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ORIGINAL

Forming the value of a healthy lifestyle among students through mathematical problems

Formar el valor de un estilo de vida saludable entre los alumnos mediante problemas matemáticos

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ABSTRACT

Introduction: mathematical skills are of great importance since they foster critical thinking, problem-solving, and logical reasoning. Mathematical competence focuses on enabling students to apply mathematical concepts in real-life contexts, particularly to form the value of a healthy lifestyle.
Objective: to study the possibilities of shaping the student's value of a healthy lifestyle and health-preserving competence through integrating mathematics problems into the educational process.
Method: to achieve the research's aim, experimental research design was applied. The experiment involved 23 instructors from different regions of Ukraine who taught mathematics in the 5th grade. A total of 404 students participated in the study, with 250 forming the Experimental Group and 154 forming the Control Group. The intervention phase lasted 12 weeks and included 7 mathematics topics. The method of descriptive statistics was selected for data analysis.
Results: various teaching strategies are used in the mathematics classroom for the formation of the value of a healthy lifestyle. Students consider video-based activities and problems the most exciting and engaging. At the same time, text activities are found to be less effective in the mathematics classroom. Besides, the experiment demonstrated that students remembered the educational information better when they solved mathematics problems in the classroom and were engaged in active or interactive activities. Using mathematics to form the value of a healthy lifestyle offers several advantages and challenges.
Conclusions: the results have significant implications for secondary education improvement and student development.

Keywords: Mathematics Classroom; Mathematics Knowledge; Health-Preserving Competence; Perception; Problem Solving.

RESUMEN

Introducción: las competencias matemáticas son de gran importancia ya que fomentan el pensamiento crítico, la resolución de problemas y el razonamiento lógico. La competencia matemática se centra en capacitar a los alumnos para aplicar conceptos matemáticos en contextos de la vida real, en particular para formar el valor de un estilo de vida saludable.
Objetivo: explorar las posibilidades de formar en el alumno el valor de un estilo de vida saludable y la competencia de preservar la salud mediante la integración de problemas matemáticos en el proceso educativo.

Método: para alcanzar el objetivo de la investigación, se aplicó el diseño de investigación experimental. En el experimento participaron 23 instructores de distintas regiones de Ucrania que enseñaban matemáticas en 5º curso. Participaron en el estudio 404 alumnos, de los cuales 250 formaban el grupo experimental y 154 el grupo de control. La fase de intervención duró 12 semanas e incluyó 7 temas de matemáticas. Para el análisis de los datos se seleccionó el método de la estadística descriptiva.
Resultados: se utilizan diversas estrategias didácticas en el aula de matemáticas para la formación del valor de un estilo de vida saludable. Los alumnos consideran que las actividades y los problemas basados en vídeos son los más emocionantes y atractivos. Al mismo tiempo, las actividades de texto resultan menos eficaces en el aula de matemáticas. Además, el experimento demostró que los alumnos recordaban mejor la información educativa cuando resolvían problemas de matemáticas en el aula y participaban en actividades activas o interactivas. Utilizar problemas matemáticos para formar el valor de un estilo de vida saludable ofrece varias ventajas y retos.
Conclusiones: los resultados tienen implicaciones significativas para la mejora de la educación secundaria y el desarrollo de los estudiantes.

Palabras clave: Aula de Matemáticas; Conocimientos Matemáticos; Competencia para Preservar la Salud; Percepción; Resolución de Problemas.

INTRODUCTION

In the past, mathematics served as the foundation for ancient civilizations contributing to the creation of calendars, architecture, and trade systems.[1] In today's world, mathematics is a fundamental condition for both society progress and personal development.[2] It supports technological innovation, economic growth, and scientific discoveries, driving advancements that improve quality of life and address global challenges.[3]

From engineering to medicine and environmental sustainability, mathematics provides the essential tools for generating solutions that move society forward. On a personal level, mathematical skills foster critical thinking, problem-solving, and logical reasoning, empowering individuals to navigate complex information and make accurate decisions.[4]

In modern society, mathematical competence refers to a powerful tool for achieving societal progress and driving innovation by providing the foundation for breakthroughs in artificial intelligence, data science, and cybersecurity, which shape the future of industries and improve quality of life.[5,6,7]

According to recent research,[5,6] mathematical competence is formed within the educational process that is aimed at the development of professional readiness, including problem-solving, analytical, and critical thinking skills, enabling students to apply mathematical concepts in the real-life contexts. In this regard, it is worth mentioning that mathematics is a universal language that transcends cultural boundaries as well as reflects the values, practices, and needs of societies.[1]

Moreover, mathematics is seen as a way of thinking that has evolved alongside human civilization, deeply intertwined with cultural and intellectual development.[8] Obviously, mathematics education is related to a cultural transmission process, where learners engage with mathematical ideas that have been shaped by historical and cultural phenomena [9]. This perspective highlights the importance of connecting mathematics to learners' previous experiences, acquired values and behaviors, making education relevant and meaningful for future professional activity.

The theory of values, axiology, is closely connected with mathematics through its exploration of the intrinsic and instrumental worth of mathematical knowledge and its applications.[10,11] Since mathematics often has an intrinsic value, representing beauty, order, and logic, it is correlated with the philosophical principles that prioritize abstract and objective truths.[12] Simultaneously, mathematics holds an instrumental value due to its practical utility in solving real-life problems, advancing technology, and enhancing professional activity.[4]

Axiology helps us understand how individuals and societies prioritize these values, influencing how mathematics is taught, learned, and applied in different educational contexts.[13] It also shapes the ethical dimensions of mathematics, studying how mathematical knowledge is used.[14] In this regard, axiology must be considered while teaching mathematics and preparing future mathematics teachers as well since they shape students' values, such as logical thinking, fairness, and an appreciation of mathematical reasoning.[15]

A number of axiological investigations show that the value of a healthy lifestyle is one of the principal ones as it brings both individual well-being and society benefit.[16] A healthy lifestyle promotes physical fitness, mental health, and emotional resilience, contributing to an individual's overall quality of life and ability to engage with the environment.[17] Besides, fostering a culture of health, individuals make the choices that lead to lower healthcare costs and increased productivity.[18]

Importantly, mathematics significantly contributes to the formation of values among young individuals

because it improves critical thinking, discipline, and collaboration and, therefore, influences the behavior in social interactions, professional environments, and personal growth. The axiological approach makes it possible to combine theory with practice as it actualizes the values not only of education but also of human life and education in society as a whole.

In addition, the axiological approach allows students to realize their own potential in society.[19] Thus, given the above, there is a need to take into account the axiological paradigm and the use of personality-oriented approach to learning in order to maximize the potential of mathematics in forming the value of a healthy lifestyle among students.[14]

Mathematics and a healthy lifestyle

Mathematical concepts are known to promote a healthy lifestyle since they provide students with the tools to analyze, interpret, and make accurate decisions about their health.[20] It was found that statistics are one of the key areas, enabling young individuals to assess health risks, understand the prevalence of diseases, and evaluate the effectiveness of various treatments.[21,22]

When students are able to analyze health-related data, they recognize patterns and correlations that inform their lifestyle choices, such as the impact of diet and exercise on overall well-being.[23] Additionally, statistics help students interpret research studies and generate evidence-based solutions regarding their health, such as dietary changes or fitness routine.[24]

Algebra and geometry also contribute to maintaining a healthy lifestyle through practical applications in nutrition and fitness. Algebraic calculations help individuals determine their daily caloric needs, macronutrient distributions, and portion sizes considering their personal health goals. At the same time, geometric concepts are essential for calculating Body Mass Index and understanding body composition through measurements. These mathematical tools not only assist students in tracking their physical health but also enable them to set realistic goals, monitor progress, and make necessary improvements in their diet and exercise regimens.[25]

The recent studies demonstrate the connection between mental health and studying mathematics among students.[26] It was revealed that mathematics education influences both cognitive development and emotional well-being.[27] Certain psychological investigations prove when students successfully solve complex problems, they foster a sense of accomplishment and boost their self-esteem.[28] This cognitive engagement promotes mental clarity and focus, which are beneficial for overall mental health.

To benefit from studying mathematics supportive teaching methods and a positive learning environment must be implemented to increase students' resilience and motivation, and reduce their anxiety associated with learning mathematics.[29] Additionally, incorporating real-life applications of mathematical concepts enhance students' engagement and collaboration, making the subject more interesting.[30]

Predictive modeling is an essential aspect of mathematical education for students.[31] When students learn mathematical concepts such as regression analysis, probability theory, and statistical inference, they gain the tools necessary to analyze complex health data and make informed predictions about future health outcomes.[32] This not only enriches their understanding of mathematics but also illustrates its practical applications in real-world scenarios, particularly in public health and epidemiology.

As students engage with predictive modeling, they are encouraged to assess the validity and reliability of data sources, recognize biases, and evaluate the impact of health interventions. In the classroom, when the link between mathematical theory and health applications are shown, students are better prepared to address contemporary health challenges.

According to some findings, mathematics education played an important role during the COVID-19 pandemic because it provided young individuals with essential tools for understanding and addressing the health crisis through data analysis, modeling, and critical thinking.[33,34]

Definitely, mathematical concepts became central to interpreting data related to virus transmission, infection rates, and the effectiveness of public health measures. Students learned to analyze statistical data, such as case numbers and vaccination rates, which allowed them to understand the size of the crisis and the importance of mitigation strategies. Additionally, mathematics education during this period emphasized the significance of data literacy, teaching students to critically assess sources of information.[35]

All this indicates that the pandemic emphasized the relevance of mathematics in the field of healthcare and reinforced its meaning as a foundational skill for promotion of healthy lifestyle. During the war in Ukraine, mathematics education contributes to stability and continuity significantly.[36,37]

As students engage with mathematical concepts, they develop resilience and the ability to analyze situations, preparing them for future possible challenges. More importantly, increasing mathematics competence, students can develop lifelong skills that contribute to their physical health and enhance their mental resilience in the face of adversity.[38]

Thus, it follows that the *aim of this article* is to study the possibilities of shaping the students value of a healthy lifestyle and health-preserving competence through the integration of mathematics problems into the

educational process.

To further explore this topic, the research addresses the following *questions*:

1. What are students' preferences in receiving teaching instructions in the mathematics classroom?
2. What exercises help to memorize the information relevant to healthy lifestyle?
3. What are advantages of using mathematics problems while forming the value of a healthy lifestyle?

What challenges do mathematics instructors face?

METHOD

To achieve the research, aim the experimental research design was applied because it allowed for the control of variables and ensured that the effects of a pedagogical intervention was accurately measured. Exploring the possibilities of shaping the students value of a healthy lifestyle through the integration of mathematics problems the experiment provided a structured approach to determine cause-and-effect relationships and, therefore, help mathematics instructors understand which teaching strategies are the most effective in improving learning outcomes.

When the experimental design was applied, it was possible to test these strategies in controlled settings, enhancing the reliability of the research findings. Also, the experiment enabled the replication of studies as well as contributed to the development of evidence-based practices in education to form health-preserving competence among students.

For our research, 23 instructors were initially from different regions of Ukraine who taught mathematics in at least 2 classes parallel to the 5th grade. The students from one class formed the Experimental Group, while the students from another class formed the Control Group. If a instructors had 3 classes in parallel, then two of their classes could form the Experimental Group. As a result, a total of 404 students participated in the study, with 250 forming the Experimental Group and 154 forming the Control Group.

For each of the groups (Experimental and Control), we created a three-block questionnaire on the basis of a Likert scale to measure attitudes and perceptions regarding the role of mathematics education in forming the value related to a healthy lifestyle, where the first block was related to students' preferences in receiving teaching instructions; the second one concerned teaching strategies; the third block was oriented towards the investigation of advantages and problems of using mathematics problems while forming the value of a healthy lifestyle. The instructors were provided with a range of options from "strongly disagree" to "strongly agree").

Respondents could express their level of agreement with statements from the questionnaire which was distributed through Google forms. Each group underwent a survey twice – before the start of the experiment and after its completion. Additionally, teachers were surveyed upon the completion of the experiment.

The intervention phase lasted 12 weeks from February 26 to May 23, 2024 taking into account the additional week for spring break (from March 25 to March 31, 2024). It included seven mathematics topics according to the school curricula approved by the pedagogical councils of the institutions of secondary education. The intervention plan is described in table 1.

Table 1. Intervention plan description

Topic	Hours	Potential effect
Numbers and operations	8	Development of skills in managing own finances, such as budgeting for healthy food choices and understanding the cost of sport activities.
Fractions and decimals	8	Applied to nutrition, such as reading food labels, measuring ingredients, and portion control.
Measurement	6	Ability to measure ingredients for healthy meals and track their physical activities (e.g., distances run, weights lifted), reinforcing the importance of physical health
Geometry	8	Understand space and design, awareness of physical space.
Data and statistics	4	Analyzing data related to health and fitness; Encouragement of informed decisions about lifestyle choices.
Patterns and algebra	6	Recognizing trends in health behaviors and outcomes leading to more conscious lifestyle choices.
Problem solving	8	Navigating real-life scenarios, such as planning a balanced diet or managing time for exercise and studies.

The instructors in Experimental groups used a number of specially chosen teaching strategies oriented towards the formation of the value of a healthy lifestyle: video-based tasks, narrative, problems, audio-based tasks, tests, measurement activities, interactive games, tasks collaborative tasks. The special attention was paid to the creation of mathematics problems related to a healthy lifestyle which were incorporated into the learning process. The exercises were introduced in the classroom. Also, some activities were carried out

independently at home.

Table 2 provides the examples of teaching strategies used to form the value of a healthy lifestyle among students. At the same time, traditional teaching methods were implemented in Control group.

Table 2. Teaching strategies used during the experiment

Teaching strategy	Examples
Video-based tasks	Nutrition analysis video; Exercise and math challenge video; Fitness data tracking video; Educational video from asapscience channel.
Narrative	Healthy day story; Fitness journal; Meal planning adventure; Exercise “a day in the life of a healthy hero”.
Problems	Calorie counting problem; Step tracking problem; Water consumption problem; Healthy meal portions problem; Exercise routine problem.
Audio-based tasks	Daily routine audio story; Exercise time calculation audio task; Meal planning audio scenario.
Tests	Multiple-choice tasks; Matching test; Fill-in-the-gap exercise; True\false test.
Measurement activities	Food portion measurement activity; Distance measurement activity; Height and weight measurement activity.
Interactive games	Calorie count challenge; Healthy habits bingo; Jeopardy-style game “exercise equations”; Mindful eating quiz.
Collaborative tasks	Healthy meal planning project; Exercise and activity calendar; Nutrition poster creation; Fitness data analysis; Community health survey; Healthy lifestyle debate.

The method of descriptive statistics was selected for summarizing and organizing the collected data. This process involved calculating the measures of central tendency and to identify the average responses or outcomes within the dataset. Also, the standard deviations were assessed and this enabled to understand the difference between individual responses and the average ones.

The visual representations, such as histograms and bar charts, were created to identify the trends or patterns of the process of formation of the value of a healthy lifestyle. The experimental data served as a foundation for deeper analysis of the research problem and design of the effective mathematics curriculum for the 5th grade of the secondary school oriented towards the formation of the value of a healthy lifestyle among students.

RESULTS

Studying students’ preferences, it was found that they consider video-based activities (42 %) and problems (32 %) the most interesting and engaging. Instructors admitted that in the mathematics classroom where these strategies are applied students show higher learning outcomes and participate in the educational process more actively. These activities, according to mathematics instructors, help to form the value of a healthy lifestyle among fifth-graders.

Besides, 16 % of students prefer text activities, like healthy day story, fitness journal, or meal planning adventure, where they are taught to apply different measurement techniques and become aware of numbers and operations. 2 % of students like to be engaged in test activities and perform audio-based tasks each. Other activities make 6 % totally. They include interactive games, collaboration and measurement tasks. Figure 1 shows students’ preferences in receiving teaching instructions.

The experiment demonstrated that instructors use a number of teaching strategies depending on students’

motivation, understanding of mathematics concepts, retention of information, level of critical thinking skills among students. But to enhance the efficiency of the educational process it is necessary to consider students' learning needs addressing varying knowledge levels and learning styles. This may impact the formation of the value of a healthy lifestyle among students positively since they are more interested in engagement in learning activities and build positive attitudes towards mathematics.

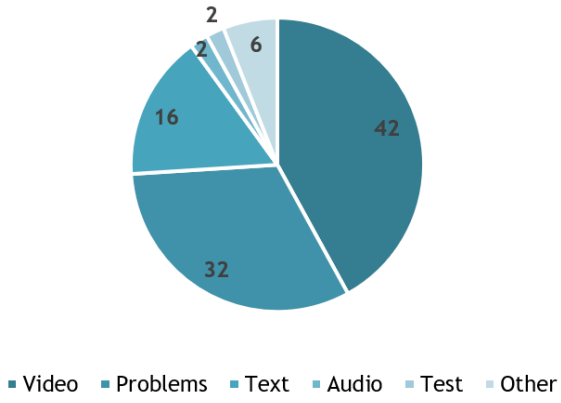

Figure 1. Students' preferences in receiving teaching instructions

At the same time, participants were asked how students remembered the information about a healthy lifestyle. According to the findings, when the facts were solved and discussed in the classroom, students remembered them for long and could apply the information in the real-life context (80,8 %). The information presented in homework problems was characterized by less efficiency; but when the exercises were accompanied by additional videos, students had better memorization (27,6 %). Besides, only 16,4 % of students remembered facts about a healthy lifestyle when the problem was solved on the test. Figure 2 shows students' perceptions on the memorization of mathematics information.

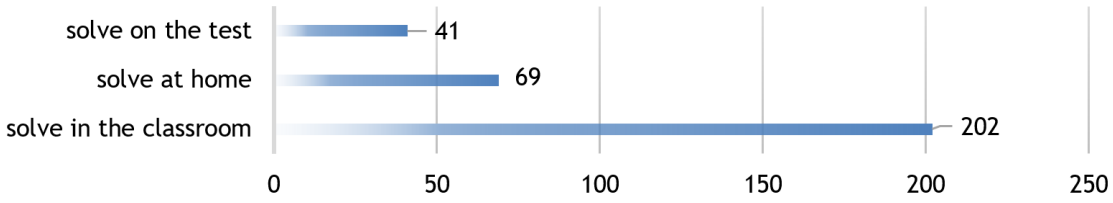

Figure 2. Students' perceptions on the information memorization

To make educational materials relevant and engaging for students, mathematics problems must consider real-life context so that they help students understand the practical applications of what they are learning. For example, statistics is widely used to analyze sports performance, geometry – to design a room, or algebra – to budget for a project. This allows students to see the influence of mathematics on their lives outside the classroom. The findings showed that this approach enhances comprehension and fosters a sense of relevance, encouraging students to appreciate the value of mathematics in their daily activities.

During the experiment instructors paid the great attention towards students' attitudes towards educational materials and found that 54,6 % of young individuals hear the facts that surprised them. 30,1 % of students learnt the facts that they did not know about. 11,3 % of fifth-graders memorized the facts that were discussed in detail in the classroom, and only 1,8 % of children knew the information that was discussed during the lesson. Interestingly, 2 % of students demonstrated that they need additional video to achieve higher learning outcomes and to solve mathematics problems more accurately.

Figure 3 analyzes students' attitudes towards educational materials according to instructors' observations.

Besides, it was necessary to investigate the advantages and challenges of using mathematics problems while forming the value of a healthy lifestyle. Instructors stated that using mathematics problems while forming the value of a healthy lifestyle among students has a number of benefits. First of all, such activities activate the educational and cognitive activity of students and emotionally support the learning process.

The findings proved that the formation of the value of a healthy lifestyle among students contributes to showing the application of mathematics and makes learning this subject more meaningful. Importantly, both

students and instructors admitted the increase of the value of a healthy lifestyle.

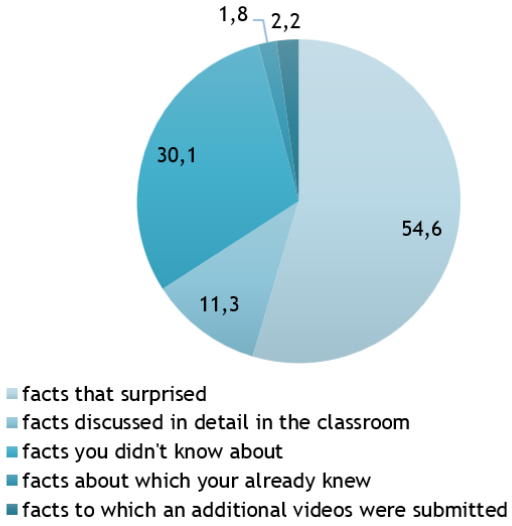

Figure 3. Students' attitudes towards educational materials

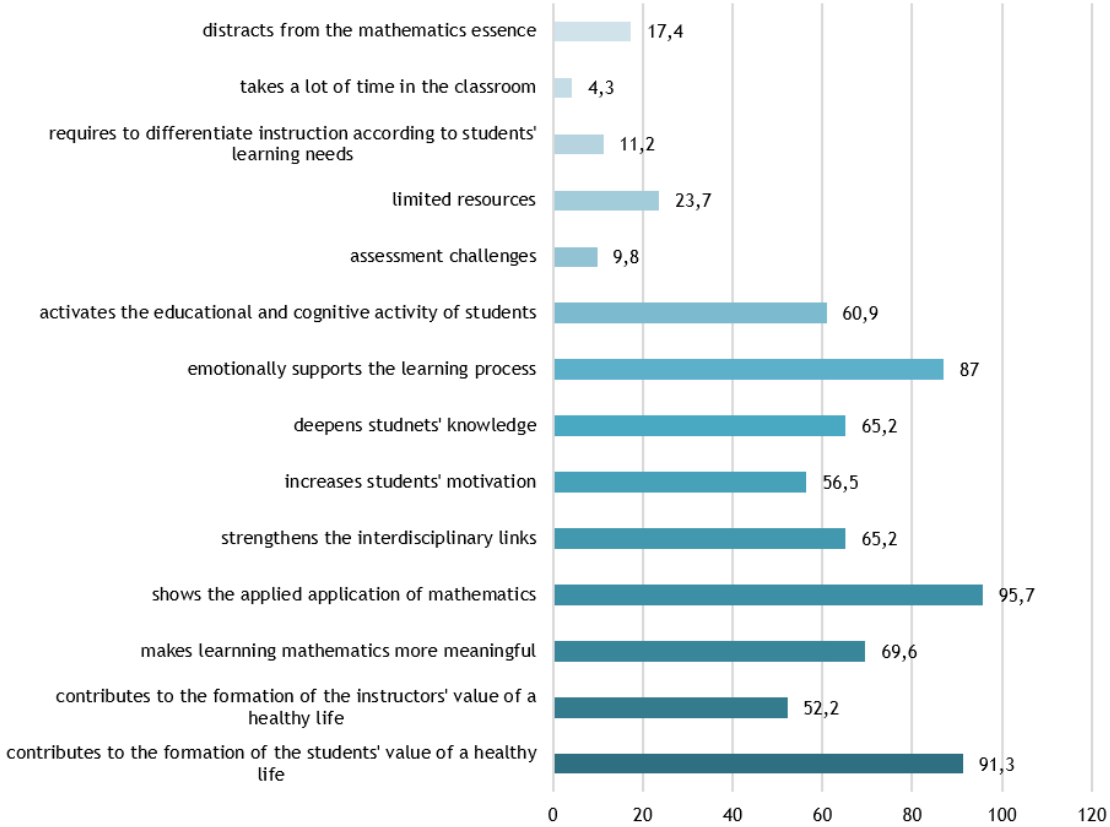

Figure 4. The analysis of advantages and challenges of using mathematics problems

At the same time, the pedagogical experiment revealed that using mathematics problems as a tool to form the value of a healthy lifestyle among fifth-graders has some challenges. They include the following: distraction from mathematics essence, taking a lot of time in the classroom and necessity to develop specific educational materials.

Additionally, such an approach faced certain assessment challenges since it was oriented towards the formation of interdisciplinary understanding of mathematics. The detailed analysis of advantages and challenges of using mathematics problems is shown in figure 4.

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Therefore, the pedagogical experiment proved the potential of mathematics as a valuable instrument to form the value of a healthy lifestyle and health-preserving competence among fifth-graders in interesting and engaging way through the real-life context.

DISCUSSION

The literature analysis showed that, in the mathematics classroom, a variety of teaching strategies are employed to enhance students' understanding, engagement, and application of mathematical concepts.[39] Some scholars admit the importance of direct instruction and group discussion.[40,41] Other findings focus on the use of collaborative learning, game-based learning, and problem-based learning.[42,43,44]

Recently, great attention is paid towards differentiated learning since this strategy involves tailoring instruction to meet the diverse needs of students in the classroom.[43,45] A number of scientific works are devoted to the use of manipulatives (physical objects) or visual aids (graphs, charts, and diagrams) to explain the abstract mathematical concepts and demonstrate the importance of mathematics in everyday life.[46] Also, it was found that incorporating technology, such as educational software, online simulations, and interactive tools, enhances mathematics instruction.[47,48]

The experiment supported the idea that various teaching strategies are used in the mathematics classroom but the formation of the value of a healthy lifestyle requires the application of certain techniques considering students' motivation to learning, level of mathematics knowledge, learning style and interest in integration of mathematics in the real-life context.

The results showed that students consider video-based activities and problems the most interesting and engaging. At the same time, text activities are found to be less effective in the mathematics classroom. We found that, in the process of formation of the value to a healthy lifestyle, only a small number of students prefer test activities audio-based tasks each. Other activities like interactive games, collaboration and measurement tasks are used sporadically and are not considered as effective tools by the research participants.

The research concerned the approaches to enhance memorization of information during mathematics lessons. It was found that this can be achieved through various engaging exercises and activities.[44] Educators insist on using flashcards with math problems or formulas.[46]

Also, scholars prove the importance of incorporating fun games in the mathematics classroom.[43] They admit that this competitive element encourages engagement and helps reinforce key mathematics concepts. Some works showed that the creation of visual aids or diagrams that represent mathematical concepts help to memorize the educational materials better and, therefore, students are able to apply them in real-life contexts.[49] Additionally, it was discovered that peer teaching, interactive whiteboard activities, and story-based mathematics problems are effective for secondary school environment.[50,51]

To compare, the experiment demonstrated that students remembered the educational information better when they solve mathematics problems in the classroom and are engaged in active or interactive activities. Importantly, the information presented in homework problems was characterized by less efficiency and the use of additional videos.

Instructors admitted when the problem was solved on the test a smaller number of students were able to repeat it or use it in the everyday environment. This testifies the literature findings that the formation of the value of a healthy lifestyle must focus on classroom activities where students collaborate and solve mathematics problems under the supervision of an instructor.

According to scientific literature, using mathematics problems to form the value of a healthy lifestyle offers several advantages.[52,53,54] Firstly, they concern real-life relevance and promoting healthy habits. Secondly, using mathematics problems helps develop essential skills among students that may influence making informed choices about their health in future. These skills include critical thinking, discipline, and motivation to learn.

Thirdly, incorporating health-related math problems promotes an interdisciplinary approach to education, linking mathematics with science, health, and physical education. This can enhance students' engagement and foster a more comprehensive understanding of the topics that are learned.

Besides, some challenges were differentiated.[53,54,55] Some scholars admitted that mathematics instructors struggle to find ways to integrate real-life problems into the existing curriculum.[55,56] This can require careful planning and creativity to ensure that the mathematical concepts remain accurate while also being relevant to different topics.[54]

The findings showed that mathematics instructor faces problems with students' engagement, differentiating instruction, and resource availability.[57] Certain works are devoted to the explanation of the necessity to improve assessment in the mathematics classroom.

The experiment results showed that mathematics instructors face a number of challenges while focusing on the formation of the value of a healthy lifestyle. These challenges include the following: distraction from mathematics essence, taking a lot of time in the classroom, necessity to develop specific educational materials, and organization of subjective assessment. To conclude, navigating the above-mentioned challenges,

mathematics instructors can create a dynamic learning environment that increases mathematical proficiency among students and teach them to appreciate a healthy lifestyle.

At the same time, the research contains some limitations. Since the experiment used a homogenous sample size, the findings may not be generalizable to a broader population, particularly higher education students. Besides, this limitation can restrict the ability to apply the conclusions to students in other countries with different socioeconomic, cultural, or academic backgrounds.

Also, measuring the formation of values, such as a healthy lifestyle, is subjective. The research might rely on behavioral observations which could introduce some inaccuracies; and the doing some classroom activities (e.g. meal planning, daily routine analysis, or healthy lifestyle debate) could lead to controversial discussion among students.

CONCLUSIONS

In the mathematics classroom, a variety of teaching strategies are employed to enhance students' understanding, engagement, and application of mathematical concepts. The results showed that video-based activities and problems had the most significant impact on the formation of students' value to a healthy lifestyle while learning mathematics. The students indicated that they remembered most from the tasks introduced through video since they have powerful demonstrative qualities. At the same time, text activities, test activities, or audio-based tasks proved to be less effective in forming the value of a healthy lifestyle in the mathematics classroom. To enhance memorization of information during mathematics lessons, various engaging exercises and activities were applied, particularly flashcards, interactive whiteboard activities, or story-based mathematics problems. According to the experiment, students remembered the information about healthy lifestyle better when they solve mathematics problems in the classroom and are engaged in active or interactive activities than when they do it on their own at home. Both students and teachers have noticed an increase in the value of a healthy lifestyle after adding math problems about healthy lifestyles to the educational process. Using mathematics problems to form the value of a healthy lifestyle offers several advantages. They are concerned with real-life relevance and promoting healthy habits, development of essential skills among students, and promoting an interdisciplinary approach to education, linking mathematics with science, health, and physical education. The challenges include distraction from mathematics essence, taking a lot of time in the classroom, and the necessity to develop specific educational materials and subjective assessment. The results have significant implications for both secondary education improvement and students' development. Since the study demonstrates that mathematical problems can effectively promote healthy lifestyle values, it highlights the potential for interdisciplinary teaching. This integration could lead to more engaging and relevant lessons, encouraging students to apply mathematics concepts to real-life health decisions.

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