been appreciated by the teachers, students and their parents in all the regions of Ukraine.

The study enables to view MIKSIKE tools as those possessing several peculiarities and advantages, which distinguish them among other online educational simulators. The latter need further investigation and should be considered more precisely.

*The analysis of received results and the possibility to compare them to other users' results.* The research explores

that every site user has the possibility to assess their achievement in comparison with the users completing the same task. The table of the results for any task type is available for the registered members. For instance, the training program generates quantitate and qualitative analysis of the completed calculations of a single user, highlighting their mistakes and wrong answers. This allows the student to estimate his or her own capabilities, points out their weaknesses to the teacher, as well as effortlessly ensure the individual approach to every student. The results are stored on the site. Teachers, students or their parents can follow the dynamics of changes and studies efficiency, as well as the course of further development. In addition to mental calculation abilities reaction, attentiveness, concentration and logical thinking also develop. The skills learned as a result are not limited only to math, but also benefit overall life skills. The competitiveness of exercises makes the process of solving math calculations a way of achieving the aim, beating the rival, receiving the maximum points, breaking one's own record etc. As a result, school grades become less important than life skills such as overcoming hardships, ability to play and lose, make conclusions, set goals and achieve them become the top priority.

On the site, the teacher has the opportunity to create an environment, which is educational and competitive, allowing for individual, pair, and group work, depending on the educational objectives set. Task availability allows using the tools for home assignments and extracurricular activities 24/7. Six different complexity levels of mathematical problems allow working with both gifted students and those who require individual approach and a longer period to learn the information etc. Monitoring students' results on regular basis allows the teacher to identify students' capabilities and common difficulties and focus on their overcoming.

*A large selection of arranged mathematical exercises and problems.* The training program Pranglimine contains thousands of mathematical exercises and problems recommended to the users taking into consideration their age (grade) and the complexity level. No other book of mathematical problems can offer that number of tasks being instantly checked with the analysis of the results. Problems are selected by the system randomly with a low probability of repetition, eliminating memorization and providing more accurate results.

*The opportunity to create, store and use didactic materials on various school subjects.* MIKSIKE not only offers the teachers ready-made assignments and problems but also enables them to create didactic materials by themselves, store and use them in the teaching process directly from the site. Teachers can determine the complexity level of the created exercise and the time span students need to solve it. The table with students' results is accessible to the teachers who can also combine several exercises in order to create tasks for the tests and store them in relevant site sections. Teachers can use their own exercises as well as other teachers' exercises thus carrying out virtual cooperation between teachers, sharing experience and their findings.

The simplicity and the quickness of creating exercises which do not require any peculiar computer knowledge or skills, instant availability to the students upon creation or at any determined by the teacher time allow using MIKSIKE interactive exercises in teaching efficiently. Where and when to use the exercise depends only on the teacher, his or her creativity, educational and didactic objectives of the lesson or extracurricular activity.

*The tool for creating test tasks of different complexity with the integrated conversion system of the obtained points into a school grade.* One of the MIKSIKE tools is a test formation tool for creating test tasks. As the tests contain 4 test tasks of a close type this test formation tool enables the user to determine, the complexity level of each task and assess each task according to the scale. Test tasks might even contain graph drawings. Teachers' assessment of the task is performed with the click of the mouse and the number of obtained points is automatically converted into a 12-point assessment scale. After the test being assessed, students get the information about the obtained results, the mark as well as about the possibility to look through the right and wrong answers. Test results are stored in students' archive and may be printed.

Teachers receive the overall table of test results organized by the tasks and users and students' rating. All this allows teachers to monitor the quality of learning process and the dynamic analysis of obtained results.

As for the current moment, the teachers have created a community of those involved in the project that constantly come up with the new ways of using MIKSIKE tools in various educational activities and are eager to share their ideas and the results of their work. The investigation attempts to show that Ukrainian project members not only learn from their Baltic counterparts but also suggest new ways of developing MIKSIKE in their countries.

In 2016–2017, some member states of the project initiated regional activities, which may be joined by the Ukrainian users of MIKSIKE. Lviv region housed Stryi open championship of mental calculations (September–October, 2016), which served the purpose of practising base for the selection competition participants of Pranglimine–2017. Zhytomyr region initiated two theme quizzes "Human rights begin from children's rights" (December, 2016) and "Day of Unification of Ukraine" (January, 2017). Zaporizhzhia region hosts a theme quest "Arts in Math or Math in Arts". Kirovograd region held a range of activities for the project the key one being cooperation between healthy teens and children with disabilities which is called "Children among Children". Multilingual quiz show in the languages of ethnic minorities was dedicated to the Mother Language Day. Approximately 1.2 to 1.6 thousand of participants took part in the mentioned above activities. Increasingly this online mental calculation contest Pranglimine unites a great number of participants annually: 1800 participants in 2014–2015, 15165 participants in 2015–2016, 20831 participants in 2016–2017, 22907 participants in 2017–2018. As part of the project framework

in 2014–2015 about a hundred activities were held online and in person. National and international mental calculation contests Pranglimine and multilingual quizzes, where the participants from all project member states compete, take place annually. All this encourages teachers to share their experience of implementing online tools on the international and national level.

The study highlights that both teachers and parents appreciate the efficiency of using the training program and interactive exercises in the process of learning school subjects, which benefits the learning process and the psychological condition of the students. Students' self-confidence along with their motivation to studies increase, which influences their success and competitiveness in the future job market.

The project itself and the usage of its online tools are becoming increasingly popular in Ukraine. Since the project being launched in 2014 in Lviv region, educational institutions from 12 regions joined it in March 2015 and the participants from all other regions took part in October 2015. The core centres of the project implementation are established in every region and they actively promote its ideas all around the country. This proves the fact that teachers and students are interested in the project and the ideas and tools it promotes. Only those interested join in as the project is not required which means that motivation prevails among the participants.

### Conclusions

The results of conducted research enhance the understanding that the dynamics of increasing growth of the Ukrainian and Estonian project, its popularity among the teachers and the usage of MIKSIKE online tools confirm the demand for it in the schools of Ukraine. Synchronization between the project online tools and the technical knowledge of the teacher highlights the benefits of using MIKSIKE in comparison with other online services. Successful experience of using MIKSIKE tools in schools around Ukraine proves to be beneficial and therefore should be promoted for the implementation in public schools around Ukraine.

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