

"Quest-tourism" pedagogical technology for improving the physical condition in 6-7-year-old children

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Abstract:

The use of the theme of tourism in traditional physical education curricula in 6-7-year-old children attending preschool institutions has not been sufficiently studied. *Purpose:* to develop a methodology and evaluate the use of «quest-tourism» pedagogical technology effectiveness to improve the physical condition of older preschool (over-fives) children. *Research materials and methods.* The pedagogical project involved 20 girls and 20 boys in 6-7-year-old children, who were equally divided into control (CG) and experimental groups (EG). In both groups, PE classes were held 3 times a week for 35 minutes. In CG, classes were organized according to the traditional curriculum for preschool institutions. In EG, two classes a week were conducted according to the traditional curriculum. At the third lesson, the pedagogical technology «quest-tourism» was used to improve the EG children's physical condition. A survey of children from the experimental group on the tourist skills and abilities knowledge was conducted. The high-stakes testing results of the children's cardiorespiratory system and motor qualities functional parameters were analyzed. *Research results.* At the end of the project, all functional parameters values of the cardiorespiratory system and all motor tests improved in both groups of children compared to the beginning of the project. The increase in the values of EG children's indicators was significantly better than in CG, $p < 0.05$. The level of theoretical knowledge concerning tourism increased by 89.4% among EG children. *Conclusions.* The results of the experiment showed the high efficiency of using «quest-tourism» pedagogical technology proposed by us with traditional means of preschool children's physical education to improve physical condition and develop knowledge and skills of tourism in 6-7-year-old children.

Key Words: physical education, pedagogical technology, functional and motor high-stakes testing, physical condition

Introduction

The child population's level of health is one of the most important medical and demographic indicators of the socio-economic state of any country. Children's health affects the formation of the future reserve of labor and intellectual potential of the country (Andrieieva et al., 2017).

In recent decades, there has been a decrease in child population's physical activity in many countries of the world. Inactivity in the younger generation contributes to the growth of diseases of civilization (Nemček & Ladecká, 2020; Bakiko et al., 2020; Syamsudin et al., 2021). According to WHO (2010), only 25% of children perform the recommended amount of daily physical activity. Significant educational and psycho-emotional loads in educational institutions play a negative role in health deterioration (Demirci, & Toptaş, 2018), children's preference for computer games, a healthy lifestyle basics violation (Pengpid et al., 2019). In conditions of isolation associated with the COVID-19 pandemic, the population is experiencing hypodynamia (Anugrahsari et al., 2021).

In order to improve the health of the population, scientists, teachers and coaches in the field of physical culture are constantly searching for means and methods of effective impact of physical exercises over the human body. This is especially important for the child's body (Sturova, et al., 2021). During this period of ontogenesis, the child develops and improves organs and functional systems, and physical condition is formed. In childhood, an interest in physical activity begins to be laid; a healthy lifestyle foundations and the degree of the individual's physical condition are formed. Teachers of an educational institution can help a child develop physical abilities

(Bendíková, 2017). In recent years, many studies have appeared on the rationalization and modernization of existing programs of physical education or sports activity of a person. This is achieved by making adjustments to traditional educational programs or introducing additional training in the proposed forms of physical education or sports (Chekhovska et al., 2020; Mischenko et al., 2021). The pedagogical quest-technology, which has educational, cognitive, teaching and developing functions, is spreading (Kiselok, 2017). Such methodical approaches develop children's interest in regular physical activity, improve their health and increase the effectiveness of sports activities (Görner, Reineke, 2020; Slovákova et al., 2022).

One of such approaches is PE classes' organization using tourism activities. There are several types of tourism activities: regional, ecological, extreme, sports, health improving and others.

Researchers have found that health improving and regional tourism strengthen physical and somatic health, form a healthy lifestyle, educate physical abilities and normalize children's psycho-physiological state (Galan et al., 2019). Health improving tourism activities contribute to a young person's self-esteem, develops leadership qualities, arouses interest in the study of his/her native land, nature and culture (Mhanna, 2018). There are data indicating a positive effect of hiking to increase the adaptation of the cardiovascular and respiratory systems to physical activity (Vaskan et al., 2018), positive dynamics of motor qualities and strengthening of the child's body (Kashuba et al., 2017). According to Sobolev et al. (2017), young tourists' physical training is aimed at developing such motor qualities as strength and coordination abilities, explosive strength, general and high-speed endurance and speed. Currently, the program and methodological support of recreational and health improving technology with the use of health improving tourism (Butenko et al., 2017), ecological tourism (Andrieieva et al., 2017), sports tourism (Sobolev et al., 2017) and regional tourism (Galan et al., 2019) in the system of integrated physical education of children attending primary school. However, the theme of the tourism elements use in physical education programs for over-fives preschool children remains insufficiently studied. Therefore, the theme of scientific research chosen by us is relevant and in demand by time.

Purpose: to develop a methodology and evaluate the use of «quest-tourism» pedagogical technology effectiveness to improve the physical condition of older preschool (over-fives) children.

Material & methods

The research project was conducted in the academic year 2020-2021 in the Siberian Federal District (Russia) on the basis of a preschool educational institution with the participation of 20 girls and 20 boys aged 6-7, who were equally divided into control (CG) and experimental groups (EG). The consent of the parents for the examination of the children was obtained. The principles and rules of the biomedical research organization, which are reflected in the documents of the Helsinki Declaration (2008) were not violated.

In both groups, PE classes were held 3 times a week for 35 minutes. The CG used the traditional curriculum for preschool institutions (The main general educational program of preschool education, 2010), in accordance with the current Russian federal state requirements (Federal requirements, 2009). The experimental group conducted two classes a week according to the traditional curriculum. In the third lesson, EG children were engaged in tourism according to the pedagogical quest methodology. For this purpose, an artificial obstacle course was created on the outdoor sports ground of the preschool institution. In the EG classes in the preschool gym, pictures with images of tourist equipment and inventory were used. Game and competitive methods of physical education were used in all classes.

On a monthly basis, depending on the time of year and weather conditions, we modified the means and methods of mastering the tourist obstacle course. The equipment and the sequence of its application changed as well as the child's initial position to perform the educational task, the difficulties and the nature of performing physical activities gradually became more complicated. It increased the children's interest in completing tasks. Twice a month, they took a walk to the nearest park, where children performed walking with overcoming natural obstacles: passing and jumping over tall grass, running between bushes, climbing and descending from the mountain, walking on shallow snow. Every month the tasks became more complicated. The movement was carried out with a backpack weighing 0.5 kg.

In order to develop motor qualities, physical exercises necessary for tourist activities were used. To develop the children's general endurance, prolonged walking and running in complicated conditions (on grass, snow, sand and uphill), outdoor games with searching for objects were used. To develop their strength abilities, the children performed such exercises as: climbing and hanging on the wall bar, throwing balls, pine cones and snowballs, performing exercises with a backpack on, overcoming terrain. To develop «speed» motor quality, running exercises and outdoor games were used, which were performed at maximum speed. To develop flexibility, physical exercises were used with a gradual increase in the amplitude of movement in different joints of the body. For coordination abilities and agility development, tight-rope walking, shuttle running, relay races with a tourist orientation were used.

At the same time, during the classes at EG, the teacher conducted theoretical training on the basics of tourism activity and its significance for a person. During the project, the teacher formed children's cognitive and physical education knowledge and skills about the use of techniques for overcoming obstacles, moving safely in the forest, in the mountains, traffic safety on roads and in vehicles and skills in providing first aid. The high-

stakes level of theoretical knowledge and skills of the basics of tourism activities in EG children was carried out by a survey method with a point rating.

The high-stakes testing of children's from CG and EG motor qualities was carried out. Such tests were used: running to a distance of 30 and 300 m, s; shuttle running 3x10 m, s; sit-ups for 30 seconds, number of times; bending the torso forward from a sitting position on the floor, cm; standing long jump, cm.

To characterize the children's reserve capabilities and adaptation of the cardiovascular system to physical exertion, the resting heart rate (number of beats per minute) was determined. The Roufier-Dixon index was calculated after a test exercise (30 squats in 45 seconds) with its assessment: excellent ≤ 6.0 conventional units; good 6-11; satisfactory 11-17; weak 17-21; unsatisfactory ≥ 21.0 . The state of the children's respiratory system was assessed based on the results of hypoxic Stange's and Genche's tests and the respiration frequency at rest.

Using the software material Statistica 6.1, Microsoft Excel (2003) and parametric methods of statistics, we obtained valid results of a survey of children and analyzed the data obtained.

Results

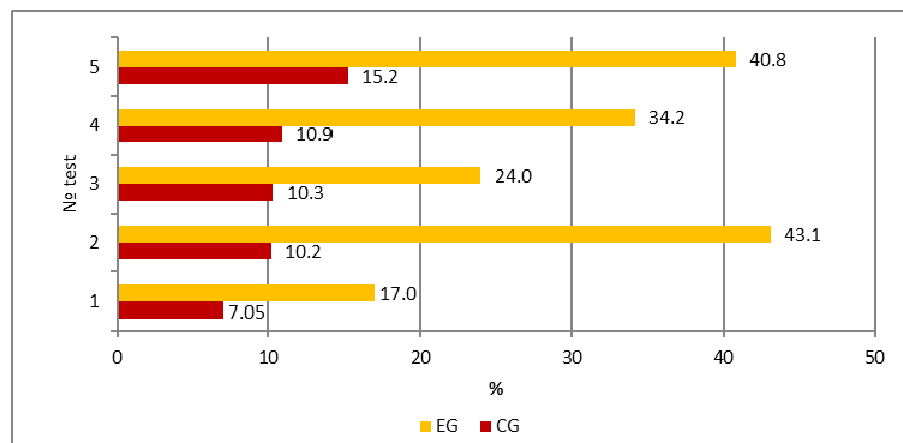
Prior to the experiment, we did not establish statistically significant differences between the values of functional indicators of children in CG and EG, $p > 0.05$, Table 1.

Table 1. High-stakes indicators values of the cardiorespiratory system of children in CG u EG (M \pm m)

| Test # | Functional indicators | CG (n=20) | | EG (n=20) | |
|--------|---|---------------------------------|---------------------------|---------------------------------|---------------------------|
| | | At the beginning of the project | At the end of the project | At the beginning of the project | At the end of the project |
| 1 | Resting heart rate, beats per minute | 96.4 \pm 2.2 | 89.6 \pm 2.5* | 96.8 \pm 2.7 | 80.3 \pm 3.1* |
| 2 | Roufier-Dixon index, conditional units | 19.5 \pm 1.7 | 17.5 \pm 1.4 | 19.0 \pm 1.5 | 8.2 \pm 1.0* |
| 3 | Respiration frequency, number of times per minute | 25.2 \pm 1.9 | 22.6 \pm 2.2 | 25.0 \pm 2.3 | 19.0 \pm 2.0* |
| 4 | Stange's test, s | 26.5 \pm 1.8 | 29.4 \pm 2.3 | 25.7 \pm 2.4 | 34.5 \pm 2.7* |
| 5 | Genche's test, s | 11.8 \pm 1.4 | 13.6 \pm 1.8 | 11.5 \pm 1.4 | 16.2 \pm 1.9* |

Note.* - the difference is significant ($p < 0.05$)

At the end of the experiment, the children of the control group registered significant positive changes in only one functional indicator (heart rate at rest), compared with the beginning of the project, $p < 0.05$. In the children of the experimental group, the values of all functional indicators significantly improved, $p < 0.05$, Table 1. The increase in the values of functional indicators was higher in EG children, Figure 1.



Note: 1, 2, 3, 4, 5 – numbers of functional tests

Fig. 1. The increase in the functional indicators values of children in CG and EG at the end of the project

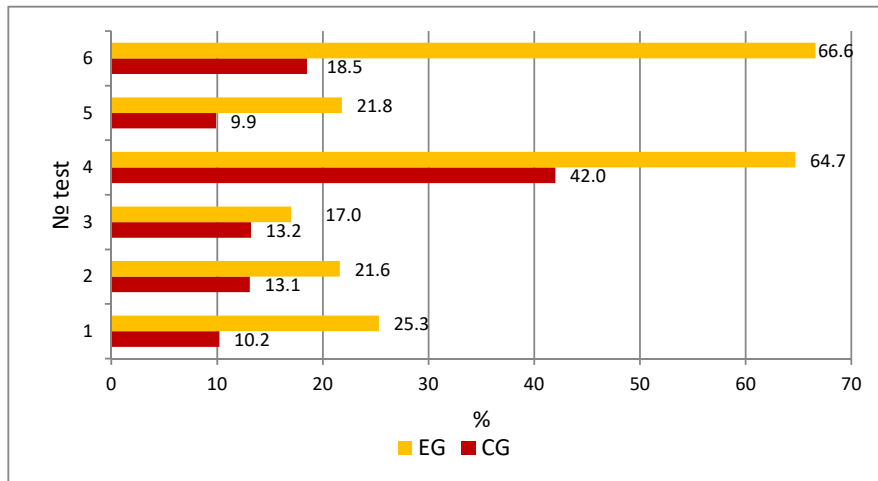
The greatest increase in the functional indicators values was found in EG children (tests №2 and № 5). In order to determine the effect of physical loadings on improving the physical fitness of CG and EG children, separate testing of the boys' and girls' motor qualities was carried out. At the beginning of the research project, there were no significant differences between the values of motor tests of girls in the control and experimental groups, $p > 0.05$, Table 2.

Table 2. High-stakes indicators values of the girls' physical fitness (M±m)

| Test № | Indicators | CG (n=10) | | EG (n=10) | |
|--|--|---------------------------------|---------------------------|---------------------------------|---------------------------|
| | | At the beginning of the project | At the end of the project | At the beginning of the project | At the end of the project |
| Speed | | | | | |
| 1 | Running to a distance of 30 m, s | 8.8±0.8 | 7.9±0.7 | 8.7±0.8 | 6.5±0.5* |
| Coordination and speed-strength endurance | | | | | |
| 2 | Shuttle running 3x10 m, s | 9.9±0.9 | 8.6±0.8 | 9.7±0.9 | 7.6±0.7* |
| General endurance | | | | | |
| 3 | Running to a distance of 300 m, s | 125.8±4.2 | 109.1±3.9* | 124.7±4.3 | 103.5±4.0* |
| Speed-strength endurance of body's muscles | | | | | |
| 4 | Sit-ups for 30 seconds, number of times | 6.9±1.2 | 9.8±1.3* | 6.8±1.0 | 11.2±1.2* |
| Dynamic strength of leg muscles | | | | | |
| 5 | Standing long jump, cm. | 89.3±3.9 | 98.2±4.4 | 88.9±3.9 | 108.3±4.2* |
| Active flexibility of the spinal column | | | | | |
| 6 | Bending the torso forward from a sitting position on the floor, cm | 7.0±0.5 | 8.3±0.8 | 6.0±0.8 | 10.0±0.9* |

Note.* - the difference is significant ($p < 0.05$)

By the end of the research project, the girls of CG and EG had an improvement in the values of indicators in all motor tests. In the control group of girls, a significant improvement was recorded in two tests (№ 3 and № 4), in the experimental group - in all tests, $p < 0.05$, Table 2. The increase in the values of the motor tests of girls CG and EG at the end of the project is shown in Figure 2.



Note: 1, 2, 3, 4, 5, 6 – numbers of motor tests

Fig. 2. The increase in the motor indicators values of girls in CG and EG at the end of the project

The increase in the values of indicators of all motor tests in girls was higher in the experimental group.

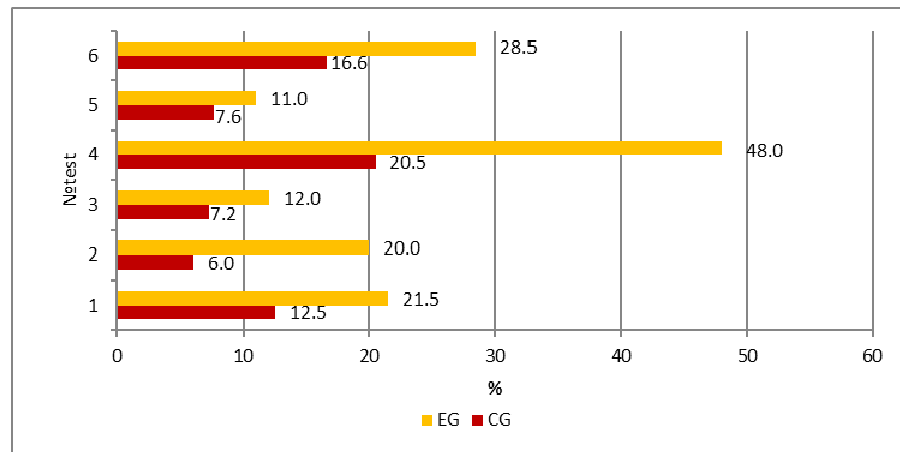
The greatest increase was registered in the value of the flexibility index in EG girls (test №6).

Table 3. High-stakes indicators values of the boys' physical fitness (M±m)

| Test № | Indicators | CG (n=10) | | EG (n=10) | |
|--|--|---------------------------------|---------------------------|---------------------------------|---------------------------|
| | | At the beginning of the project | At the end of the project | At the beginning of the project | At the end of the project |
| Speed | | | | | |
| 1 | Running to a distance of 30 m, s | 8.0±0.7 | 7.0±0.6 | 7.9±0.8 | 6.2±0.5* |
| Coordination and speed-strength endurance | | | | | |
| 2 | Shuttle running 3x10 m, s | 9.2±1.2 | 8.6±0.7 | 9.0±1.0 | 7.2±0.6* |
| General endurance | | | | | |
| 3 | Running to a distance of 300 m, s | 128.4±3.9 | 119.2±3.6* | 128.2±3.8 | 112.8±3.3* |
| Speed-strength endurance of body's muscles | | | | | |
| 4 | Sit-ups for 30 seconds, number of times | 10.2±1.1 | 12.3±1.2 | 10.0±1.1 | 14.8±1.7* |
| Dynamic strength of leg muscles | | | | | |
| 5 | Standing long jump, cm. | 101.3±3.9 | 109.0±4.2 | 102.5±4.0 | 113.8±4.4 * |
| Active flexibility of the spinal column | | | | | |
| 6 | Bending the torso forward from a sitting position on the floor, cm | 6.0±0.4 | 7.0±0.9 | 7.0±0.6 | 9.0±1.1* |

Note.* - the difference is significant ($p < 0.05$)

After the experiment was completed, the values of all motor tests indicators of CG and EG boys improved. A significant improvement in boys of CG is recorded in one test №3, in boys of EG - in all motor tests, $p < 0.05$, Table 3. The increase in indicators of all motor tests was higher in boys of the experimental group than in boys of the control group, Figure 2.



Note: 1, 2, 3, 4, 5, 6 – numbers of motor tests

Fig. 3. The increase in the motor indicators values of boys in CG and EG at the end of the project

The greatest increase in the values of indicators was registered in EG boys in tests №4 and №6. The analysis of the survey results on the theoretical tourist training of EG children at the beginning and at the end of the research project is presented in Table 4.

Table 4. High-stakes level of the EG children's theoretical tourist training

| Test # | Theoretical knowledge | Level, points (M±m) | |
|----------------------|---|---------------------------------|---------------------------|
| | | At the beginning of the project | At the end of the project |
| General knowledge | | | |
| 1 | Concepts of tourism, its types and meaning for a person | 2.1±0.18 | 3.7±0.52* |
| Skills and abilities | | | |
| 2 | Participation in active games related to tourism | 2.4±0.21 | 3.5±0.45* |
| 3 | Collecting tourist equipment and carrying it | 2.0±0.15 | 3.8±0.49* |
| 4 | Setup of a place of rest | 1.8±0.14 | 3.4±0.38* |
| 5 | Equipment | 1.6±0.13 | 3.1±0.37* |
| 6 | Off-road movement | 2.1±0.22 | 3.7±0.55* |
| 7 | First aid providing | 2.0±0.20 | 3.8±0.55* |
| | Average score | 1.9±0.11 | 3.6±0.57* |

Note.* - the difference is significant ($p < 0.05$)

At the beginning of the experiment, a low (1.9 ± 0.11 points) level of theoretical knowledge and skills of tourist readiness of EG children was established. At the end of the project, this level significantly increased by 89.4% and amounted to 3.6 ± 0.57 points, $p < 0.05$. The analysis of the research project results obtained by us showed that the use of «quest-tourism» pedagogical technology in physical education proved to be effective for improving the physical condition and tourist readiness of children aged 6-7.

Dicussion

The search and testing of new methods increasing the effectiveness of PE curricula for children remains an urgent area of physical culture and sports pedagogy (Chekhovska et al., 2020; Mishchenko et al., 2021). In the scientific literature, it is known about the use of the depreciation method in the curricula of physical education of children (Görner, & Reineke, 2020; Slovákova et al., 2022).

According to Galan et al. (2019), the use of health improving tourism program's elements in the educational process of physical education of children strengthens their psycho-physical health, promotes an active lifestyle formation, develops motor qualities and reduces the level of hypodynamia. Shchepina (2017) received positive research results on the use of pedagogical quest technology for teaching preschool children.

The game method of physical education is the most acceptable for children. It allows developing communicative, cognitive and learning functions in children, increases motivation to perform physical exercises and the effectiveness of training sessions (Kiselok, 2017). Children enjoy physical education. The choice of our research theme is based on the integration of «quest» pedagogical technology and the methodology of physical

education with a tourism orientation. Therefore, adjustments have been made to the traditional curriculum of physical education for preschoolers aged 6-7, where the pedagogical technology proposed by us takes up 30% of the study time in the program for children of the experimental group.

Our use of the theme of tourism in the physical education of children aged 6-7, attending preschool allowed us obtaining by the end of the pedagogical experiment a significant improvement in the functional characteristics of the cardiorespiratory system and indicators of the physical condition of EG children, compared with the results of CG ones. According to our data, by the end of the pedagogical project, the children of the experimental group significantly decreased the Rouffier-Dixon index by 43.1% and the resting heart rate by 17.0%, $p < 0.05$. In children of the control group, the improvement was 10.2% and 7.05%, respectively.

A comparative analysis of different educational programs (traditional and proposed by us) use indicates a significantly greater increase in the tolerance of the body of children of the experimental group to physical loads, compared with the control one. We believe that it is due to the performance of physical exercises with a large volume of aerobic orientation by children of the experimental group, which does not contradict the results of the Svyatova study et.al. (2018).

The increase in the reserve capabilities of the cardiorespiratory system of children in the experimental group at the end of the experiment is confirmed by a significant increase in the value of the motor test «running 300 m», which is a marker of the body's endurance. In the girls of the experimental group, the value of the index in the endurance test was 28.8%, in boys 66.6% more than in CG children. The values of functional indicators of external respiration were significantly better in children of the experimental group. There was a significant decrease in the values of the respiratory rate at rest and an increase in the results of hypoxic tests, compared with the data of children in the control group. After the end of the project, the reserve capacity of the body of the children of the experimental group was higher than that of the children of the control one.

Many authors associate the occurrence of human hypokinesia with an insufficient level of physical fitness, which leads to the development of non-communicable diseases, the genesis of which is insufficient physical activity (Nemček & Ladecká, 2020; Bakiko et al., 2020; Syamsudin et al., 2021). In our project, the increase in the values of indicators of all motor tests and the physical fitness and physical health levels turned out to be significantly higher in children of the experimental group who were engaged in the «quest-tourism» technology proposed by us.

The children of the experimental group showed higher results of functional and motor tests compared with the data of the children of the control one. We attribute it to an increase in interest in physical activity at PE classes in preschool, which is consistent with studies by Görner, & Reineke (2020) and Slováková et al. (2022). According to our data, an increase in the level of theoretical knowledge of the basics of tourism by 89.4% in the children of the experimental group by the end of the project indicates the emergence of interest in such pedagogical technology and non-traditional means of physical education.

Conclusions

Improving children's physical fitness and health level is one of the pedagogical educational tasks of an educational institution and a family. The variable method of increasing preschool children's physical activity forms the motivational and psychological sphere of the child's body and increases his/her physical condition. The presence of «quest-tourism» pedagogical technology in the traditional physical education program for children aged 6-7 attending preschool, allows expanding the types and variety of physical exercises of the physical training curriculum.

The results of the proposed motor education technology approbation of over-fives preschool aged children showed that at the end of the pedagogical project, the increase in the values of the cardiorespiratory system and the reserve capacity of the body to perform physical activity was higher in EG children, compared with the results of testing children of the control group who were engaged in the traditional curriculum.

At the end of the research project, the children of the experimental group significantly increased the values of the indicators of testing all the main motor qualities, compared with the results of the children of the control one. It indicates the harmonious physical development of the children in the experimental group. Classes in the control group significantly led to the development of only general endurance and speed-strength endurance of the trunk muscles in girls and general endurance in boys.

The use of tourism topics in our «quest-tourism» educational technology to increase the interest of children of the experimental group in physical activity led to an 89.4% increase in the level of theoretical knowledge of the basics of tourism, to expand their skills and behavioral skills in emergency situations necessary in their daily lives.

Conflicts of interest. The authors declare no conflict of interest.

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