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DIGITAL INTERACTION: THE KEY TO FORMING AND DEVELOPING DIGITAL SKILLS IN HIGH SCHOOL MATHEMATICS

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This article explores the essential role of digital interaction in shaping and developing digital skills in high school mathematics education. By integrating technology into the educational process, students are exposed to a variety of digital tools and resources that help them understand complex mathematical concepts and develop practical skills. From using interactive applications and online learning platforms to simulations and educational games, digital interaction provides students with significant opportunities to experience, practice, and apply mathematical knowledge in a stimulating virtual environment. Through these digital experiences, students acquire not only essential mathematical skills but also valuable digital skills that are indispensable in the modern world.

Keywords*: digital interaction, digital skills, mathematics, high school education.*

INTERACȚIUNEA DIGITALĂ: CHEIA FORMĂRII COMPETENȚELOR DIGITALE LA MATEMATICĂ ÎN LICEU

Acest articol explorează rolul esențial al interacțiunii digitale în formarea și dezvoltarea competențelor digitale la disciplina matematică în cadrul învățământului liceal. Prin integrarea tehnologiei în procesul educațional, elevii sunt expuși la o varietate de instrumente și resurse digitale care îi ajută să înțeleagă concepte matematice complexe și să-și dezvolte abilitățile practice. De la utilizarea aplicațiilor interactive și a platformelor de învățare online până la simulările și jocurile educative, interacțiunea digitală oferă elevilor oportunități semnificative de a experimenta, de a practica și de a aplica cunoștințele matematice într-un mediu virtual stimulativ. Prin intermediul acestor experiențe digitale, elevii dobândesc nu doar competențe matematice esențiale, ci și abilități digitale valoroase care sunt indispensabile în lumea modernă.

Cuvinte-cheie: *interacțiune digitală, competențe digitale, matematică, liceu, formare.*

Introduction

With the advancement of technology and the popularization of the Internet, education has entered a new digital era, fundamentally changing how students learn and teachers teach. Technology has brought with it a multitude of digital tools and resources that have revolutionized the learning process. In this context, digital skills are becoming increasingly important for career success and active participation in society. It is evident that we are in a period where technological progress has surpassed developments in the field of pedagogy, having a significant influence. It is necessary to pay attention to and address digital literacy issues, creating conditions for students to develop the skills needed to navigate the increased volume of information and critically evaluate available sources [11].

In education, integrating digital skills into the learning process becomes essential to prepare students for life in an increasingly digital world [9].

The article aims to highlight the importance of developing digital skills in learning mathematics at the high school level. It will explore how integrating digital skills can improve the mathematics learning process and how teachers can use technology to enhance student engagement and performance in this field. Additionally, the article will analyze teachers' rights and responsibilities in promoting digital skills, offering concrete examples and practical tips for effectively integrating technology into high school mathematics education.

Integrating digital skills into the high school mathematics curriculum not only prepares students to meet the demands of society and higher education requirements but also improves academic results.

Several arguments can be made for integrating digital skills in learning mathematics:

1. *Access to Interactive Resources and Tools*: Technology provides access to a wide range of interactive mathematical resources and tools such as mobile applications, specialized software, and online platforms that can enhance understanding and application of mathematical concepts.
2. *Personalization and Differentiation of Learning*: Technology allows the adaptation of materials and learning methodologies according to individual student needs. Thus, teachers can personalize and differentiate instructions to address diverse abilities and learning styles.
3. *Collaboration and Communication*: The use of technology facilitates student-teacher and student-student collaboration and communication in projects and group activities. This promotes the development of essential social and collaborative skills in the modern world.
4. *Simulations and Experimentation*: Technology offers the possibility to conduct virtual simulations and experiments, allowing students to understand complex mathematical concepts in an interactive environment.
5. *Engagement and Motivation*: Using technology in learning mathematics can influence student motivation through interactive activities and immediate feedback provided by digital applications and tools.

Teachers play a crucial role in developing students' digital skills. It is essential for teachers, regardless of the subject they teach, to develop technological competencies to effectively integrate and use digital tools in the learning process. In this context, the teacher becomes not only a provider of knowledge for students but also a guide and mentor in exploring and understanding the digital world [10].

Educational guidelines provide the framework and necessary guidance for this adaptation, establishing learning objectives and standards, while also offering support and resources for implementing effective educational practices. Teachers' rights include academic freedom and autonomy in choosing teaching methods and materials and complementing them with other types of learning activities, depending on the students' preferences and mathematical preparation, while their responsibilities include ensuring that the learning process is relevant, equitable, and effective for all students [1, p. 18].

The math teacher will take into account that competence is demonstrated through action and materializes in products. Through the proposed learning activities and products, the curriculum guides the teacher toward developing specific mathematical competencies in students [1, p. 17].

This recommendation from the High School Math Guide clarifies how to develop and enhance digital skills: Digital competencies will be actively demonstrated through digital interactive actions and will materialize in relevant digital products. This involves not only acquiring technological knowledge but also applying it in practical contexts, focusing on solving mathematical problems and creating digital products that demonstrate the understanding and application of mathematical concepts. Thus, integrating digital skills into the mathematics curriculum encourages the use of technology and promotes the development of specific mathematical skills in an interactive and innovative way.

Researcher F. Santoianni believes that learning largely occurs when a person is involved in various experiences and interactions within their social and cultural environment, and co-creation and innovation activities in the learning process emphasize knowledge creation [11].

Teachers are encouraged to support meaningful learning and provide students with mobile devices as learning tools that can offer learning experiences by combining real-world elements with virtual ones, while also encouraging them to be autonomous and to expand their knowledge in a relevant and meaningful way throughout their lives [3]. The use of mobile devices, such as smartphones or tablets, will provide interactive and immersive learning experiences by accessing applications or provided content [7], [3].

In his research, author D. Agostini highlights that mobile mixed reality technologies represent innovative opportunities in education, allowing the transmission of complex concepts in an interactive and engaging manner [2]. However, their implementation in the educational environment requires adjustments and adaptations.

Additionally, the importance of protecting privacy [13] and data security [6], as well as the ethical use [14] of technology, becomes essential, requiring the assurance of students' well-being and rights. In integrating digital technologies into teaching and learning mathematics at the high school level, issues of

digital equity must be navigated carefully, ensuring that all students have equitable access to devices and connectivity [13].

According to Rodríguez and his colleagues (2017), mobile devices serve as channels to extend access to information and facilitate interaction, thus contributing to creating a favorable environment for learning and collaboration [8].

In the view of Indian researchers A. Mohanty and A. Alam, a student's responsibilities can be divided into four distinct categories through mobile learning: (1) cultivating the ability to express, (2) accessing diverse resources, (3) actively participating in the learning process, (4) collaboration and interaction [4].

It is important to recognize the increasingly important role that technology plays in education and to integrate it appropriately to support students' learning processes.

According to the DEX (Dictionary of the Romanian Language), the word „form" can be interpreted as a way of organizing the elements that make up an object or process. The word „activity" is seen as a set of physical, intellectual, and moral acts performed to achieve a specific result; systematic use of one's forces in a field, active and conscious participation. The meaning of the word „interaction" is interpreted as a form of connection of objects, phenomena, etc., manifested through mutual influence, conditioning, or causal action. „Digital devices" are defined as technical equipment that generates, measures, processes, or stores digital signals.

Digital interaction means using technology to facilitate interaction between students, teachers, and learning content (the so-called didactic triangle). This refers not only to communication via the Internet but also to using digital tools and platforms to create interactive learning experiences.

The form of activity in a lesson refers to how the learning process and interaction between students and teachers are organized and conducted. This can involve different teaching techniques and methods, such as lectures, group discussions, pair work, practical activities, technology use, or educational games. The purpose of these forms of activity is to motivate and engage students in the learning process, facilitate understanding of materials, and stimulate active participation in the lesson.

The question arises: can we consider using digital technologies as a distinct form of activity in learning and education?

Given that digital technologies can be seen as a tool or medium through which students interact with educational content and their peers, and their purpose is to motivate and actively integrate students into activities, an affirmative answer can be given to the above question. Recognizing the potential of digital interaction to transform and enhance how students learn and apply mathematical concepts in the digital age, we propose a definition that, in our opinion, is innovative.

Digital interaction can be defined as the form of activity in which digital elements, such as devices, tools, or systems, are organized in a way that facilitates the connection and exchange of information between users or between users and technology. This interaction involves mutual influence and causal action between digital elements and users to achieve a specific result or satisfy a need. It is an active and conscious process in which individuals systematically use their own forces to communicate, collaborate, or perform various activities in the digital environment. A deeper understanding of this complex phenomenon can be derived from the framework representing the form of digital interaction activity shown in Figure 1, whose basic elements are:

- *Users*: Individuals (single users or groups) interacting in the digital environment.

- *Devices and Technology*: Devices, tools, or systems used to facilitate digital interaction. These can include cobe graphical user interfaces (GUI), touch interfaces, etc.

Content: Information or data transmitted or accessed during digital interaction. This content can be text, images, videos, multimedia files, documents, etc.

- *Communication and Interaction*: The means and channels through which users communicate and interact with each other or with digital technology. These can include text messaging, video calls, online forums, social networks, collaboration on shared documents, etc.

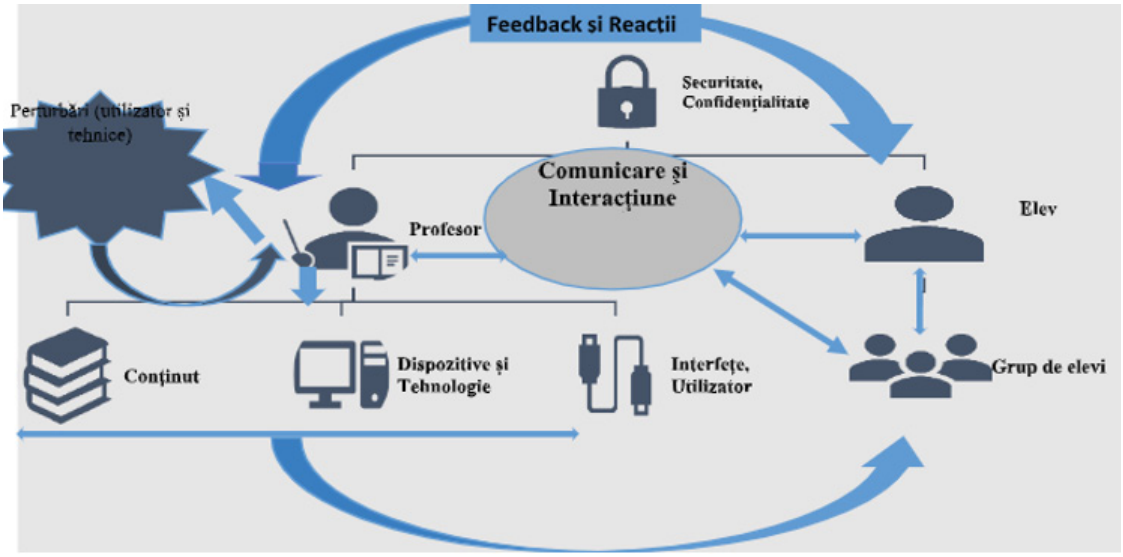
- *Feedback and Reactions*: Users' responses and reactions to their interaction with digital technology. This feedback can be received as likes, comments, etc.

- *Security and Privacy*: Measures and policies to protect user data and privacy during digital interaction.

These elements can be adapted and expanded depending on the specific context or needs of the students.

Of course, there is a risk of situations where the actions or behaviors of some students disrupt the activity or neglect the proposed tasks. To avoid such situations, the teacher can clearly establish and communicate the rules and expectations regarding behavior and participation in the activity (the so-called didactic contract). It is also important for the teacher to provide a safe and inclusive learning environment where all students feel encouraged to participate and respect each other's contributions. Using classroom management strategies and open communication with students can also help prevent and manage interferences or disruptions in educational activities. Choosing relevant and motivating content during math lessons will prevent interferences, misunderstandings, and unwanted student behavior.

Figure 1. The Framework for the Form of Digital Interaction Activity.



The form of activity through digital interactions is a framework or structure that facilitates and promotes the active interaction of students with learning material using digital devices. This may include the use of various educational and digital technologies. Thus, the form of activity through digital interactions refers to the specific way the learning process and interaction are structured and organized in a lesson or educational activity to incorporate interactive activities.

In the context of technological changes and curriculum modernization, teachers may face the risk of confusing the form of activity through digital interactions with interactive activity or computer-assisted instruction methods when adopting innovative methodologies.

Interactive activity refers to an activity where there are reciprocal exchanges or interactions between the learner and the material content, either through technology or through discussions or practical exercises. Essentially, interactive activity involves students' active participation and engagement in the learning process, representing the nature and participatory character of a learning activity, while the form of interactive activity refers to the specific way this interactivity is structured and organized in a lesson or educational activity.

The computer-based instruction method relies on using computers for educational purposes and their peripherals. The computer-based instruction method refers to a specific approach in which computing systems and educational software are used to deliver educational content and guide students' learning process. It is a form of utilizing digital technologies in the learning process.

On the other hand, when we talk about the form of activity through student interactions with digital technologies, we refer more to how students use these technologies in various educational contexts. This may include students using computers, tablets, the Internet, educational software, and other digital devices and applications to access information, work on exercises and projects, and communicate with other students and teachers (see Fig. 2).

Figure 2. Differences Between Computer-Based Instruction Method and Form of Activity Through Digital Interactions.

Computer-Based Instruction Method	**Form of Activity through Digital Interactions**
It refers to a specific approach in which computers and educational software are used as the primary means of delivering educational content and guiding the learning process. It is a structured and planned method, where the curriculum is designed to be delivered mainly through computers. It involves the use of specialized educational programs, simulations, e-learning platforms, etc. In general, it is designed and managed by educators or specialists in the field of educational technology.	It refers to the broader way in which students interact with digital technologies in the learning process, without being limited to a specific method. It includes the use of various digital devices and applications for educational purposes, such as accessing information, collaborating with peers, creating projects, communicating, and presenting results. It is more flexible and can be integrated into various educational activities, including traditional or alternative teaching methods. Digital interaction can take place during face-to-face, individual, pair, or group activities and can be managed by either students or educators.

Thus, although the computer-based instruction method is a specific form of using digital technologies in education, the form of activity through digital interactions is broader and more flexible, covering various ways in which digital technologies can be integrated into the learning process, including within or outside computer-based instruction methods.

When implementing a form of activity through digital interactions in the learning process, it is important to consider several factors and involve all students:

- *Accessibility*: Ensure all students have access to technology and Internet connection to participate in the proposed activities.
- *Appropriate Platforms and Tools*: Choose digital platforms and tools suitable for the learning needs and objectives. These should be interactive, engaging, and offer collaboration and feedback opportunities.
- *Relevant and Quality Educational Content:* Select or create educational content appropriate to students' level, age, and abilities.
- *Training and Support*: Provide appropriate training and support for students in using technology.
- *Evaluation and Monitoring*: Develop appropriate evaluation methods to track students' progress and monitor the effectiveness of the learning form.
- *Data Safety and Privacy*: Ensure the protection of personal data and sensitive information, providing students with knowledge about online safety.
- *Collaboration and Engagement*: Encourage students' active collaboration and involvement in the learning process through technology.
- *Continuous Improvement*: Constantly adjust and improve the learning process based on feedback received.

In the current educational context, digital interaction is becoming increasingly important, offering opportunities for personalization, collaboration, and accessibility that meet the diverse needs of students in the

digital age. Recent research highlights that new innovative approaches to teaching can be integrated into the educational arsenal to improve or complement the traditional teaching method [16]. Innovative pedagogy involves the creative use of teaching methods and appropriate learning materials for the benefit of students [16].

Modern pedagogy promotes initiative and originality in reevaluating and reconstructing every aspect with the aim of improving and modernizing educational methods at all levels. Thus, to enhance the teaching-learning experience of mathematics in high school, an experiment was conducted, and several innovative methods were implemented, focusing on the relevance of content, action, and interaction, with the use of digital technology being an essential element in this process.

The „Triple Curiosities in Learning and Applying Concepts” method involves finding and presenting three distinct areas of application for the learned concepts, stimulating students' interest and the relevance of learning. Using the digital platform Padlet facilitates real-time interaction and collaboration, providing an additional interactive dimension. Using mobile phones, students access the link sent by the teacher and share on the Padlet displayed on the interactive board their curiosities and responses simultaneously.

The „Interdisciplinary Problem Solving Method” promotes collaboration and integration of knowledge from various fields, using various digital technologies: educatieinteractivă.md, multimedia materials, mobile phones, Padlet, etc., to support interdisciplinary problem solving.

The „Project-Based Method on Multiple Intelligences in Learning Mathematics” encourages collaboration and creativity, focusing on enhancing students' individual strengths. The integration of digital technologies allows the adaptation of projects to the specific needs and interests of each student.

The „Pictographic Method of Knowledge Generalization” ensures active student involvement by creating simple and quick drawings to synthesize key concepts learned in the lesson, also using Padlet and mobile phones. The use of the digital tool Mentimeter facilitates the creation and sharing of visual concept maps, thus strengthening the understanding and retention of knowledge.

The „Digital Exploration and Interactive Engagement Method” encourages students to research and select relevant content, actively involving them in the learning process through interactive games and activity creation. The use of educatieinteractivă.md and other digital resources supports the diversity and attractiveness of interactive activities, contributing to the improvement of understanding and retention of mathematical concepts. Digital interaction can be successfully achieved within any innovative or traditional teaching-learning methods and is aimed at enhancing or complementing them. We will mention that the value brought by digital technologies in the classroom will be enormous, both by extending the limits of space and time in teaching the subject and by presenting content inaccessible to students, which is not described in textbooks. Digital interaction can be integrated at any stage of the mathematics lesson, taking into account the type of lesson, the objectives, and the students' interests (see Table 1). In this way, students' motivation will be stimulated, creating a conducive environment for exploring and actively learning mathematical concepts, forming and developing not only mathematics-specific competencies but also digital competencies.

Table 1. Table of Digital Interaction Integration in Lesson Stages.

Lesson Stage	Digital Interaction	Feedback and Evaluation	Digital Resources
Capturing Attention	Interactive Presentation Using Padlet to collect students' thoughts and ideas in real-time. The interactive board will attract students' attention to the lesson subject in a more engaging and interactive way.	Feedback is collected through direct interaction with students during interactive presentations. Teachers can evaluate the level of engagement and interest of students and can adjust the presentation accordingly.	Padlet (for collecting thoughts and ideas), interactive board (for presentation), presentation tools (such as PowerPoint or Google Slides, Canvas, multimedia content, etc.).

Provocative Questions	Using Canva or Genially to create attractive visual materials with provocative questions to stimulate critical thinking and reflection. Students can respond to provocative questions through the interactive Padlet or the Educator.io platform.	Teachers can evaluate student responses in real-time through the interactive board and provide additional explanations and guidance during the lesson.	Canva or Genially (for creating visual materials), interactive board (for questions and responses), Padlet (for interactive activities and evaluation).
Online Games	Animations, Simulations, Using online game platforms like Kahoot!, Quizziz, or Educator.io to reinforce knowledge and consolidate understanding in an engaging and fun way.Students can use animations and simulations for a more in-depth exploration of mathematical concepts.	Teachers can evaluate student performance and offer personalized feedback through these game platforms. Feedback can be offered individually or to groups and can include additional guidance.	Kahoot!, Quizziz (for interactive games and quizzes), animations and simulations (for illustrating concepts), Jamboard (for brainstorming and collaboration).
Problem Situations	Using the Educator.io platform or digital tools like Google Forms to present a problem situation and collect students' responses and solutions. Online collaboration tools such as Google Docs or Microsoft Teams can be used to allow students to work in groups and share ideas and solutions.	Feedback can be provided through the Educator.io platform or by collaboratively evaluating the solutions proposed by students. The teacher can give individualized or group feedback and provide additional guidance.	Educator.io, Google Forms (for collecting responses), Google Docs, Microsoft Teams (for group collaboration), and other online resources specific to the lesson topic.
Checking Homework Completing an Independent Assignment	The teacher sends a link to the activity created on educatieinteractiva.md to students on their phones. This interactive activity involves solving tasks similar to the homework. The students' results are recorded on the teacher's computer.	The teacher will provide individual feedback to students regarding their performance, identifying strengths and weaknesses.	Educatieinteractiva.md (digital platform for creating interactive activities), students' phones (for accessing the activity link), teacher's computer.
Discussing Homework Problem Solutions	The teacher organizes real-time discussions using the Jamboard and projector, allowing students to discuss their homework solutions and provide additional explanations.	Feedback is given in real-time by the teacher and peers. Students benefit from clarifications and guidance in solving problems.	Jamboard, projector, teacher's computer.
Collective Analysis of Problem Solutions	The teacher uses the interactive Padlet board to present the students' problem solutions. Students will submit these solutions using their mobile phones.	Feedback is provided in real-time during the discussions and collective analysis of the solutions. Students can actively contribute ideas and solutions during the analysis process.	Interactive Padlet board, projector, teacher's computer, mobile phones.

Updating Knowledge and Skills	The teacher sends a link from their computer to the students' phones, allowing them to access the educatieinteractiva.md platform. Students answer questions in the form of quizzes or interactive games on their phones. The results are automatically and centrally recorded on the teacher's computer. The teacher shares an interactive video activity created on educatieinteractiva.md from their computer to the projector board. The video pauses at intervals set by the teacher, and a question appears on the board, which is discussed and answered collectively. Students can interact with the question and respond verbally or through the interactive board.	The teacher can access and analyze the results collected from the educatieinteractiva.md platform to evaluate the students' understanding and progress. Feedback can be provided individually or collectively, and additional instructional needs can be identified to improve students' understanding and skills.The teacher can evaluate students' participation and engagement in the discussion and provide real-time feedback. They can also identify gaps in understanding and offer additional explanations for clarification.	educatieinteractiva.md (platform for quizzes and interactive games), students' phones (for accessing the link), teacher's computer (for monitoring and recording results). educatieinteractiva.md (platform for interactive video activities), teacher's computer (for sharing the video activity on the projector board), projector board (for displaying the video activity and questions), verbal interaction and interactive board (for responses and discussions).
Teaching and Learning New Material	The teacher uses the educatieinteractiva.md platform to deliver learning materials in the form of interactive presentations, videos, or digital activities. Students can access the content on their mobile devices or computers and interact directly with the presented materials. The teacher encourages student discussions and questions during the presentation.	Feedback can be collected in real-time throughout the presentation via questions and discussions. The teacher can assess students' understanding and provide additional clarifications as needed.	educatieinteractiva.md (platform for interactive materials), mobile devices, computers (for accessing content), online collaboration tools (for questions and discussions).
Consolidating Knowledge and Skills Reproductive Level	Students access the educatieinteractiva.md platform to solve exercises and problems at a reproductive level, allowing them to apply and consolidate previously acquired knowledge. The teacher can configure the exercises and problems on the platform and monitor students' progress in real-time.	Feedback is automatically provided by the educatieinteractiva.md platform as students work on the exercises and problems. The teacher can analyze the results and progress of each student.	educatieinteractiva.md (platform for solving exercises and problems), mobile devices, computers (for accessing the platform), automatic feedback function (for instant evaluation).

Productive Level	Students access the educatieinteractiva.md platform to solve exercises and problems at a productive level, which require applying knowledge in practical contexts and solving complex problems. The teacher can configure the exercises and problems on the platform and monitor students' progress in real-time.	Feedback is automatically provided by the educatieinteractiva.md platform as students work on the exercises and problems. The teacher can analyze the results to offer additional help or clarifications.	educatieinteractiva.md (platform for solving exercises and problems), mobile devices, computers (for accessing the platform), automatic feedback function (for instant evaluation).
Transfer to Other Domains	Students use the educatieinteractiva.md platform to solve exercises and problems that involve applying knowledge in different contexts and situations or in domains other than those previously presented. These exercises encourage critical thinking, problem-solving, and the transfer of knowledge to new situations. The teacher can monitor and evaluate students' progress in real-time.	Feedback is automatically provided by the educatieinteractiva.md platform as students work on the exercises and problems. The teacher can analyze the results and progress of each student and provide individual intervention if necessary.	educatieinteractiva.md (platform for solving exercises and problems), mobile devices, computers (for accessing the platform), automatic feedback function (for instant evaluation).
Creative Level	Using Padlet to organize a problem-creation contest, where students can post problems they have designed themselves. On their mobile phones, students are encouraged to use photo or video editing apps to create visual presentations or document their creative thinking process. Students present interactive activities they have created on the educatieinteractiva.md platform.	Feedback can be provided through comments on Padlet and through direct interaction with the visual presentations or videos created by the students. The teacher can evaluate the creativity and originality of the problems.	Padlet (for organizing the problem-creation contest), photo or video editing apps on mobile phones (for creating visual presentations or videos), mobile devices (for accessing and using the apps), educatieinteractiva.md (for presenting interactive activities).
Generalization	The teacher sends a link to an activity created on educatieinteractiva.md to students' phones. The activity is an interactive quiz in the format of a "wheel of fortune," where students answer questions. The results are recorded on the teacher's computer.	After completing the quiz, the teacher provides individual feedback to students regarding their performance, identifying strengths and weaknesses. The results are recorded in an electronic database for monitoring individual progress and learning needs.	educatieinteractiva.md (digital platform for creating interactive activities and quizzes), students' phones (for accessing the activity link), teacher's computer (for monitoring and recording results).

Generalization	- Conduct a quick survey using Google Forms, where students respond to key questions related to the topics covered in the lesson. - Use real-time question and answer platforms like Kahoot or Quizizz to test students' knowledge on the studied materials. - On the interactive Padlet board, students simultaneously respond to proposed questions. **- Pictographic Method for Knowledge Generalization:**	Results are stored on the teacher's computer. Strengths and weaknesses are identified. The teacher can evaluate the creativity and originality of the problems and presentations created by students. Students are encouraged to create a conceptual map using Mentimeter.	Google Forms, projector, Padlet board, students' phones, Padlet, interactive activities on educatieinteractiva.md, Kahoot, Quizizz, Jamboard, etc.

Engaging students in digital interactions throughout the year has brought numerous significant benefits to the learning process and personal development. Following the integration of digital interaction in high school mathematics lessons, a positive impact on academic success was observed, as confirmed by the results obtained from a questionnaire regarding the impact of interactive activities on learning mathematics, applied to the 61 students participating in the pedagogical experiment [15].

Increased Motivation: The majority of students indicated that interactive activities increased their motivation to learn mathematics, either to a great extent (39.3%) or to a moderate extent (44.3%). This suggests that these activities were positively perceived and generated increased interest in the subject.

Motivational Aspects: Students identified several aspects of the interactive activities that motivated them the most, such as the opportunity to work collaboratively with peers (47.5%), the use of technology and digital tools (42.6%), and direct interactivity in problem-solving (29.5%). These elements were considered crucial for increasing motivation in learning mathematics.

Increased Engagement: Interactive activities led to a higher level of engagement during mathematics lessons, according to responses indicating greater involvement in the lesson (21.3%), increased interest and curiosity about topics (42.6%), and opportunities for active participation and contribution to discussions and problem-solving (21.3%).

Overall, the results indicate that interactive activities positively impacted student motivation and engagement in learning mathematics through collaboration, the use of technology, interactivity, and providing opportunities for active participation.

In Conclusion, engaging students in digital interactions had a significant positive impact on their academic and personal development, contributing to increased responsibility, autonomy, and motivation for learning and future success. Digital interactions provided a more dynamic and engaging learning environment, reducing the likelihood of deviant behavior or inattention in class. Students felt more involved and motivated to participate in the proposed activities. Through the use of technology and participation in digital activities, students acquired and applied a range of new skills, including technological skills, critical thinking and problem-solving, effective communication, and collaboration. The positive and engaging experiences provided by digital interactions significantly increased students' motivation to learn and to pursue a career in mathematics or technology. Students felt more inspired and connected to the subject studied, seeing its relevance and applicability in their daily lives and future.

Conclusion

As mobile technologies continue to advance and penetrate educational environments, it is crucial for

teachers and institutions to capitalize on their potential and address the transformative opportunities they bring in shaping the educational landscape of the future.

The integration of digital interaction in high school mathematics lessons has demonstrated a significant positive impact on student motivation and engagement in the learning process, facilitating better understanding and application of concepts. Furthermore, direct involvement in problem-solving, collaboration with peers, and the use of technology were key factors in generating this positive impact. Continuous improvement of the diversity and adaptability of interactive activities, along with greater practical relevance of the content, could contribute to reinforcing these benefits and optimizing the learning process of mathematics in the high school environment.

References:

1. *Ghid de implementare a Curriculumului Matematică pentru clasele a X-a – a XII-a.* Chișinău: Lyceum, 2019. [on-line]. [citat 02 martie 2023].
2. AGOSTINI, D. (2021). *Metodologii și strategii pentru o învățare mobilă cu realitate mixtă.* În D. Agostini (Ed.), *Predare și învățare mobilă* (Ediția I, pp. 28). CRC Press. ISBN: 9781003052869, Disponibil la: Taylor & Francis
3. AGOSTINI, D. (2021). *Interacțiuni de predare și învățare cu instrumente mobile de realitate mixtă.* În D. Agostini (Ed.), *Predare și învățare mobilă (*Ediția I, pp. 23). CRC Press. ISBN: 9781003052869, Disponibil la: Taylor & Francis
4. ALAM, A., & MOHANTY, A. (2023). *Tehnologia educațională: explorarea convergenței tehnologiei și pedagogiei prin mobilitate, interactivitate, inteligență artificială și instrumente de învățare*. [Articol publicat online]. https://doi.org/10.1080/23311916.2023.2283282, Disponibil la: Tandfonline
5. ANDREWS, T., DYSON, L. E., & WISHART, J. (2015). *Advancing ethics frameworks and scenario-based learning to support educational research into mobile learning. International Journal of Research & Method in Education*, 38(3), 320–334. https://doi.org/10.1080/1743727X.2015.1026252. Disponibil la: Web of Science și Google Scholar
6. DYSON, L. E., ANDREWS, T., SMYTH, R., & WALLACE, R. (2013). *Towards a holistic framework for ethical mobile learning*., Disponibil la: Google Scholar
7. REDDY, P., SHARMA, B., & CHAUDHARY, K. (2020). *Digital literacy: A review of literature.* International Journal of Technoethics (IJT), 11(2), 65–94. https://doi.org/10.4018/IJT.20200701.oa1, Disponibil la: Web of Science și Google Scholar
8. RODRÍGUEZ, A. I., RIAZA, B. G., & GÓMEZ, M. C. S. (2017). *Collaborative learning and mobile devices: An educational experience in primary education. Computers in Human Behavior*, 72, 664–677. https://doi.org/10.1016/j.chb.2016.07.019, Disponibil la: Web of Science și Google Scholar
9. *Standarde de competențe digitale ale elevilor din ciclul primar, gimnazial și liceal.* Chișinău: Ministerul Educației și Cercetării, 2015 [citat la 02.06.2024]. Disponibil la: https://mecc.gov.md/sites/default/files/cnc.pdf.
10. *Standarde de competențe digitale pentru cadrele didactice*. Ministerul Educației și Cercetării, Guvernul Republicii Moldova. [citat la 02.06.2024]. Disponibil la: https://mecc.gov.md/sites/default/files/cnc.pdf.
11. SANTOIANNI, F. (2021). *Aspecte cheie ale educației digitale mobile*. În F. Santoianni (Ed.), *Predare și învățare mobilă* (Ediția I, pp. 26). CRC Press. ISBN: 9781003052869, Disponibil la: Taylor & Francis
12. SANTOIANNI, F. (2021). *Teorii educaționale ale predării mobile*. In F. Santoianni (Ed.), *Predare și învățare mobilă* (Ediția I, pp. 21). CRC Press. ISBN: 9781003052869, Disponibil la: bucatidincarti.blog
13. WILLEMS, J., FARLEY, H., & CAMPBELL, C. (2019). *The increasing significance of digital equity in higher education: An introduction to the digital equity special issue*. *Australasian Journal of Educational Technology*, 35(6), 1–8. https://doi.org/10.14742/ajet.5996, Disponibil la: Web of Science și Google Scholar
14. WISHART, J. (2009). *Ethical considerations in implementing mobile learning in the workplace. International Journal of Mobile and Blended Learning (IJMBL*), 1(2), 76–92. https://doi.org/10.4018/jmbl.2009040105, Disponibil la: Google Scholar
15. https://docs.google.com/forms/d/1WGT6hYwx5tHWzrvDD5rn90lGsWlxebKnhnhltiFKu9g/edit#responses
16. ZHANG, A., et al. (2020). *Effects of Innovative and Traditional Teaching Methods on Technical Students' Achievement in Computer Craft Practices*. *Higher Education, Education Theory and Practice*, 10(4), 41-50. https://doi.org/10.1177/2158244020982986

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