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COUNTRY REPORT

DELIVERABLE 2.1

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Bulgaria

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ASSOCIATION WALKTOGETHER

BULGARIA

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Introduction

This comprehensive report presents the detailed findings and observations of the HopaSus project, a sport-oriented initiative funded by Erasmus+ and utilizing non-formal education methods. The project took place in the city of Plovdiv, Bulgaria, and aimed to enhance physical abilities and promote a healthy lifestyle among participants. This report encompasses the research workshops conducted, the challenges issued, the participants' performance in each challenge, the use of photo and video materials, and the overall outcomes of the project.

Google Survey

The 15 questions were focused on the following topics, within the context of each country:

- What challenges did teachers face while working with children, young people, and students during the lockdown imposed by the pandemic?
- What virtual resources did they utilize?

To what extent did they believe that video gaming could serve as an educational tool and help facilitate practical activities?

- Video gaming refers to games that simulate sports, such as FIFA, Pro Evolution Soccer, Madden NFL, Football Manager, Out of the Park Baseball, Need for Speed, Arch Rivals, Punch-Out, Just Dance, and others.

The main keywords we focused on were sport video gaming, physical education and sport, gymnasium, adaptation, educational resource, and digitalization.

The sport sector in Bulgaria faced significant challenges during the COVID-19 pandemic. The organization of events was prohibited, hindering effective training for young individuals, and all forms of organized sports were suspended. There was a constant need to invest more in protective measures such as masks, gloves, and regular disinfection of facilities. Online training courses continued, with theoretical aspects being easily conveyed by teachers. However, the practical component of physical education and sport courses could not be implemented due to a lack of digital infrastructure. Many teachers also struggled to teach sports through online platforms like Zoom. Consequently, during this period, both students and the general population tended to be less physically active, spent more time in front of screens, had irregular

sleep patterns, and had poorer diets, leading to weight gain and decreased fitness levels.

In this context, when most countries and schools were closed, many turned to video games as a means of learning, playing, exercising, or simply escaping from the situation.

This questionnaire forms the foundation for the development of the Erasmus Sport Plus HopaSus project, which focuses on sports video games rather than esports. In today's digital landscape, the HOPASUS project emphasizes the use of commercial video games that provide sophisticated and engaging simulations of popular team sports and individual or pair activities. The project aims to demonstrate how such games offer simulated experiences that can enhance students' motivation, confidence, understanding, and performance in sporting activities. It also explores how these games can be utilized for assessment or grading purposes in online settings.

Objectives and Purpose

The 15 questionnaire questions in this study are aimed at physical education and sport teachers, coaches, physical trainers, and professionals working directly in movement-related fields. The objectives of the questionnaire are as follows:

- To raise awareness and evaluate the extent to which the quality of physical education and sport lessons was compromised during the pandemic period.
- To identify the difficulties teachers encountered in adapting to the circumstances.
- To assess the level of familiarity and competence of physical education and sport teachers in the digital education environment, particularly regarding video games.
- To gauge the value and perception of video games as educational tools or for evaluation and grading purposes in physical education and sport lessons.
- To establish realistic goals and targets that can serve as the foundation for a large-scale project aiming to enhance the secondary school curriculum through qualitative digitalization and the implementation of new guidelines and best practices.
- To determine the level of knowledge, engagement, and challenges faced by teachers when accessing online resources related to the study.
- To evaluate the teachers' capacity to adapt and embrace new educational paradigms that are tailored to the future.
- To explore the criteria employed by teachers when selecting and using video games.
- To gauge the interest and receptiveness of the participating teachers to acquire knowledge, develop skills, and implement new digital methods in physical education and sport lessons.

The study consisted of 15 general questions, which are provided in Annex 1 of this document. The first five questions aimed to assess the participants' perceptions regarding the impact of the COVID-19 pandemic on the development of physical education and sport activities. It also sought to determine their ability to identify and utilize video and gaming resources as alternatives to specialized physical activity spaces. The subsequent three questions focused on evaluating the teachers' knowledge and utilization of video and gaming resources, while the remaining seven questions aimed to measure their perceptions regarding the usefulness and availability of these resources for teaching and assessing learners.

Protocol

Dear colleagues and friends,

This document has a goal to give you clear information about the research process (HopaSus research) in HopaSus project. The idea is to assess the influence of children's playing sport video games on physical activity, healthy behavior and body posture.

Research process consists of 3 phases: initial test, implementation of HopaSus recommendations and final test. Initial and final tests will be described further in this document, and HopaSus recommendations you will find in a separate document.

As mentioned, initial and final test will be done through several instruments: healthy behavior, physical challenges and body posture. Information about healthy behavior will be collected through an online survey. For the physical challenges, we will use home based complex physical exercises in order to assess level of physical skills. Body posture will be assessed using participant body photos.

It is important to inform all participants that collected personal data will be used for research and educational purposes. Also, all participants (parents and guardians) will be informed about this before they start using an online survey. Accepting parent/guardian accordance, participants are safe about their personal data and can continue participation in HopaSus research.

HopaSus recommendations will be applied immediately after the initial test, and it will run from October 2022 till end of December 2022, and final test has to be done at the end of this period. It is important to track applied recommendations with

a parent/guardian online log book that will be presented to parents at the end of December 2022.

Target group of HopaSus research are children from age 11 till age of 15 years and their parents/guardians. Children can be organized in project participation through schools, sport clubs, youth associations, other organizations or individually.

HopaSus research will be conducted in four European countries: Romania, Bulgaria, Lithuania and Serbia.

Every country will have HopaSus research coordinator which will be your local contact point.

All collected data in the research process will be supplied to the coordinator.

Important: Note, all participants must do first survey, because they will accept or refuse parent/guardian accordance for research!

Important: Implement the initial test before HopaSus recommendations!

Important: If it is possible, try to organize group testing for the body posture

HEALTHY BEHAVIOR SURVEY

The survey is intended for children's parents/guardians, where we will collect data about children's health habits in an indirect way.

Before the survey, parents/guardians will be informed about protection of their personal data and accepting accordance they can continue participation in research.

The survey will collect data about children’s: level of physical activity, mobility from home to school, rest behavior and information about playing video games.

Survey must be done first because it contains accordance for project participation.

You can find online survey over this link

Repeat survey at the end period of recommendations (close to end of December 2022)

PHYSICAL CHALLENGES

In order to assess the level of physical skills, we use five complex exercises that can be done at home.

It is important that the initial test is done without previous practicing of challenges. So don't try it! Children can do challenges after parents complete a survey!

Implement the initial test before recommendations!

All challenges are video recorded by parent/guardian or coordinator in the way that participant is visible all the time during the challenge.

Coordinator can organize group or individual testing, or it can collect video files from participants.

We recommend that all children are supervised by an adult when attempting these challenges. All participants take part at their own risk. The coordinator does not accept responsibility for injury as a result of taking part in this project.

Final test is to be done with same challenges at the end period of recommendations (close to end of December 2022)

List of Challenges

Challenge 1

For this challenge, you need a skipping rope (professional skipping rope or any other rope you have at home) and adequate space at home where you can do the challenge;

Assume the starting position, holding the ends of the rope, arms straightened and alongside the body, and the middle of the rope on the floor behind your feet;

When ready to start, move your arms upwards, turn the rope over your head and start skipping over the rope;

You may use double jumps (turn the rope slower and have one small hop between jumps over the rope) or single jumps (turn the rope faster and jump over the rope without hopping between the jumps), but remember to jump with both feet at the same time (simultaneously);

The challenge is to perform consecutive jumps in a period of one minute;

Challenge yourself and be active!
VIDEO

Challenge 2

For this challenge, you need two plastic bags and an adequate space at home where you can do the challenge;

Take the two plastic bags in one hand, holding them for the bottom part and not their handles;

Start tossing the plastic bags, one by one, in front of your body and head;

Continue in that manner, tossing the plastic bags using only one hand, and don't let any of the bags fall on the floor;

The challenge is that you juggle the bags for 20 consecutive times, tossing alternatively one by one bag, using only one hand in a period of one (1) minute; Challenge yourself and be active!

* You may use your right or left hand !

VIDEO

Challenge 3

For this challenge you will need two (2) T-shirts, a bed or chair and adequate space at home;

Put on both T-shirts;

Take a position with your face facing the floor, raise your legs on the bed or chair, place your palms on the floor shoulder-width apart, and keep your arms and body straight;

From that position, try to take off one T-shirt and then put it on again;

The challenge is to do this within a one-minute period;

Challenge yourself and be active!

Remember

- Use both hands alternately to take off the T-shirt;
- One T-shirt must be worn during the whole exercise / challenge;

VIDEO

Challenge 4

For this challenge, you need: a medium-sized ball (a basketball is best, but you can use another ball of a similar size) and adequate space at home;

Kneel on your knees and start tapping the ball using your right, then left hand alternately;

After doing 10 repetitions in that position, straighten up in a standing position;

Do not stop tapping the ball and do 20 repetitions in a standing position using alternating right and then left hand;

After doing 20 repetitions in a standing position, without stopping to tap the ball, return to the original position, kneeling and do 10 more repetitions;

Challenge yourself and be active!

VIDEO

Challenge 5

For this challenge, you need a ball and adequate space to complete the challenge;

Stand up straight and hold the ball in front of you with both hands;

The challenge is to throw the ball back over your head, and catch it with both hands behind your body while keeping your body straight;

Challenge yourself and be active!

VIDEO

BODY POSTURE

The postural assessment will be carried out by photogrammetry technique through a digital tablet/mobile application, able to reconstruct the posture from photography (Roggio, et al., 2021). It has to be performed at the very beginning of the experimental program, before the implementation of the recommendations (initial test) and at the end of the program (final test).

Equipment

- portable device (mobile phone / tablet) and (if it's possible) camera stand (tripod);
- APECS mobile application (New Body Technology SAS, Grenoble, France).

Procedure

During the measurement, the child is barefoot on a flat and firm surface, dressed in shorts (boys) or shorts and top (girls). Shorts should be dropped to the hips. Hair should be tied up.

The child is in an upright standing position with his arms next to his body, and feet hip-width apart. The head is positioned so that the "Frankfurt plane" occupies a

horizontal position (the "Frankfurt plane" is the line joining the lower edge of the left orbit and the upper edge of the left external canal, Figure 1).

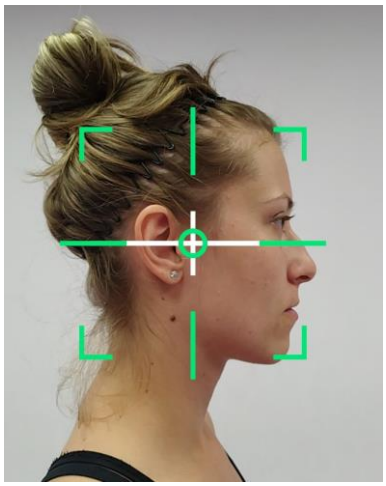


Figure 1. Frankfurt plane.
The horizontal line represents the right position of the Frankfurt plane during assessment.

Two digital photographs (of front and right side) have to be recorded using an APECS mobile application. Try and get a blank wall behind the child, as this helps us see things better.

The portable device has to be set on a tripod (camera stand), two to three meters away from the line marking the position of the child. The height of the tripod has to be adjusted, so the middle of the objective lens is at the level of the center of the body (referent point can be the child's navel).

We recommend that photos be made by one, always the same examiner (coach / sport teacher…) - the person designated by the coordinator of the partner organization.

If you are not able to organize a photo shoot by a sports worker, alternatively you can instruct the parents to make them at home.

Step-by-step instructions of how to use APECS mobile application for making photos

APECS mobile application can be downloaded for free from Google Play or the following website: https://apecs.newbodytechnology.com/. Note: sports teachers / coaches / parents will use it only for the purpose of taking a photo of the child, which will further serve us to assess body posture.

Before opening the application, the user (photographer) should check where the screenshot button is located on his portable device.

When the application starts, the photographer will see the home screen, where he/she has to choose *Quick Analysis* (presented on Figure 2).

Figure 2. Screenshot of home screen of APECS mobile applications. The red circle indicates the button to be pressed.

Pressing the *Quick Analysis* it will appear a screen in the center of which is a button in the form of a blue camera. Pressing the *front* or *right side* button, that is located at the bottom of the screen (indicated by the red arrow in Figure 3A), the photographer chooses whether to take a photo from the front or from the right side (front is set by default).

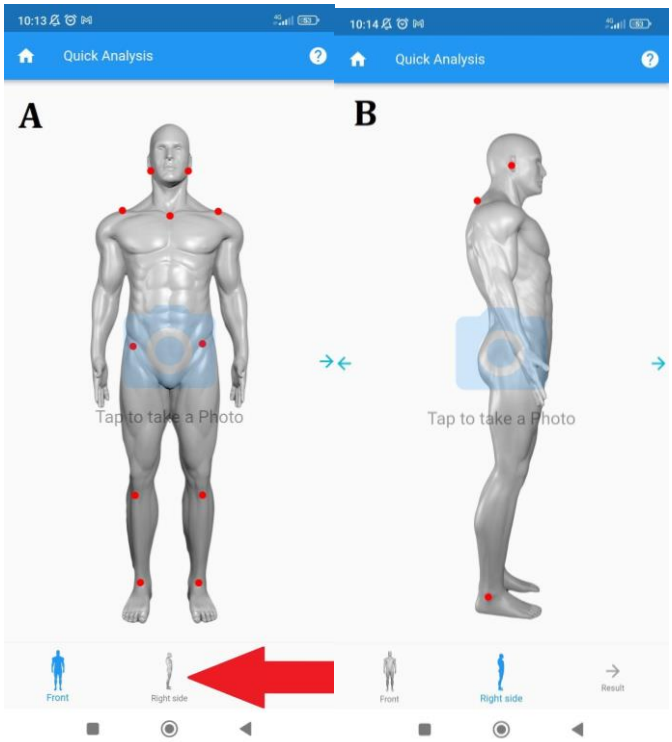


Figure 3. Screenshot of Quick analysis screens. A - front and B - right side position of subject. The red arrow indicates the place where the buttons are to be pressed in order to select the desired position for photography.

When the user taps to take a photo, at the bottom of the screen will appear a question from which source he/she wants to pick a photo (Figure 4). It has to be selected “Camera”.

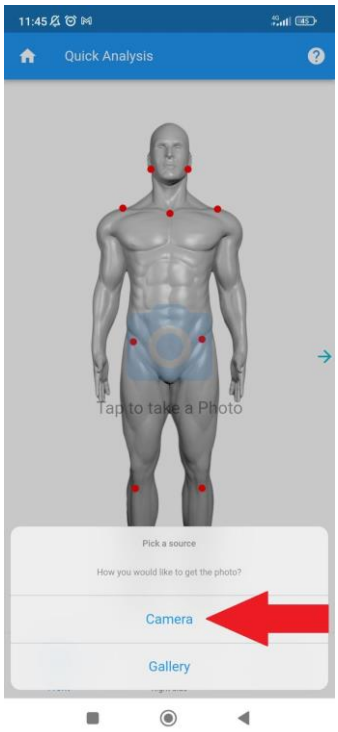


Figure 4. Selecting a photo source.

Choosing the *Camera* button, the phone's camera will activate. In the same time, across the screen it will appear a stative red square with a circle in the center, and a mobile white cross (Figure 5A). The photographer should take a position about 2-3 meters from the child, so that the camera covers the entire body of the child. The circle of the red square should be positioned in the center of the child's body (approximately just below the navel), and then, moving the phone with light movements, the white cross should overlap with the red square. The moment they are folded correctly, the red square will turn green (Figure 5B). That's the moment when the photographer needs to take a photo.

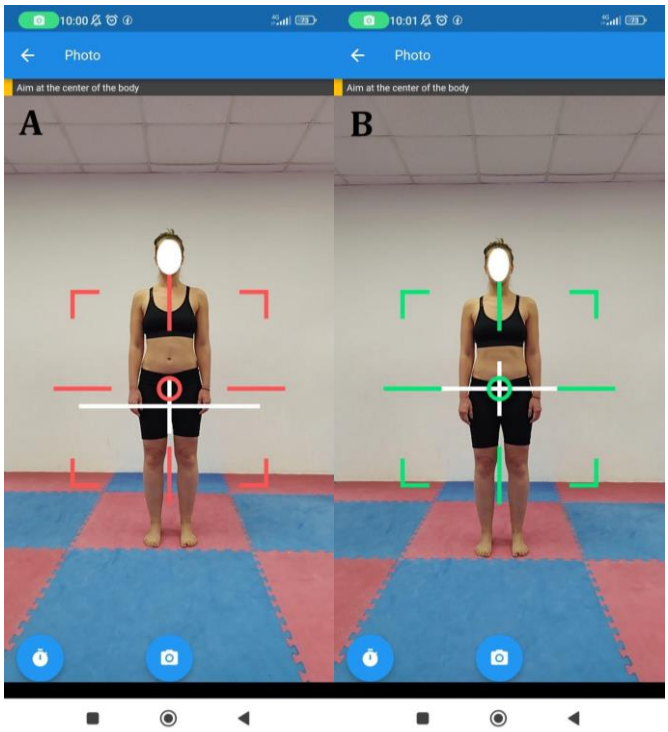


Figure 5. A. Positioning camera lens for shot. B. Moment for taking a shot, when the lens is positioned at the center of the body.

Immediately after taking a photo, the application will offer to crop the photo, but it doesn't need to be cropped, just screenshotted (Figure 6).

Figure 6. Screenshot of the photo taken in the front view. The application offers a crop, but actually the photographer needs to make a screenshot of the photo at that moment.

The same procedure has to be done with the child turned on the left (to make a photo of the child's right side) (Figure 7).

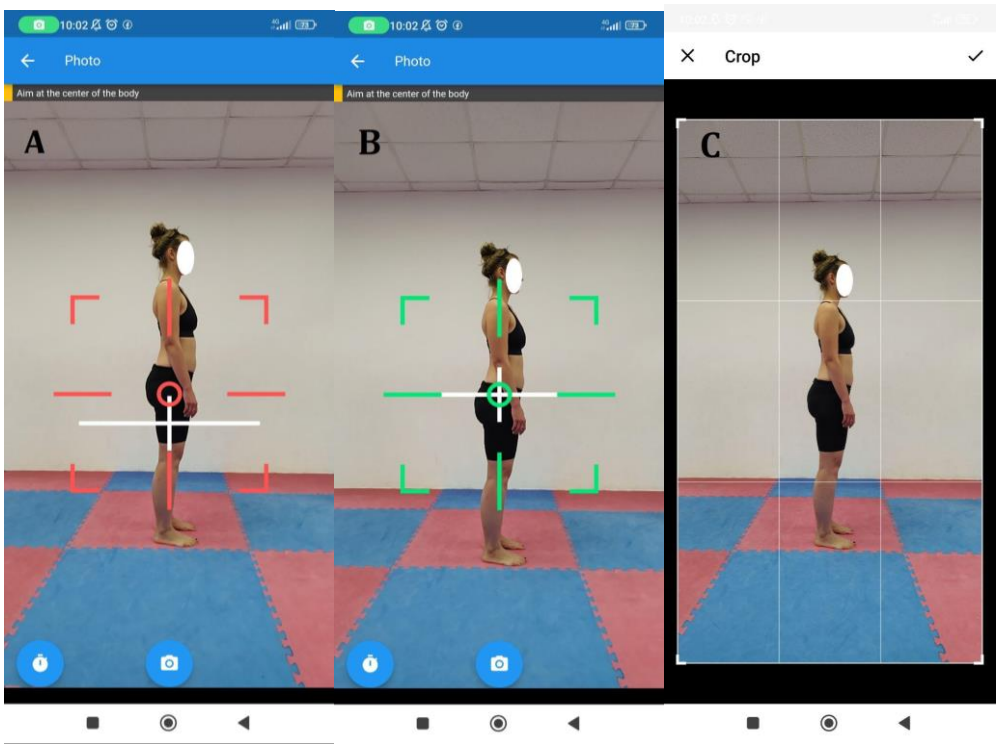


Figure 7. Taking a photo from the right side. A - Positioning camera lens for shot, B - Moment for taking a shot, C - Taking screenshot of the photo.

Research Workshops and Challenges

The research workshops held in Plovdiv involved the collaboration of two dedicated and youth workers and a local school. Their primary objective was to engage participants in physical activities through non-formal education techniques. These workshops spanned over a period of one month and focused on improving various physical skills. The participants, comprising students from a local high school experienced in Erasmus+ programs, were assigned a series of challenges to complete and repeat throughout the project workshops' duration.

The challenges included the following:

Challenge 1

Jump rope for 1 minute - This challenge aimed to test the participants' endurance and coordination while skipping rope continuously for a full minute.

Challenge 2: Juggle with two plastic bags in one hand - Participants were challenged to develop their hand-eye coordination and dexterity by attempting to juggle two plastic bags in one hand.

Challenge 3

In a push-up position, remove your sweatshirt and put it back on again - This challenge targeted the participants' strength, balance, and flexibility by requiring them to remove and put on a sweatshirt while maintaining a push-up position.

Challenge 4

Dribble with a basketball on your knees with one hand, stand up, and then return to the knees - Participants were tasked with dribbling a basketball while on their knees, transitioning to a standing position, and then returning to their knees while maintaining control of the ball.

Challenge 5

Throw a volleyball in front of you and catch it behind your back - This challenge aimed to enhance the participants' hand-eye coordination and agility by requiring them to throw a volleyball in front of them and then swiftly catch it behind their back.

Challenge Results and Observations

The outcomes of the challenges varied across the different tasks, with participants displaying varying degrees of improvement:

Challenge 1

Jump rope - Although the participants did not achieve significant success in this challenge, there was a noticeable improvement in their endurance levels. The regular practice of jump rope exercises helped them build stamina over time.

Challenge 2

Juggling with plastic bags - Participants demonstrated marginal improvement in this challenge compared to their initial attempts. Their perseverance and practice allowed them to gradually enhance their juggling skills.

Challenge 3

Sweatshirt exercise - The participants did not show any noticeable improvement in their ability to remove and put on their sweatshirts while in a push-up position. This challenge proved to be particularly demanding and required more practice and focus.

Challenge 4

Basketball dribbling - The participants exhibited exceptional skill in this challenge right from the beginning, leaving limited room for improvement. Their proficiency in dribbling a basketball on their knees showcased their pre-existing talent and aptitude for the sport.

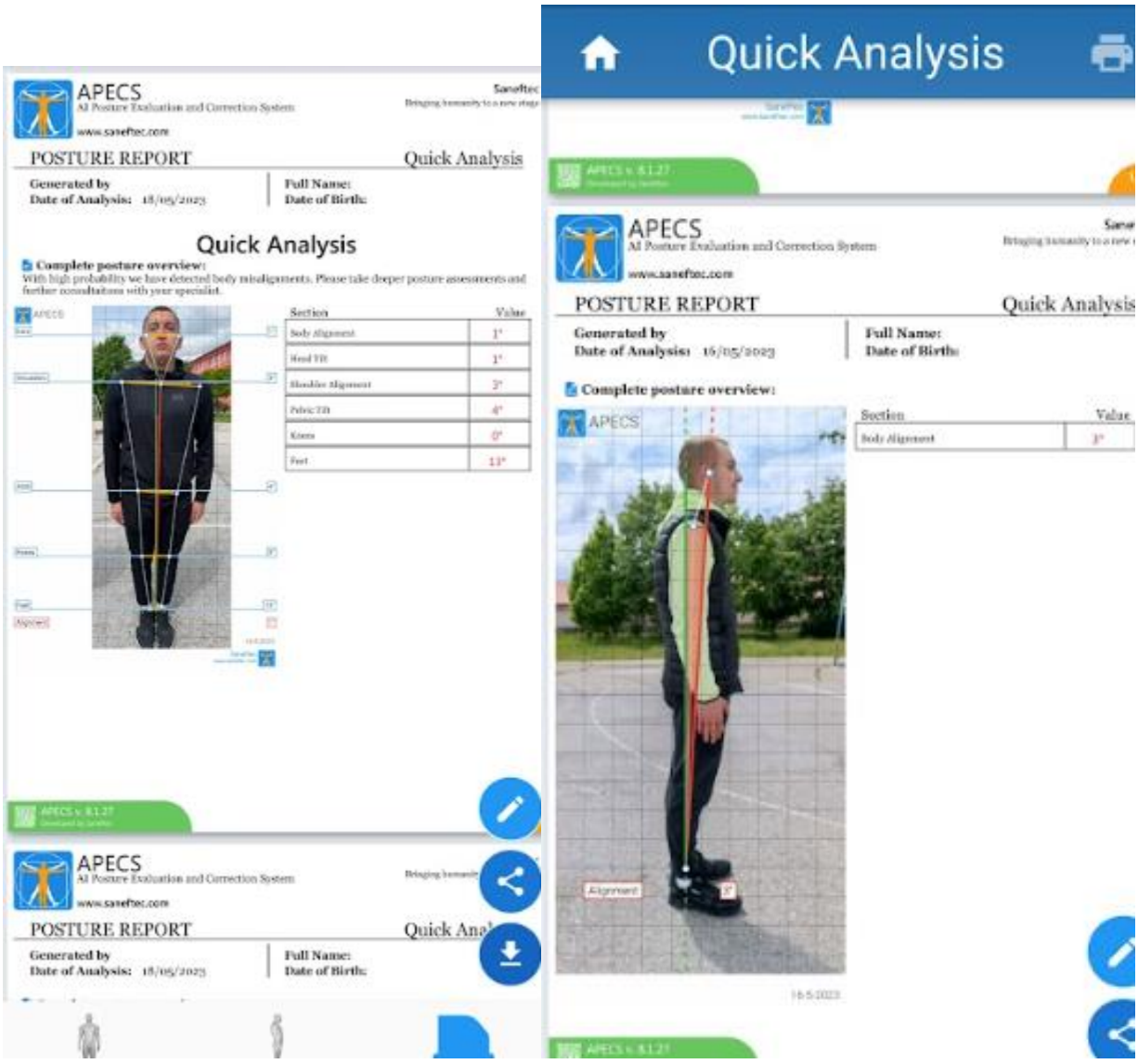
Challenge 5

Volleyball throwing and catching - This challenge yielded significant improvement among the participants, indicating their increased skill and coordination. The regular practice sessions helped them refine their technique and successfully perform the task.

Use of Photo and Video Materials

Throughout the project, the two dedicated youth workers documented the participants' progress and performances using various photo and video recording equipment. Their efforts aimed to capture the participants' engagement, skill development, and overall experience during the challenges. By meticulously documenting the project, these visual materials served as valuable evidence of the participants' journey and the project's impact.

The photo and video materials recorded the participants' posture, movements, and expressions during the challenges. These visuals provided a comprehensive record of their physical abilities and served as a means of assessing their progress. The use of mobile apps, such as Apecs, enabled the youth workers to capture accurate snapshots and analyze the participants' performance.


APECS
AI Posture Evaluation and Correction System
www.saneftec.com
POSTURE REPORT
Quick Analysis
Generated by
Date of Analysis: 18/05/2023
Full Name:
Date of Birth:
Quick Analysis
Complete posture overview:
With high probability we have detected body misalignments. Please take deeper posture assessments and further consultations with your specialist.
Section
Value
Body Alignment
1°
Head Tilt
1°
Shoulder Alignment
3°
Pelvic Tilt
4°
Knees
0°
Feet
13°
Alignment
APECS v. 8.1.27
Quick Analysis
APECS
AI Posture Evaluation and Correction System
www.saneftec.com
POSTURE REPORT
Quick Analysis
Generated by
Date of Analysis: 16/05/2023
Full Name:
Date of Birth:
Complete posture overview:
Section
Value
Body Alignment
3°
Alignment
APECS v. 8.1.27

Challenges Faced

The implementation of the HopaSus project in Plovdiv, Bulgaria, encountered several challenges along the way. These challenges included:

Lack of interest from youngsters

The overall lack of interest among the targeted youth posed a significant hurdle to the successful execution of the project. It proved challenging to engage and motivate the participants, as they displayed limited enthusiasm and commitment to the challenges. However, the youth workers' dedication and creativity in designing the activities helped to mitigate this challenge to some extent.

Lack of desire from teachers

The project team faced obstacles in garnering the necessary support and enthusiasm from the teachers at the partnering high school. Their limited engagement and involvement negatively impacted the students' motivation and overall project outcomes. The youth workers strived to communicate the project's goals and benefits to the teachers, emphasizing the significance of their active participation in motivating the students.

Lack of cooperation from organizations and institutions

The project team experienced difficulties in finding suitable institutions and organizations willing to participate in the project. It required extensive outreach and communication with more than eight potential partners before securing collaboration with the partnering high school. This lack of cooperation highlighted the general disinterest in the topic within the local community. The persistence of the youth workers ultimately led to the successful partnership, enabling the project to proceed.

Two Secondary Workshops

In addition to the workshops conducted in Plovdiv, two more workshops were organized as part of the HopaSus project. These workshops aimed to raise awareness about the project and engage students from various age groups. During these workshops, the project team interacted with the participants and encouraged discussions about physical health. The team posed questions to the participants, seeking insights into their current physical well-being, challenges faced, and aspirations for improvement. The workshops provided valuable information for the project team's ongoing efforts to tailor activities and interventions to the specific needs of the participants.

Workshop in December 2022

Date: December 2022
Location: Plovdiv, Bulgaria
Participants: Approximately 15 attendees

Introduction

The workshop, focused on the project "Erasmus Sport Plus HopaSus," took place in Plovdiv, Bulgaria, with the aim of promoting physical wellbeing and an active lifestyle among children and young people through the use of sports video games. The event, held in December 2022, provided an opportunity for participants to engage in discussions, gain insights, and explore the challenges associated with integrating video games into physical education and sport lessons.

Presentation

The workshop commenced with a comprehensive presentation highlighting the objectives and purpose of the Erasmus Sport Plus HopaSus project. Attendees were introduced to the concept of sports video games and their potential as educational

resources, particularly in fostering motivation, confidence, understanding, and performance in sporting activities. The presentation also emphasized the significance of adapting the secondary school curriculum to incorporate qualitative digitalization and the implementation of new guidelines and best practices.

The presentation further delved into the challenges faced by teachers during the pandemic lockdown, working with children, young people, and students. The difficulties in providing practical activities, the use of virtual resources, and the potential of video gaming as an educational tool were thoroughly discussed. Attendees gained valuable insights into the experiences and perspectives of teachers who have faced these challenges firsthand. The presentation concluded by highlighting the importance of physical wellbeing and an active lifestyle in the lives of students and the broader community.

Discussion

Following the presentation, an interactive discussion ensued, enabling participants to share their perspectives, experiences, and concerns. The attendees expressed their enthusiasm for incorporating video games as a means of engaging children and young people in physical activities. They emphasized the need for creative and innovative approaches to keep students motivated, especially during challenging circumstances like the pandemic.

The discussion revolved around the challenges encountered by teachers during the pandemic and the subsequent lockdown. The lack of access to physical spaces for sports and the need for alternative methods to keep students active and motivated were identified as major hurdles. Participants shared personal experiences and strategies they employed to overcome these challenges. They emphasized the importance of adapting teaching methods, exploring digital resources, and creating engaging virtual environments to ensure students' physical and mental wellbeing.

Furthermore, the discussion focused on the selection of appropriate video games for educational purposes. Attendees exchanged ideas, suggestions, and recommendations for games that simulate playing sports. They stressed the need to consider age-appropriate content, the relevance of the game to the curriculum, and its potential for promoting teamwork, strategy, and physical activity. The discussion fostered a collaborative atmosphere, allowing participants to learn from one another's experiences and insights.

Mini Workshop: Challenges and Solutions

To address the challenges faced by educators, a mini workshop was conducted to facilitate practical problem-solving. Participants engaged in group activities and exercises aimed at finding solutions to overcome obstacles in implementing sports video games in physical education and sport lessons. The workshop fostered a supportive and inclusive environment, encouraging creativity and innovation.
In the mini workshop, participants identified common challenges and shared potential solutions. The workshop highlighted the significance of teacher training and professional development to effectively utilize video games, adapt lesson plans, and create engaging learning experiences.

Participants also discussed the importance of establishing guidelines and best practices for the use of sports video games in physical education and sport lessons. The workshop served as a platform for exchanging ideas, building networks, and fostering a community of educators dedicated to promoting physical wellbeing through innovative

approaches.

Key Findings

Throughout the workshop, several key findings emerged:

1. Participants recognized the potential of sports video games to motivate and engage students in physical activities, particularly during challenging circumstances like the pandemic.
2. Students highlighted the importance of integrating digital resources into physical education and sport lessons, acknowledging the need for a balanced approach that combines virtual and physical experiences.
3. The workshop emphasized the importance of teacher training and professional development in utilizing video games effectively, incorporating them into the curriculum, and aligning them with educational objectives.

Conclusion

The workshop in Plovdiv, Bulgaria, proved to be an engaging event, providing a platform for students to discuss the integration of sports video games in physical education.

Moving forward, it is essential to address the challenges identified during the workshop, such as ensuring access to necessary resources and developing comprehensive guidelines for incorporating sports video games into the curriculum.

Workshop in May

Date: May 2023
Location: Plovdiv, Bulgaria
Participants: 30 attendees

Introduction

A workshop focusing on the promotion of physical wellbeing through sports video games and physical exercises was conducted in Plovdiv, Bulgaria. The event aimed to engage participants in interactive activities, discussions, and presentations, emphasizing the importance of physical activity and the integration of innovative approaches in physical education. The workshop took place for over two hours, providing a comprehensive platform for knowledge sharing and practical experiences.

Presentation

The workshop commenced with a detailed presentation that outlined the objectives and purpose of the event. Participants were introduced to the concept of sports video games as educational tools and the potential they hold in motivating students to engage in physical activities. The presentation highlighted the importance of integrating digital resources and innovative methods into physical education lessons to enhance students' physical wellbeing and overall health.

Focus on Physical Exercises

Following the presentation, the workshop transitioned into a series of the physical exercises/challenges designed to test the participants' physical abilities and highlight the significance of incorporating various forms of movement. The five physical challenges included were:

1. Jump Rope for 1 Minute: Participants were encouraged to demonstrate their coordination, rhythm, and endurance by jumping rope continuously for one minute.
2. Juggling Two Plastic Bags with One Hand: This exercise aimed to improve participants' hand-eye coordination and fine motor skills. Each participant attempted to juggle two plastic bags with one hand, showcasing their ability to manipulate objects in a controlled manner.
3. Removing Sweatshirt While in a Push-up Position: This challenge focused on participants' upper body strength, core stability, and flexibility. They were required to remove their sweatshirt while maintaining a push-up position, emphasizing the importance of strength and agility in physical activities.
4. Basketball Dribbling Kneeling Down and Standing Up: This exercise tested participants' dribbling skills and their ability to perform movements from different positions. They were asked to dribble a basketball while alternating between kneeling down and standing up, emphasizing coordination and adaptability.

5. Throwing a Volleyball in Front and Catching It Behind the Back: Participants showcased their hand-eye coordination, agility, and reaction time by throwing a volleyball in front of their bodies and catching it behind their backs.

Throughout these physical challenges, participants experienced firsthand the importance of physical fitness, agility, coordination, and perseverance in achieving optimal performance.

Workshop Structure and Support

The workshop was carefully structured to ensure maximum engagement and participation. Two experienced teachers provided guidance, instruction, and assistance to the participants throughout the event to support the youth worker assigned to the project.

Discussion and Reflection

After completing the physical challenges, the workshop allowed participants to engage in discussions and reflections. Attendees shared their experiences, insights, and personal perspectives on the relationship between physical exercises and the integration of sports video games in physical education. The discussions emphasized the positive impact of physical activities on students' physical and mental wellbeing, highlighting the importance of incorporating innovative approaches to keep them motivated and engaged.

Conclusion

The workshop in Plovdiv, Bulgaria, successfully promoted physical wellbeing through a combination of sports video games and physical exercises. The interactive nature of the event, including the presentation, physical challenges, and discussions, enabled participants to deepen their understanding of the benefits of physical activity and explore innovative methods to engage students in physical education.

The workshop's emphasis on practical exercises aimed to enhance participants' physical abilities and highlight the importance of incorporating diverse movements in physical education lessons.

Moving forward, it is crucial to continue advocating for the integration of sports video games and physical exercises in the curriculum, promoting a holistic approach to physical education that combines digital resources with practical activities. The workshop's success and the enthusiasm of the participants serve as a testament to the

potential of innovative approaches to enhance students' physical wellbeing and instill a lifelong commitment to active lifestyles.

Social Media Engagement

To maximize the project's reach and impact, the project team utilized social media platforms to share information and updates about HopaSus. The team actively posted content related to the workshops, including pictures and information about the challenges and participants' progress. The regular updates on social media not only showcased the project's activities but also encouraged a broader audience to get involved and show support for the initiative. These efforts aimed to create a sense of community and inspire others to adopt healthier lifestyles through physical activities.

Transnational Partner Meeting (TPM)

The project team had the opportunity to participate in a Transnational Partner Meeting held in Serbia. This meeting brought together partners from different countries to discuss the future steps of the project and share insights and experiences. The meeting served as a platform for fruitful discussions, brainstorming sessions, and collaboration

among the partners. Additionally, the project team had the opportunity to witness a workshop conducted in a local school by one of the partner organizations. This firsthand experience provided valuable inspiration and practical ideas for further implementation of the HopaSus project.

Dissemination Efforts

Dissemination played an important role in raising awareness about the HopaSus project and its objectives. The project team leveraged various tools and platforms to ensure the widespread dissemination of project-related information. Social media platforms, including Facebook, served as key channels for sharing updates, workshop highlights, and success stories. The project team created a dedicated Facebook page for HopaSus, allowing interested individuals to follow the project's progress, engage in discussions, and access relevant resources. Furthermore, the team worked on creating a comprehensive project guide, video materials, and presentations to disseminate information to a wider audience, including other educational institutions, community organizations, and stakeholders.

HOPASUS RECOMMENDATIONS

For parents, teachers, coaches, youth practitioners and other HopaSus users

Familiarize yourself with children's favorite digital content

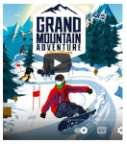
Understand children's needs but follow your goals

Be physically active and speak about sport when you are with children

Actively listen to your children, show them trust, appreciation and empathy

Avoid "over" explanations regarding video games and the importance of sports activities

....and then you can suggest to children to be physically active and to play sport video games!



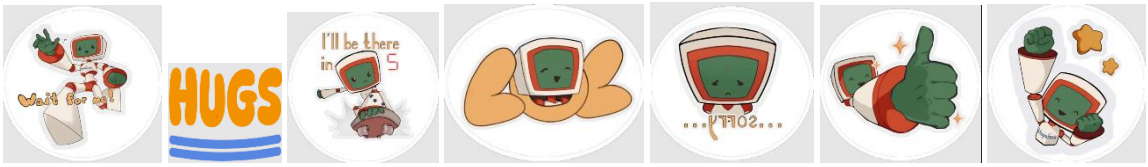
Be active and explore the world of sport video games!

Partners

Ref. No. 101049653 — HOP

Website: hopasus.eu
Email: adina.p.geambasu@gmail.com

Co-funded by the Erasmus+ Programme of the European Union



Conclusion

In conclusion, the HopaSus project workshop conducted in Plovdiv, Bulgaria, successfully employed non-formal education methods to promote physical activity, skill development, and a healthy lifestyle among participants. The challenges issued to the participants provided opportunities for them to improve their physical abilities and coordination. Although the results of the challenges were not exceptional in every case, there were noticeable improvements in some areas. The use of photo and video materials by the youth workers allowed for comprehensive documentation of the participants' progress and experiences. Despite the challenges faced, the commitment and dedication of the project team contributed to the overall success of the initiative. The HopaSus project serves as a testament to the importance of non-formal education in fostering physical well-being and personal growth among youth. The HopaSus project in Bulgaria expanded its scope through multiple workshops, participation in a Transnational Partner Meeting in Serbia, and dedicated dissemination efforts. The secondary workshops engaged participants of different age groups, gathering insights into their physical health and fostering awareness about the project. Social media platforms played a vital role in sharing project updates and reaching a broader audience. The Transnational Partner Meeting provided a platform for collaboration and knowledge exchange among partners. Dissemination efforts were intensified through the creation of a Facebook page, project guide, video materials, and presentations, enabling a wider dissemination of project-related information. Overall, these activities and efforts further strengthened the impact and reach of the HopaSus project, fostering a culture of physical well-being and non-formal education.

HOPASUS RESEARCH REPORT

Dragana Drljacic, Milan Djupovac, Aleksandar Ivanovski
Sport Diagnostic Center Sabac

METHODS

The study that was conducted from December 2022 to February 2023 involved parents/guardians, children, and coaches / teachers of physical education (TPE) from Romania (ROM), Bulgaria (BUL), Lithuania (LITH) and Serbia (SRB). The research was designed to assess the influence of HopaSuS recommendations and children's playing sport video games on physical activity, healthy behavior and body posture of children.

Considering that the target group of HopaSus research was children aged 11 to 15 years, parental approval was necessary for their involvement in the research. In this regard, participation of parents/guardians in the survey simultaneously meant their approval for the involvement of their child in the study.

Research consisted of an online survey about physical activity, healthy behavior and playing video games related habits of children. Survey is filled once, at the beginning of the research. HopaSuS recommendations are proposed to parents, teachers, coaches to be applied 45 days between initial and final testing. Testing considered the assessment of physical skills and postural status of the children. Assessment of physical skills was carried out through two identical sessions with an interval of 45 days between sessions. A single session involved the application of HopaSuS protocol - a set of five tests/challenges for the assessment of children's motorical aptitude (described in detail in the HopaSuS protocol). Assessment of the postural status is done using free smartphone application APECS mobile application (New Body Technology SAS, Grenoble, France) taking two photos of body posture.

Subjects

Subjects were classified in three groups: parents/guardians (hereinafter *parents*), children and coaches/TPE (hereinafter *sports teachers*).

Parents

The online survey about physical activity, healthy behavior and playing video games related habits of children filled out 148 parents (ROM, N = 42; LITH, N = 61; SRB, N = 45). Additionally, another 56 parents (12 from ROM, 24 from BUL, 5 from LITH and 15 from Serbia), who did not fill out the survey, gave their written consent for their child's

participation in the research. However, only parents who participated in the survey are considered participants in the research, and further all the results of the research related to parents concern those parents who filled out the survey.

Based on survey's answers most of the parents from all three countries were female (Fig. 1).

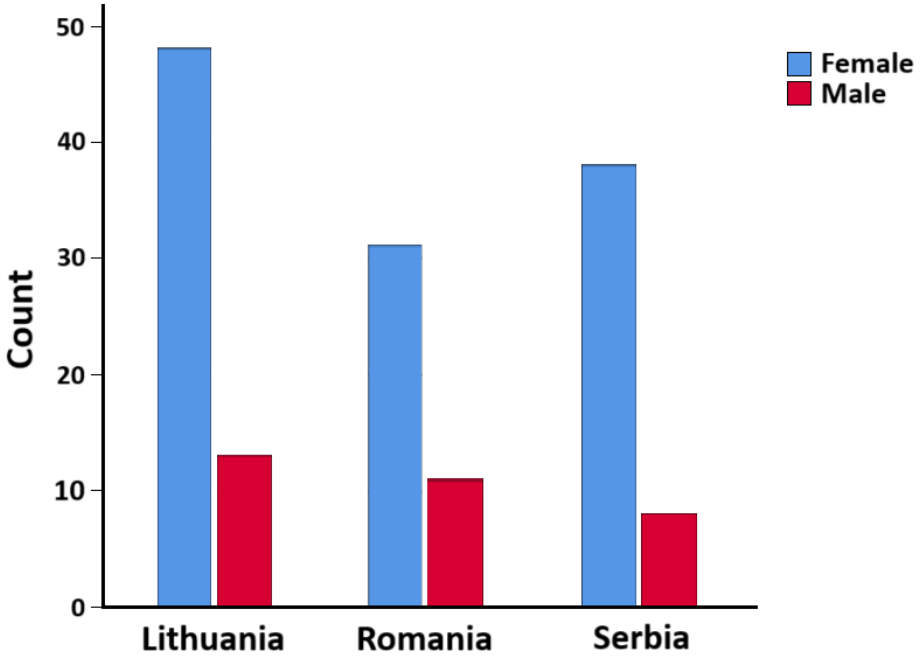


Fig. 1. *Gender of involved parents.*

Parents and children from ROM and LITH mostly live in cities (ROM = 90.5 %, LITH = 80.3%), contrary to those from SRB, who mostly live in villages (54,3%) (Fig. 2).

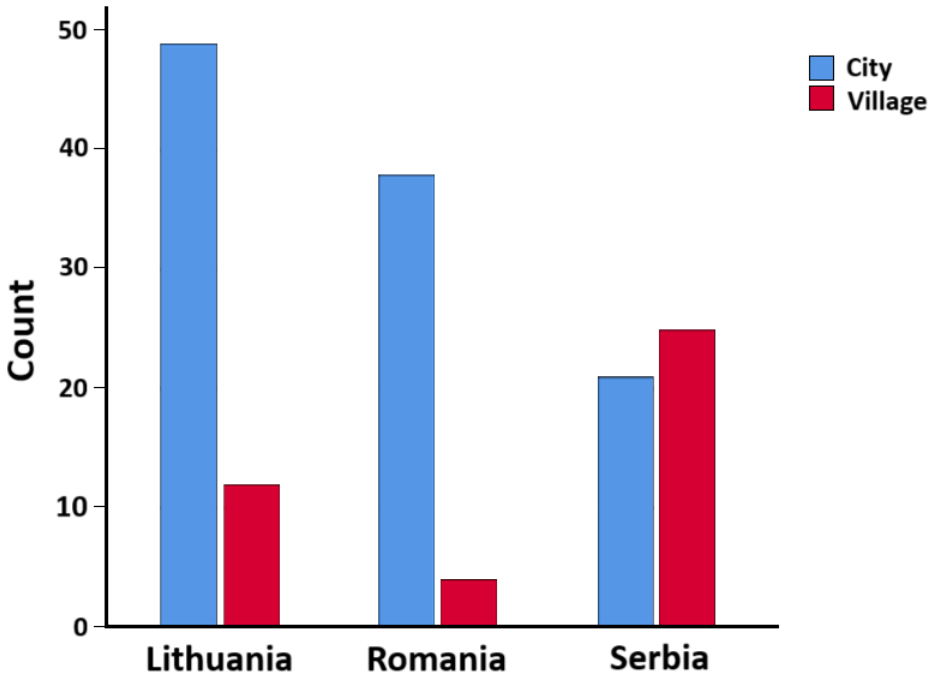


Fig. 2. *Place of residence.*

Children

Children's group was consisted of 204 boys and girls aged 11 to 15 years, divided in four subgroups: ROM (N = 54), BUL (N = 24), LITH (N = 66) and SRB (N = 60), mostly female (ROM = 52,3%, LITH = 57.4% and SRB = 84.8%) except for BUL, where the entire sample was made up of male subjects. Children were involved from schools or sports clubs.

Sports teachers

The sample of sports teachers consisted mainly of physical education teachers, with the exceptions of the Serbian sample, which also included sports coaches. The Serbian sample consisted of 1 physical education teacher and 3 sports coaches (dance, artistic gymnastics and volleyball). Overall samples' structure is given in Table 1.

Table 1. *Sample's structure*

	No. of children	Years (X ± SD)	No. of parents		No. of sports teachers
			M	F	
ROM	54	12.3 ± 1.5	11	31	5
BUL	24	13.8 ± 1.4	/	/	1
LITH	66	12.5 ± 1.4	13	48	2
SRB	60	13.0 ± 1.0	8	38	4

ROM – Romania, BUL – Bulgaria, LITH – Lithuania, SRB – Serbia, No. – number, X – mean, SD – standard deviation.

RESULTS

Healthy habits, physical skills and posture of children were evaluated in the research. The following are the results of the assessment.

RESULTS OF SURVEY ON CHILDREN'S HABITS REGARDING PHYSICAL ACTIVITY AND PLAYING VIDEO GAMES

Physical activity

Children's health habits were assessed indirectly through a survey intended for parents. The survey collected information about the child's physical activity and habits related to playing video games. As previously mentioned, parents from Bulgaria did not fill out the online survey, but gave written consent for their children's participation in the research. For this reason, the report shows the results for the other three countries.

Fig. 3 shows the way children from Lithuania, Romania and Serbia go to school and back. Looking at the total sample, 54% of children walk, 38% use transport (car, bus, etc.), and 8% use bicycles, rollerblade, skate, etc. There are present significant differences between the way of transportation between children from different countries (x^2 = 15. 65, $p < 0.01$). Children from Romania don't use bicycles etc, while children from Serbia mostly walk to school.

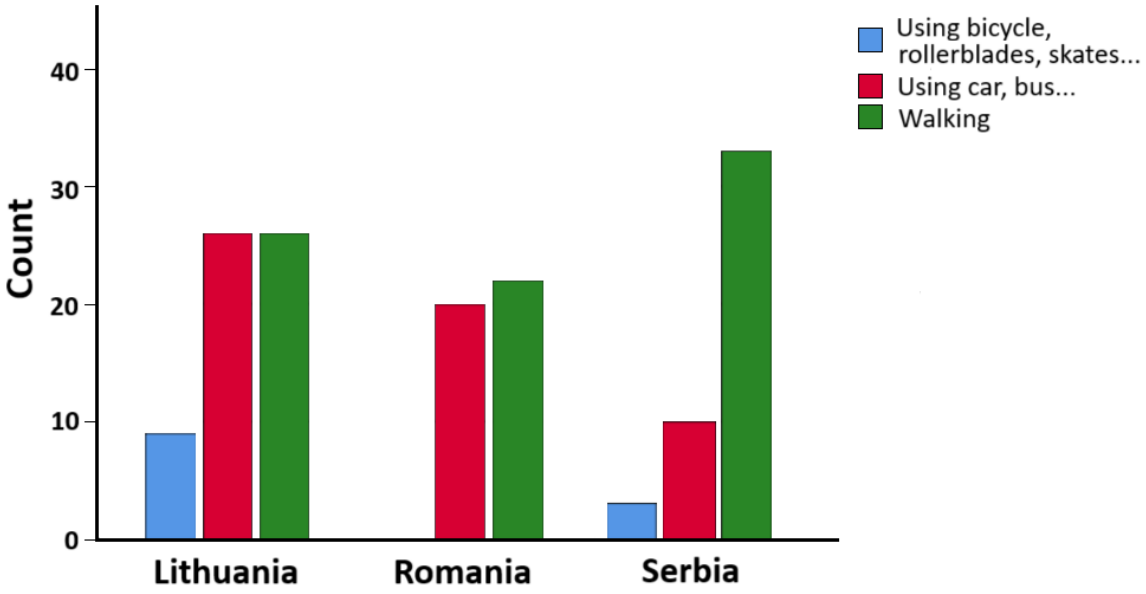


Fig. 3. *Transportation to school*

Children who walk or use bicycles usually travel up to 2 km (89%) to school and back (Fig. 4). Romanian and Serbian children mostly travel from 1 to 2 km, and Lithuanian, up to one kilometer. In all three countries there are the fewest children who travel more than 3 km.

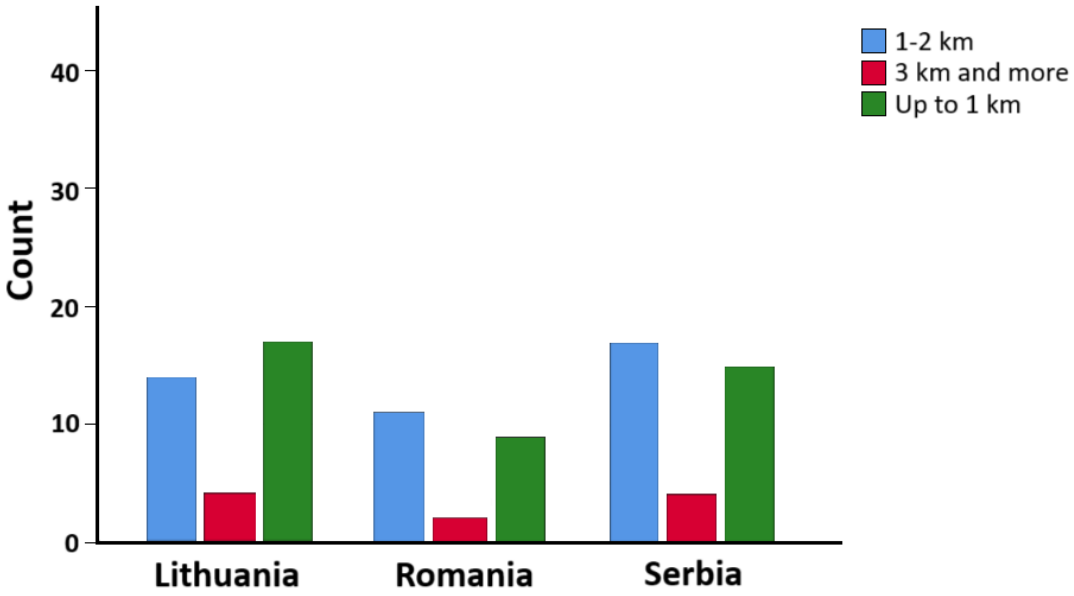


Fig. 4. *Kilometers of transport.*

Differences between the subgroups (LITH, ROM and SRB) were shown in terms of whether the children train any sports outside of physical education classes ($x^2 = 50.76$, $p < 0.001$). While in Lithuanian and Romanian samples the ratio is in favor of children who do not practice sports (LITH = 71%, ROM = 62%), the Serbian sample mostly consisted of children who practice some sport (96%, against 4% of children who do not practice sport, Fig. 5). As could be expected, children from Serbian sample practice sport more times a week (Fig. 6) than children from Lithuania and Romania ($x^2 = 16.14$, $p < 0.01$).

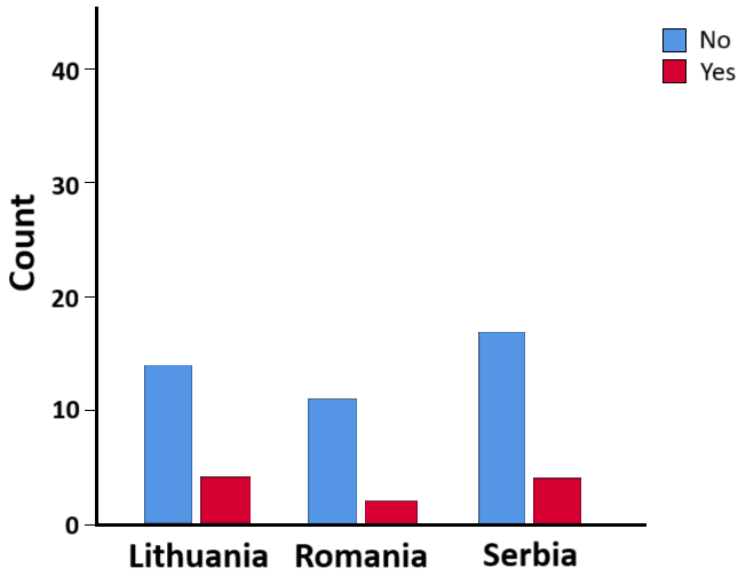


Fig. 5. *Practicing sports.*

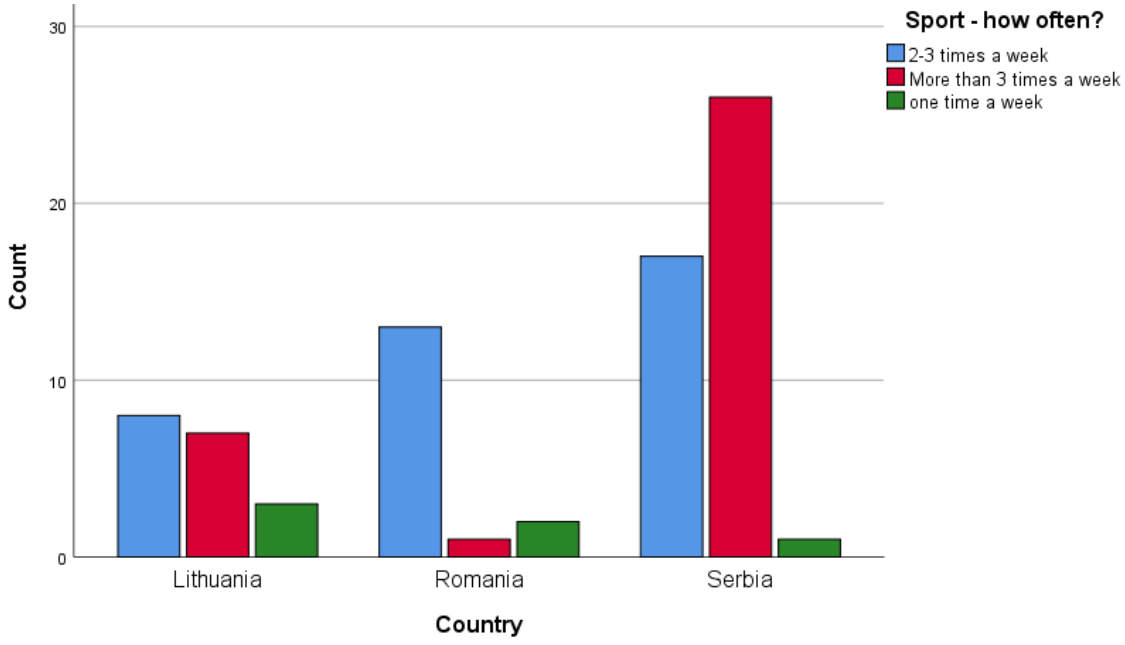


Fig. 6. How often children practice sports weekly.

Participation in physical activity (PA) outside the school is practiced by 79% of the total sample. By comparing the subgroups, a significant difference is observed (Fig. 7). The ratio between children who practice PA and those who do not is much higher in the Lithuanian and Serbian sample, compared to the Romanian one ($x^2 = 9.58$, $p < 0.01$). While in the Romanian sample, 38% of children do not practice PA, in the Serbian and Lithuanian samples, it is 15% each. Likewise, Lithuanian and Serbian sample practice PA mostly 2-3

times a week, then more than 3 times a week and at the end one time a week. (Fig. 8) Romanian sample practice PA mostly 1 time, and 2-3 times a week. More than 3 times a week practice only 5% of the sample.

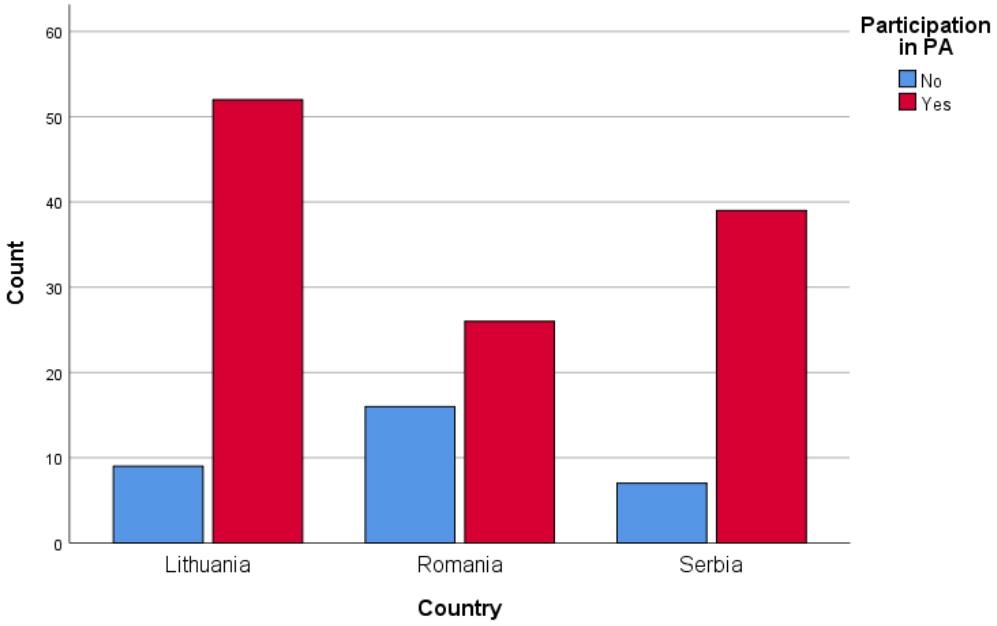


Fig. 7. Participation in PA.

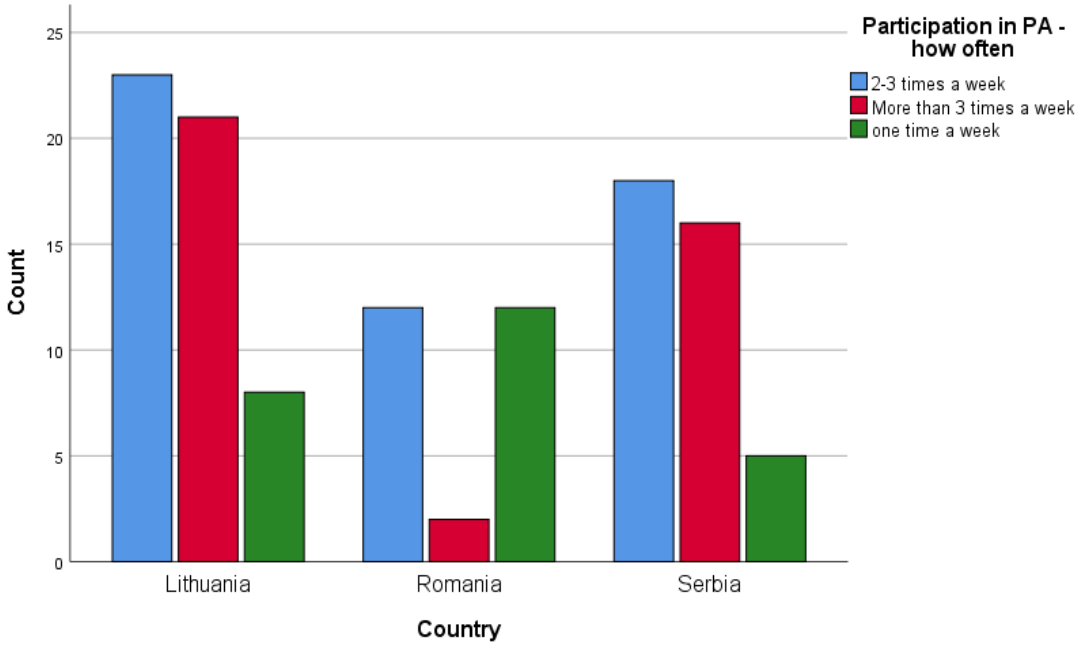


Fig. 8. How often children practice PA weekly.

Playing video games

Based on parents' statements, 74% of the total sample of children play video games, with significant differences noted between children from Lithuania and Romania compared to children from Serbia (Fig. 9). Namely, results show that children from Lithuania and Romania play video games significantly more than children from Serbia ($x^2 = 31.17$, $p < 0.001$). Unlike the LITH and ROM subgroups, the results of the survey indicate that in the SRB sample there is a higher percentage of children who do not play video games (54%) compared to those who play video games (46%).

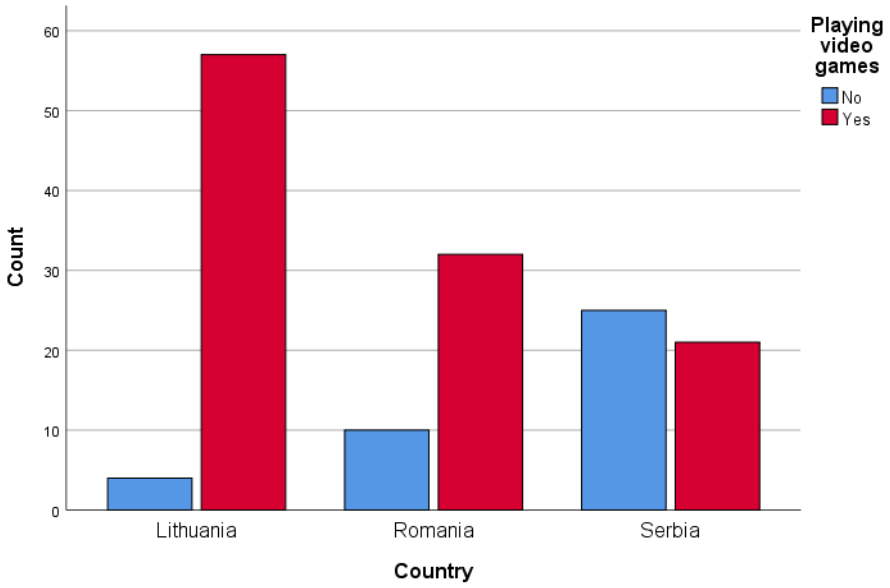


Fig. 9. Playing video games.

The following results refer only to children who play video games. Parents who stated that their children do not play video games, did not provide answers to the following statements.

Observing the time of playing video games during the day (Fig. 10), it can be seen that children mostly spend 1-2 hours playing video games, while children from Lithuania spend more than 4 hours significantly more than children from Romania and Serbia ($x^2 = 14.30$, $p < 0.01$).

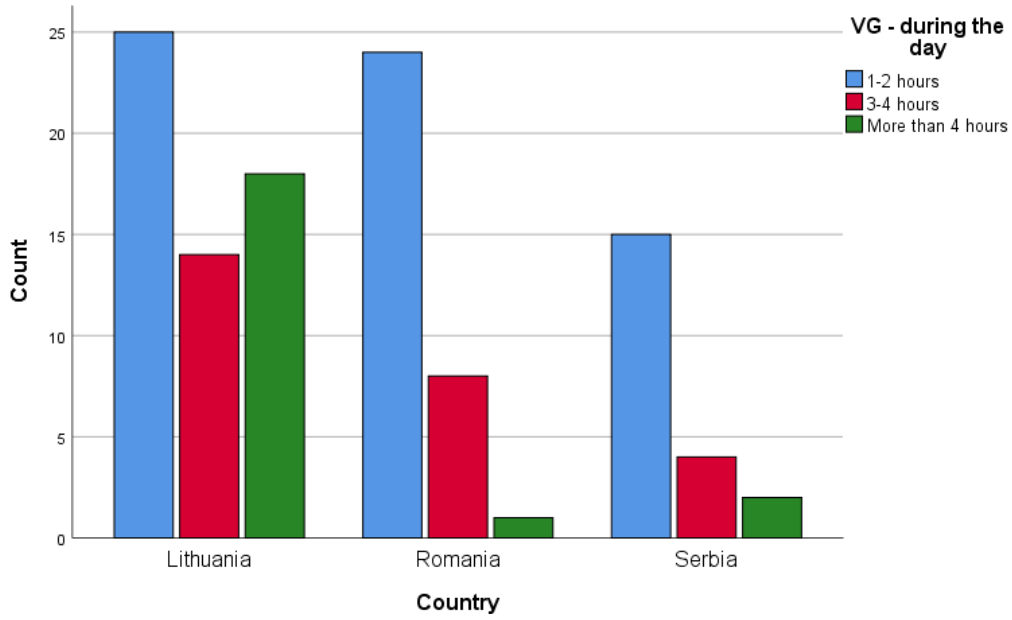


Fig. 10. Playing video games during the day.

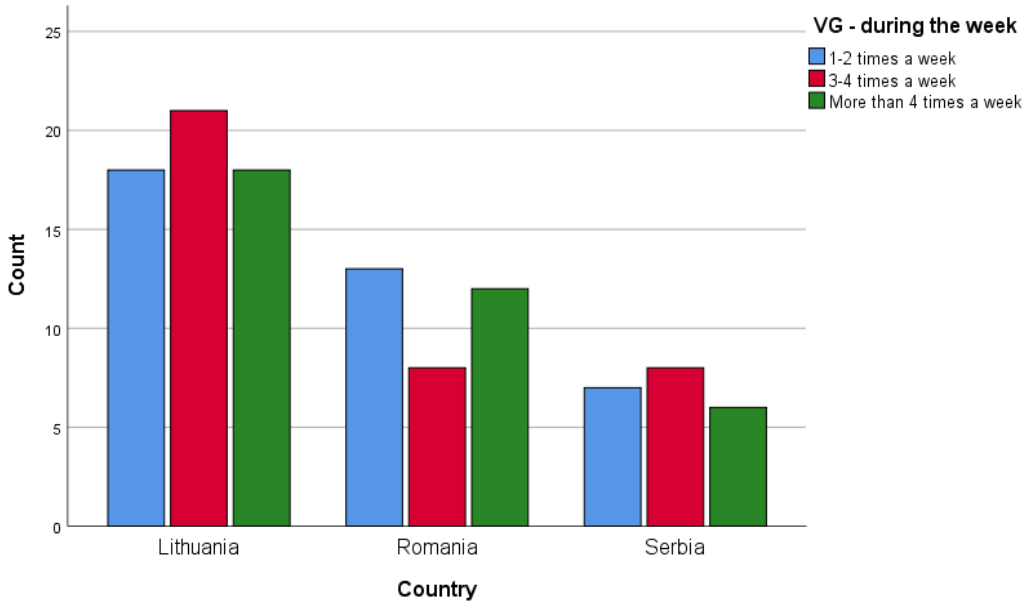


Fig. 11. Playing video games during the week.

Lithuanian and Serbian children in highest percentage play VG 3-4 times a week, contrary to ROM subgroup who mostly spend 1-2 days, or more than 4 days a week (Fig. 11). However, regarding how often children play video games a week, no significant differences between subgroups were noted (x^2 = 1.82, $p > 0.10$). Most children play video games on weekends and such a trend is present in all three subgroups (Fig. 12)

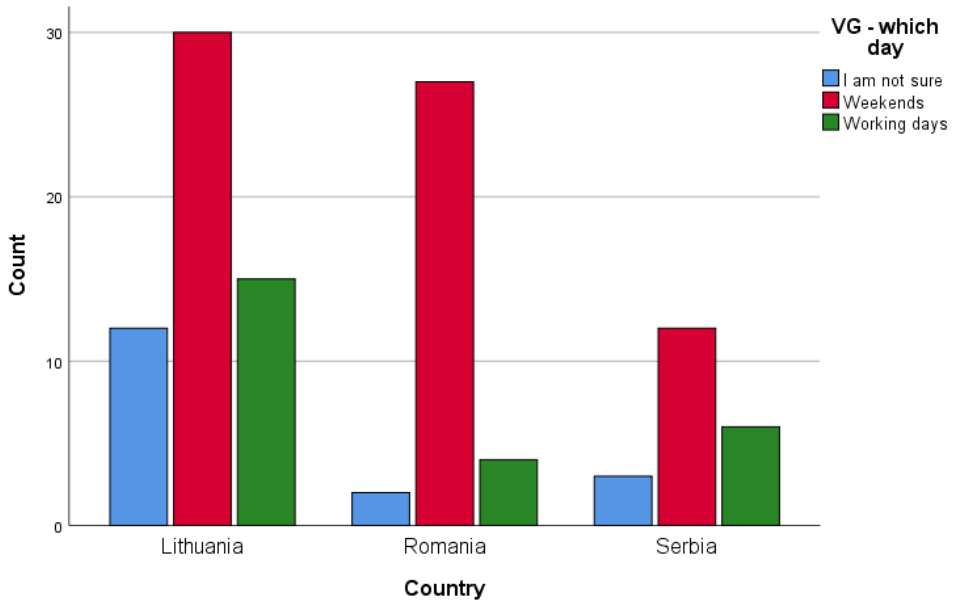


Fig. 12. Days of playing video games.

When it comes to the way children sit while playing video games (Fig. 13), there are significant differences in parents' statements between subgroups ($x^2 = 12.18$, $p < 0.05$). The highest percentage of parents from Romania and Lithuania believe that their children sit correctly, while the majority of parents from Serbia believe the opposite.

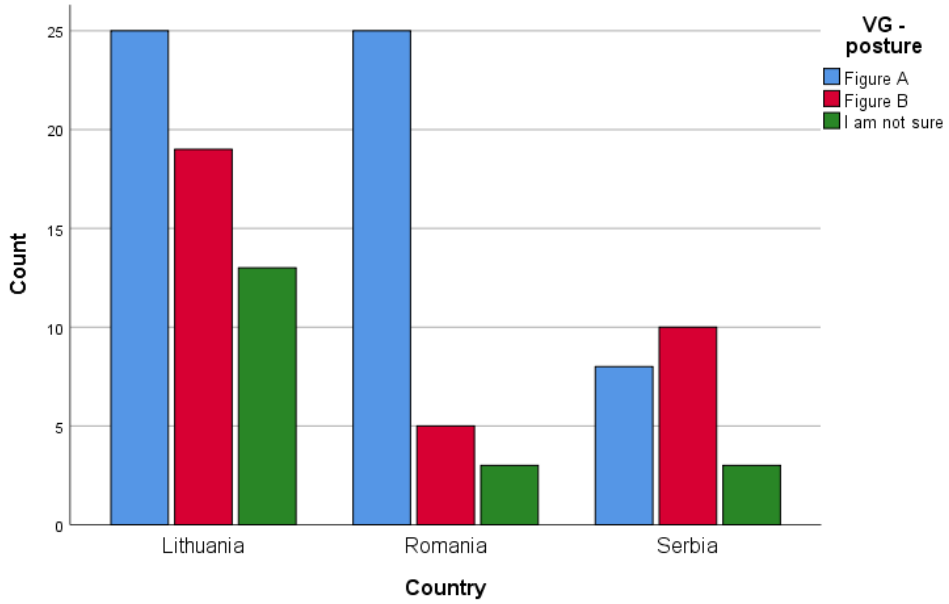


Fig. 13. Posture of children while playing video games.

Significant differences between the subgroups were also noted regarding the extent to which parents pay attention to what time of day the child will play video games ($x^2 = 13.43$,

$p < 0.01$). In all three subgroups, the highest percentage of parents take care of it (Fig. 14), which is especially pronounced among parents from Romania (LITH = 44%, ROM = 82%, SRB = 67%), however, among Lithuanian parents, the percentage of those who do not take care, or not sure is also high (56%).

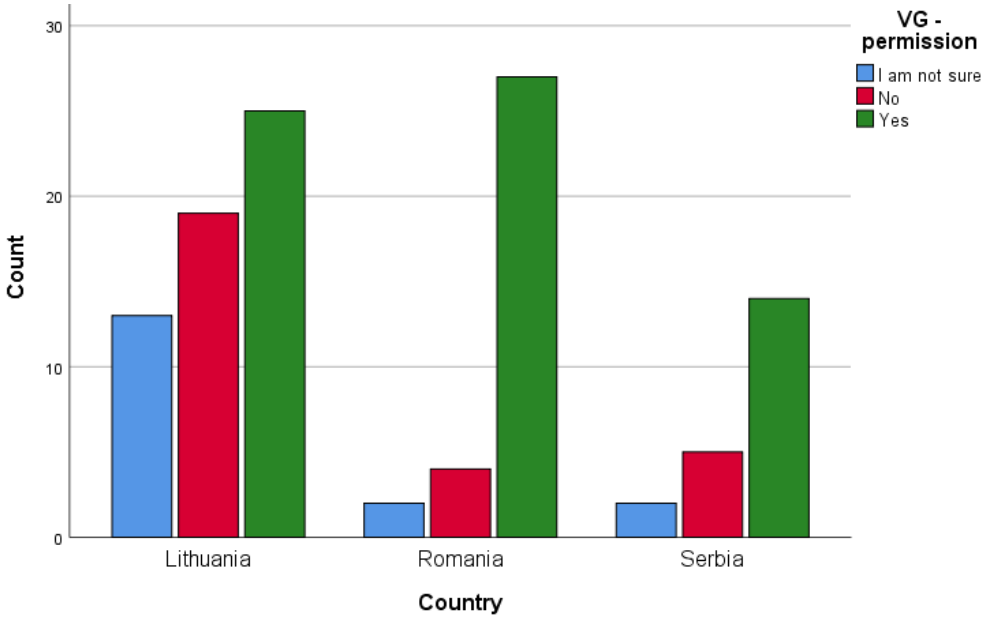


Fig. 14. Parental permission to play video games.

Significant differences between subgroups are not noted in terms of how well parents are able to control time of their children's video game playing ($x^2 = 4.00$, $p > 0.10$). Parents from all 3 subgroups stated in the highest percentage that they can control this topic (Fig. 15).

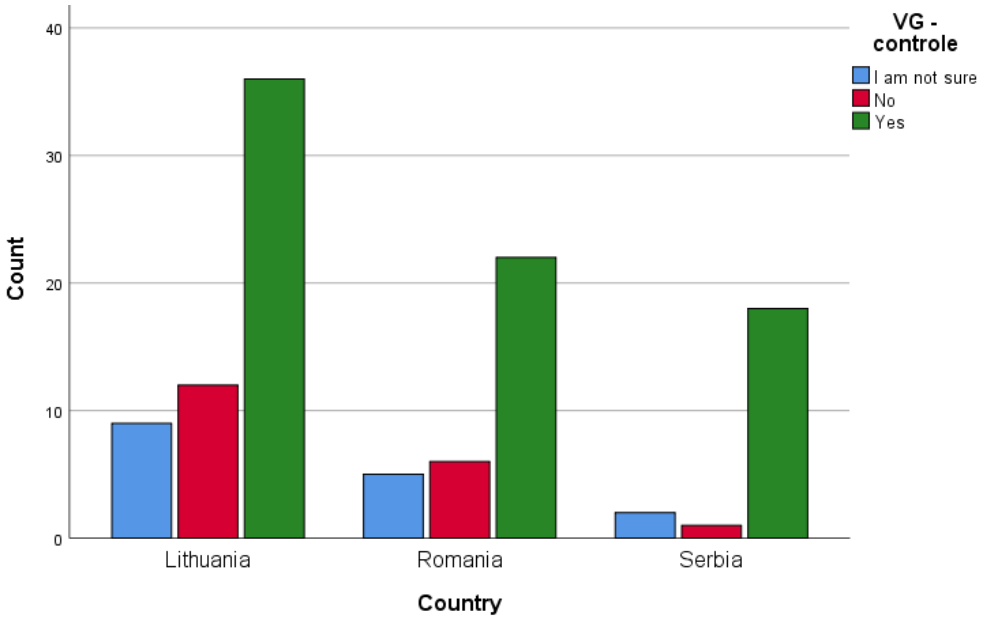


Fig. 15. Parental control of playing video games.

Most children from all three countries like to talk with their parents about video games (LITH = 61%, ROM = 82%, SRB = 62%; Fig. 16), however, there is noted a significant difference between subgroups in terms that Romanian subgroup has significantly lower percent of those who do not like to talk/not sure, relative to other two subgroups ($x^2 = 15.24$, $p < 0.01$).

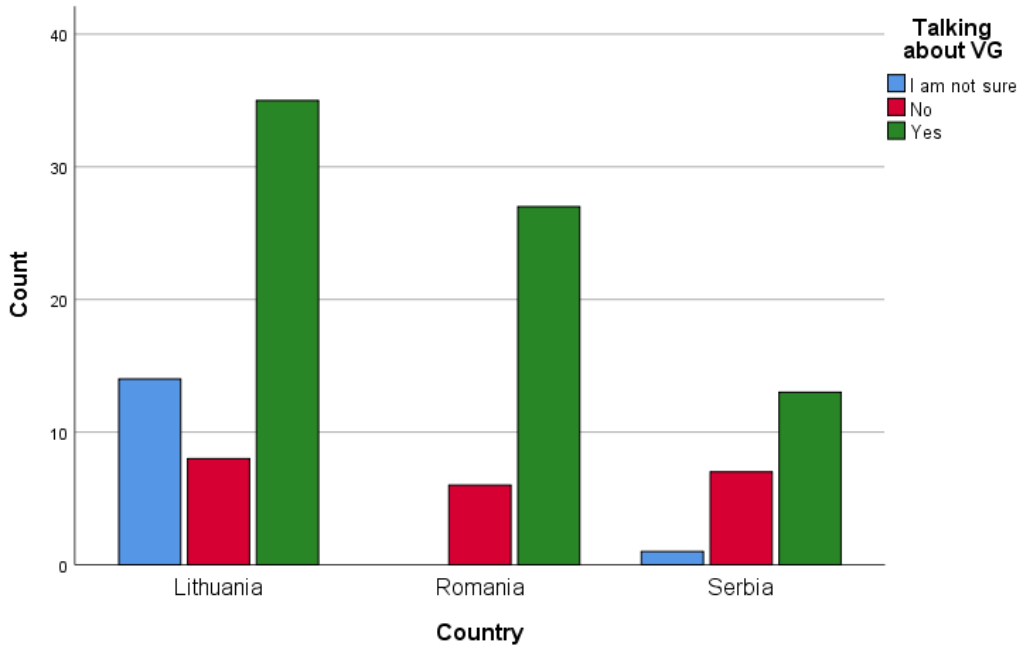


Fig. 16. Talking about video games.

Imitation of video games characters mostly is present at Lithuanian sample, while children from Romania and especially from Serbia usually do not use to do that (x^2 = 18.18, $p < 0.01$).

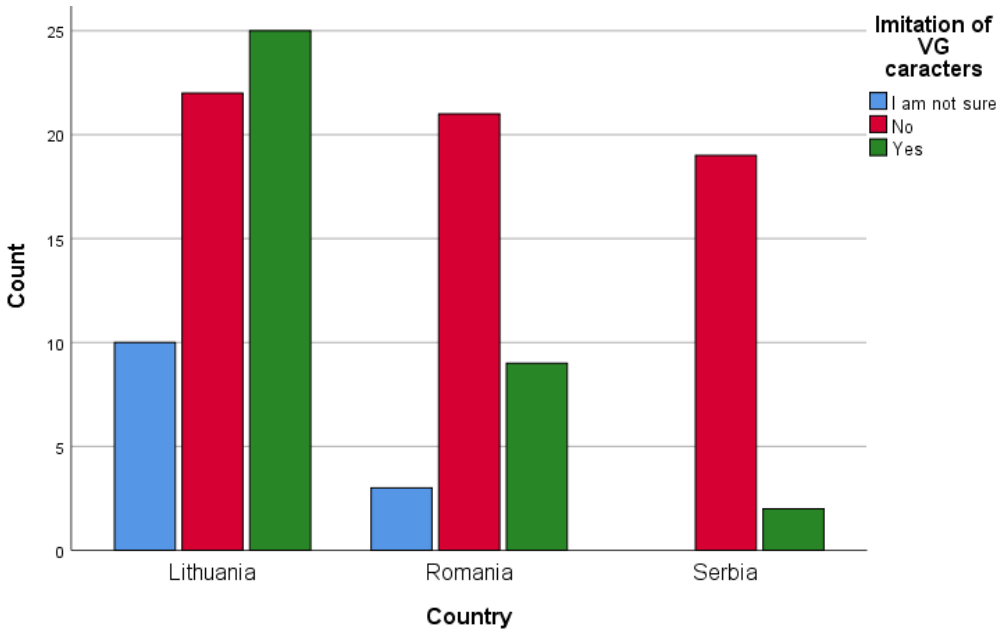


Fig. 17. Imitation of video games characters.

Results of research show that children from all three countries prefer to practicing sports rather than play sports video games (Fig. 18), however, Serbian sample significantly less like to play sports video games (91%) than children from Lithuania (44%) and Romania (70%), just like Romanian children do it less than Lithuanian one (x^2 = 16.83, $p < 0.01$).

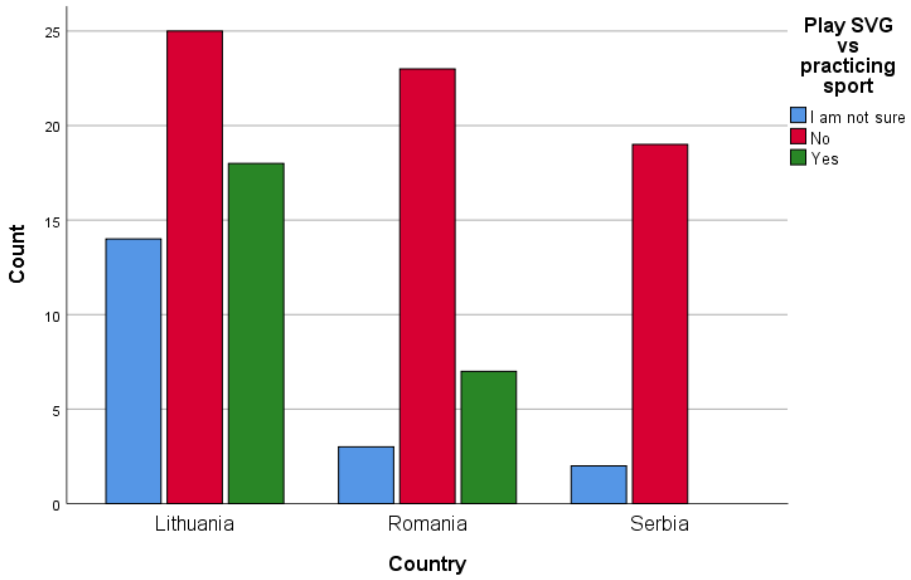


Fig. 18. Play sports video games versus practicing sports.

The last statement on which the parents had to give their attitude was that playing video games with sports content, in which the child's task would be a certain physical exercise in order to achieve the best possible result in the game (higher number of points, moving to another level, etc.), could positively improve a child's physical activity level. Based on the results (Fig. 19) Lithuanian parents have significantly different attitudes about the positive effects of playing video games than parents from Romania and Serbia ($x^2 = 19.63$, $p < 0.01$). 77% of Lithuanian parents think positively, related to 38% of Romanian and 38% of Serbian.

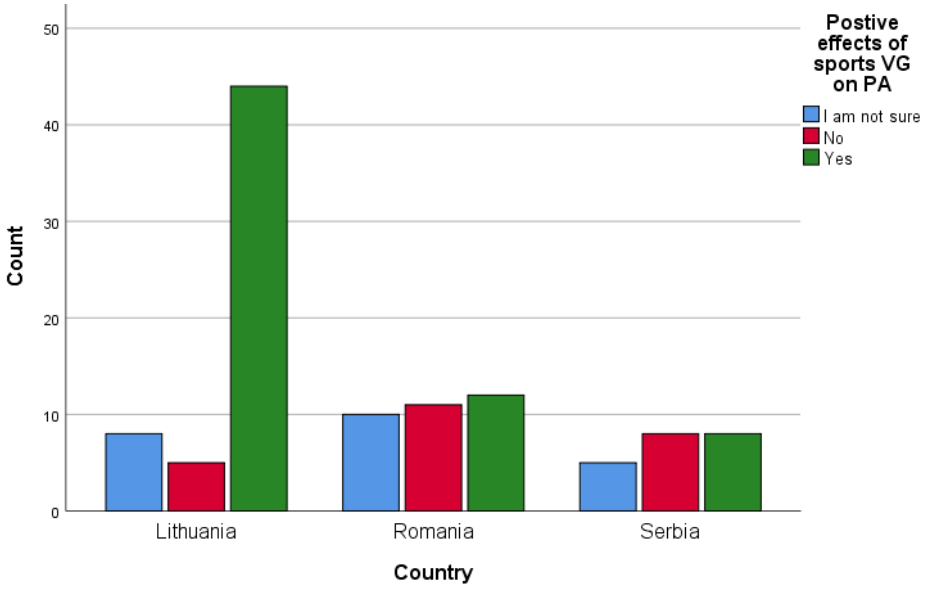


Fig. 19. Positive effects of playing sports video games on the physical activity level of children.

Resume of the results of survey on children's habits regarding physical activity and playing video games

Looking at the results of the HopaSus survey, it can be seen that the Romanian and Lithuanian subsamples were made up mostly of children from the city, in contrast to the Serbian one, which mostly consisted of children from the countryside. Given that the headquarters of the Lithuanian and Romanian partners are in the capitals of their countries, and that the Serbian organization is from a smaller town in West Serbia, this information is not surprising. The SDCS sample also included children from the rural area (Platicevo village), and given that Sabac is a relatively small town, children from the countryside often attend school in the city.

Further, the results of the survey shows that mostly mothers took part in the research and there was no difference between the countries participating in the project. Such findings could be explained by the fact that these are school-age children and that it is most likely that mothers take on the role of taking care of their curricular and extracurricular activities or were more open than fathers to participate in the survey. When it comes to the gender of the children, looking at the total sample, it is noticeable that there is a significant difference between Bulgarian (and the other three subsamples), which consisted of only male children. However, since Bulgarian parents did not participate in the survey, only the results for the Lithuanian, Romanian and Serbian subsamples will be discussed. In this regard, in terms of percentage, slightly more girls than boys participated in the research, but given that no statistically significant differences by gender were recorded, it can be considered that the total sample included an equal number of both male and female children. The same applies to subsamples by country.

Based on parents' responses, children in all three countries mostly go to and from school by walking, and then by using car, bus etc, as a way to transport. There is a noticeable difference between children from Serbia, who use walking significantly more than the other two ways of transportation (cars, buses… or bicycles, rollerblades...), in contrast to children from Lithuania and Romania, who use, with a large percentage, transportation by car and bus. Also, a subsample of children from Romania does not use bicycles, rollerblades and skates to go to and from school at all. As mentioned before, these are children who mostly live in the capital, where there is heavy traffic, and it is assumed that parents prefer to drive their children to school for safety reasons. In contrast to the Romanian subsample, in the Lithuanian one it was recorded that children use bicycles, rollerblades and skates as a means of transport. However, the Lithuanian subsample included a higher percentage of children from the countryside than the Romanian one, so it can be concluded that bicycles, rollerblades, etc. are mostly used by children from the countryside and that, accordingly, there are no differences in the mode of transport between these two subsamples. The reason why in the Serbian subsample by far the largest number of children goes by walking can be explained in a similar way. Given that they live in a small town, schools are not far from the

place of residence, traffic is also not as busy as in big cities, so it is not difficult for children to walk to school and back.

Differences between the subsamples were recorded in terms of whether the children train any sports in favor of Serbian children. However, it can be easily explained by the fact that the Serbian subsample included children from sports clubs in addition to schools. Further, children from Romania are engaged in physical activity beside regular physical education classes and sports training significantly less than children from Lithuania and Serbia. Unlike children from the other two countries, children from Romania, even if they practice additional physical activities, usually do it only once a week (LITH and SER mostly 2-3 times a week, and then more than 3 times a week). If these results are compared with the answers of parents regarding children playing video games, it is noticeable that parents from Romania are also less likely to allow their children to spend more time playing video games, and it could be concluded that parents from Romania value the time spent studying more. However, this is just an assumption. The survey did not monitor the children's success at school so that such a conclusion could be drawn with certainty. Thus, we do not have an adequate explanation for such data and it could be the subject of further studies.

Regarding playing video games survey results show that in Lithuanian and Romanian subsamples there are significantly more children who play video games compared to those who do not play. In Serbian subsample results show the opposite - there are more non-players than players. Such results can be connected with the fact that children from Serbia are more involved in sports and also used to practicing some kind of physical activity beside regular physical education classes. Also, children from Serbia who use to play video games do not prefer it in relation to playing sports. Seems that children from Serbian subsample prefer to be physically active than virtually. Furthermore, children from all three countries usually spend 1-2 hours per day playing VG, while in Lithuanian's subsample there are significantly more children that play VG for more than 4 hours, than in the other two countries. Children from Lithuania also like talking about video games and imitating VG's characters the most out of all three subsamples. It is less pronounced with children from Romania, while children from Serbia generally do not like to imitate characters more than to imitate.

If we pay attention to the parents' answers regarding what they think about whether playing sports video games can have a positive effect in terms of increasing children's physical activity, we can see a significantly more positive attitude of parents from Lithuania on this issue than parents from Romania and Serbia. Based on this, it could be concluded that the attitude of parents about the benefits/harms of playing video games influences how much time their children will spend playing VG. It is evident that Lithuanian parents have a more positive attitude towards this issue, and consequently allow their children to play video games more than parents from other two countries. On the other hand, parents from Romania are especially careful when their children play VG's during the day, and accordingly their children spend a maximum of 1-2 hours playing VG's. In addition, Serbian parents have no positive attitude about the effect of playing video games on a child's physical activity so it

is possible that they direct their children more towards sports and engagement in some forms of physical activity.

When it comes to the way children sit while playing video games, Romania and Lithuania parents mostly declare that their children sit correctly, while the majority of parents from Serbia believe the opposite. We emphasize that this result does not mean that children from Serbia have a worse body posture than children from Romania and Lithuania, but only represents the attitude of the parents about this issue. These findings will be further interpreted in the part of the report that refers to the assessment of the postural status of the children who participated in the research.

Based on the overall results of the survey and their interpretation, the following dominant finding could be highlighted: *the extent to which children will practice sports and use the potential of playing sports video games depends largely on the attitude of parents about these issues.*

RESULTS OF THE PHYSICAL SKILL'S ASSESSMENT

Statistical data analysis of physical skills assessment was performed using non-parametric statistical procedures. The Wilcoxon Signed Rank test was used to compare the results at the initial and final testing for each subsample (country), and the Kruskal-Wallis test was used to compare the results between countries at the initial and at the final testing. In the case of significant differences, additional Mann-Whitney U tests were applied to determine which subsamples differed. Following are the results of physical skill assessments.

Tables 2 and Table 3 represent results of comparison initial (PRE) and final (POST) testing by country (Romania, ROM; Bulgaria, BUL; Lithuania, LITH and Serbia, SRB), as well as comparison between countries (OVERALL). By looking at the results of all five tests, it can be seen that each subsample had a certain improvement in performance after applying the HopaSus recommendations. All subsamples show better results at the final testing at the *plastic bags juggling* test (ROM, $z = -2.89$, $p < 0.01$; BUL, $z = -2.83$, $p < 0.01$; LITH, $z = -3.40$, $p < 0.05$; SRB, $z = -4.69$, $p < 0.001$). Children from ROM and BUL had performance improvement also at the *taking the T-shirt off* (ROM, $z = -2.46$, $p < 0.05$, BUL, $z = -2.24$, $p < 0.05$), as well as SRB at *skipping the rope* ($z = -5.08$, $p < 0.001$). Finally, BUL and SRB subsamples at the final testing show better average results (AVRG) of performing all five tests (BUL, $z = -3.20$, $p < 0.01$; SRB, $z = -5.35$, $p < 0.001$).

Table 2. Country results of the motor skills assessment at the initial (PRE) and final (POST) testing using HopaSus tests skipping the rope (SR), plastic bags juggling (PB), and taking the T-shirt off (TS), as well as comparison between countries PRE and POST.

	SR	PB	TS

		X ± SD	*z*	X ± SD	*z*	X ± SD	*z*
ROM	PRE	1.3 ± 0.6	-0.81	1.6 ± 0.6	-2.89**	1.6 ± 0.8	-2.46*
	POST	1.4 ± 0.7		1.9 ± 0.3		1.9 ± 0.3	
BUL	PRE	0.7 ± 0.8	-1.41	0.7 ± 0.5	-2.83**	1.2 ± 0.7	-2.24*
	POST	0.8 ± 0.8		1.1 ± 0.7		1.4 ± 0.7	
LITH	PRE	1.5 ± 0.6	-0.97	1.4 ± 0.7	-3.40*	1.8 ± 0.6	-1.41
	POST	1.4 ± 0.8		1.8 ± 0.4		1.9 ± 0.5	
SRB	PRE	1.3 ± 0.7	-5.08***	1.6 ± 0.5	-4.69***	1.8 ± 0.4	-1.54
	POST	1.8 ± 0.4		2.0 ± 0.1		1.9 ± 0.4	
OVERALL	PRE	1.3 ± 0.7	14.14**	1.4 ± 0.7	30.48***	1.7 ± 0.6	18.83***
	POST	1.5 ± 0.7	29.13***	1.8 ± 0.5	52.39***	1.8 ± 0.5	18.47***

X ± SD - mean ± standard deviation, *z* - result of comparison. * - differences significant on the level $p < 0.05$, ** - differences significant on the level $p < 0.01$, *** - differences significant on the level $p < 0.001$.

Table 3. Country results of the motor skills assessment at the initial (PRE) and final (POST) testing using HopaSus tests dribbling the ball (DB) and throwing the ball behind the back (TB), as well as average results of all 5 HopaSus tests (AVRG) and comparison between countries PRE and POST.

		DB		TB		AVRG	
		X ± SD	*z*	X ± SD	*z*	X ± SD	*z*
ROM	PRE	1.3 ± 0.8	-1.83	1.0 ± 0.8	-0.94	1.5 ± 0.3	-0.57
	POST	1.7 ± 0.6		1.2 ± 0.8		1.5 ± 0.4	
BUL	PRE	1.4 ± 0.6	-1.73	0.7 ± 0.7	-1.73	1.0 ± 0.3	-3.20**
	POST	1.6 ± 0.5		0.9 ± 0.7		1.2 ± 0.3	
LITH	PRE	1.2 ± 0.8	-1.16	1.0 ± 0.9	-1.96	1.4 ± 0.4	-1.55
	POST	1.3 ± 0.8		1.2 ± 0.8		1.5 ± 0.4	
SRB	PRE	1.4 ± 0.7	-3.89***	1.4 ± 0.7	-1.51	1.5 ± 0.3	-5.35***
	POST	1.8 ± 0.4		1.6 ± 0.6		1.8 ± 0.2	
OVERALL	PRE	1.8 ± 0.7	3.40	1.1 ± 0.8	15.12**	1.4 ± 0.4	30.69***
	POST	1.6 ± 0.7	17.33**	1.3 ± 0.7	22.92***	1.6 ± 0.4	50.32***

X ± SD - mean ± standard deviation, *z* - result of comparison. * - differences significant on the level $p < 0.05$, ** - differences significant on the level $p < 0.01$, *** - differences significant on the level $p < 0.001$.

By comparing the results between the subsamples at initial and at the final testing (see Table 2 and Table 3, **OVERALL** → PRE and POST) findings indicate that there were differences in the performance of the SR, PB, TS and TB tests as well as in AVRG at the initial testing. At the final testing differences between subsamples were notable regarding all monitored variables. Further statistical analysis determined which subsamples differed, both on individual tests and on the average score.

Fig. 20. represents results of comparison between subsamples at the initial and at the final testing using *skipping the rope* HopaSus test (see **SR** → **OVERALL** → PRE and POST). As presented in the Table 2 at the initial testing ROM, LITH and SRB subsamples differ from BUL one ($z = -14.14$, $p < 0.01$) in terms that children from those countries showed better results

than children from Bulgaria (ROM, z = -2.37 $p <$ 0.05; LITH, z = -3.46, $p <$ 0.01; SRB, z = -2.58, $p <$ 0.05). At the final testing larger differences with a higher level of significance were noted (z = -29.13, $p <$ 0.001). At the final testing, Children from Romania and Lithuania still had better performance than children from Bulgaria, but without statistical progress between PRE and POST. After implementing the recommendations Serbian children showed progress in performing the SR test so showed better results than children from Romania (z = -3.20, $p <$ 0.01), Lithuania (z = -3.68, $p <$ 0.001) and Bulgaria (z = -5.18, $p <$ 0.001).

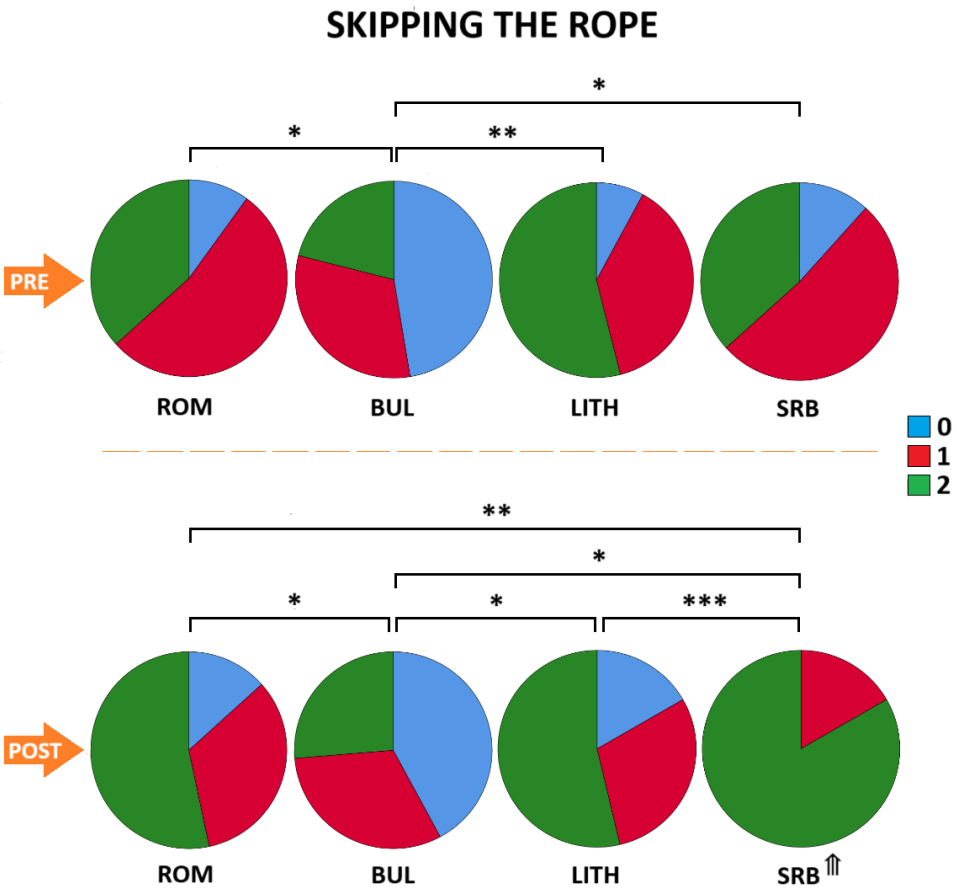


Fig. 20. Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using the *skipping the rope* HopaSus test. Symbols * indicate values where are present a significant differences between subsamples, * - differences significant at the level $p < 0.05$, ** - differences significant at the level $p < 0.01$, *** - differences significant at the level $p < 0.001$. Symbol "⇑" indicate differences in the results of the same subsample PRE and POST at the $p < 0.001$. (Note that "0" indicates the lowest, and "2" the best score).

When performing the *plastic bags juggling* test (see Table 2**, PB → OVERALL →** PRE and POST) at the initial testing, similar results were recorded, as for the SR test (z = -30.48, $p <$ 0.001). Children from ROM, LITH and SRB showed better results than children from Bulgaria (ROM, z = -4.46 $p <$ 0.001; LITH, z = -4.05, $p <$ 0.001; SRB, z = -5.33, $p <$ 0.001). After implementing recommendations (at the final testing) all four subsamples showed improvement in performing the test, with children from Romania, Lithuania and Serbia

showing better results than children from Bulgaria (ROM, z = -4.57 $p <$ 0.001; LITH, z = -4.29 $p <$ 0.001; SRB z = -6.61 $p <$ 0.001). Also, children from Serbia had a better performance than children from Bulgaria (z = -6.61 $p <$ 0.001) and Lithuania (z = -3.03 $p <$ 0.01).

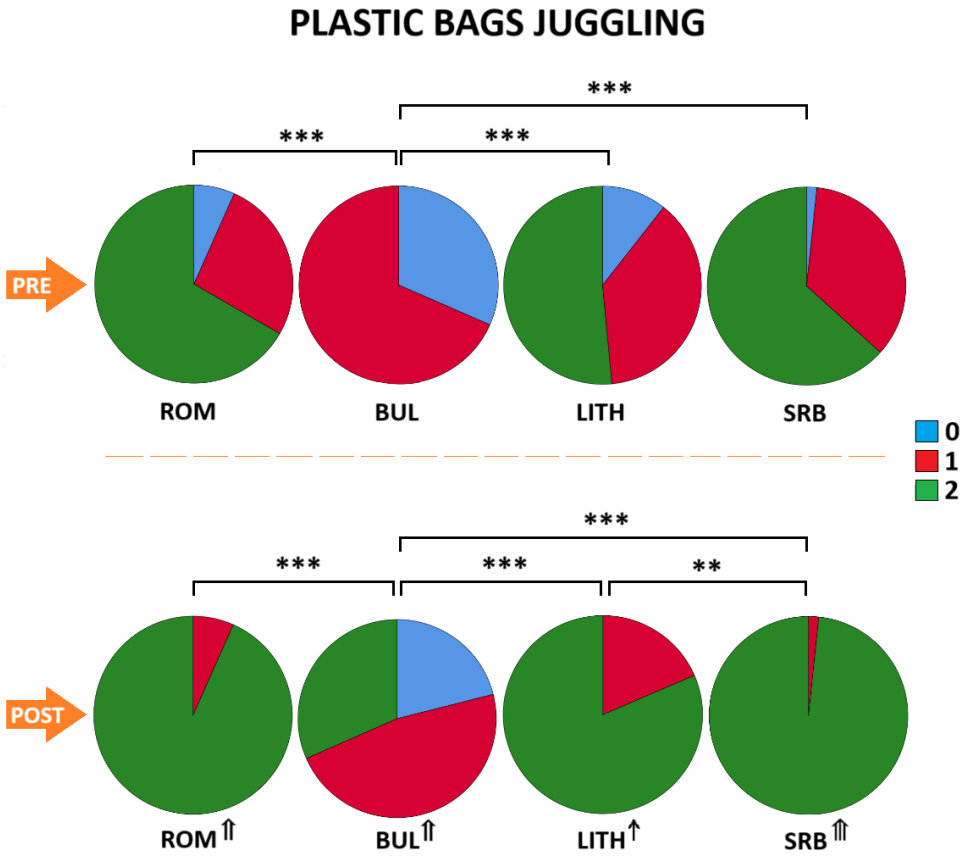


Fig. 21. Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using the *plastic bags juggling* HopaSus test. * - differences significant at the level $p <$ 0.05, ** - differences significant at the level $p <$ 0.01, *** - differences significant at the level $p <$ 0.001. Arrows indicate differences in the results of the same subsample PRE and POST, ↑ - $p <$ 0.05, ⇑ - $p <$ 0.01, and ⇑ - $p <$ 0.001. (Note that "0" indicates the lowest, and "2" the best score).

By looking at the Fig. 23, which represents results of comparison of subsamples performance at the initial (PRE) and at the final (POST) testing using the *taking the T-shirt off* HopaSus test it can be seen that PRE, as well as POST Romanian, Lithuanian and Serbia children showed better performance than Bulgarian one (PRE: ROM, z = -2.27 p < 0.05; LITH, z = -4.01, p < 0.001; SRB, z = -3.85, p < 0.001 and POST: ROM, z = -2.69 $p <$ 0.05; LITH, z = -3.07, $p <$ 0.01; SRB, z = -3.78, $p <$ 0.001). Furthermore, after implementation of HopaSus recommendation (POST vs. PRE), the Romanian sample showed statistically significant improvement in performing the test (z = -2.46, $p <$ 0.05).

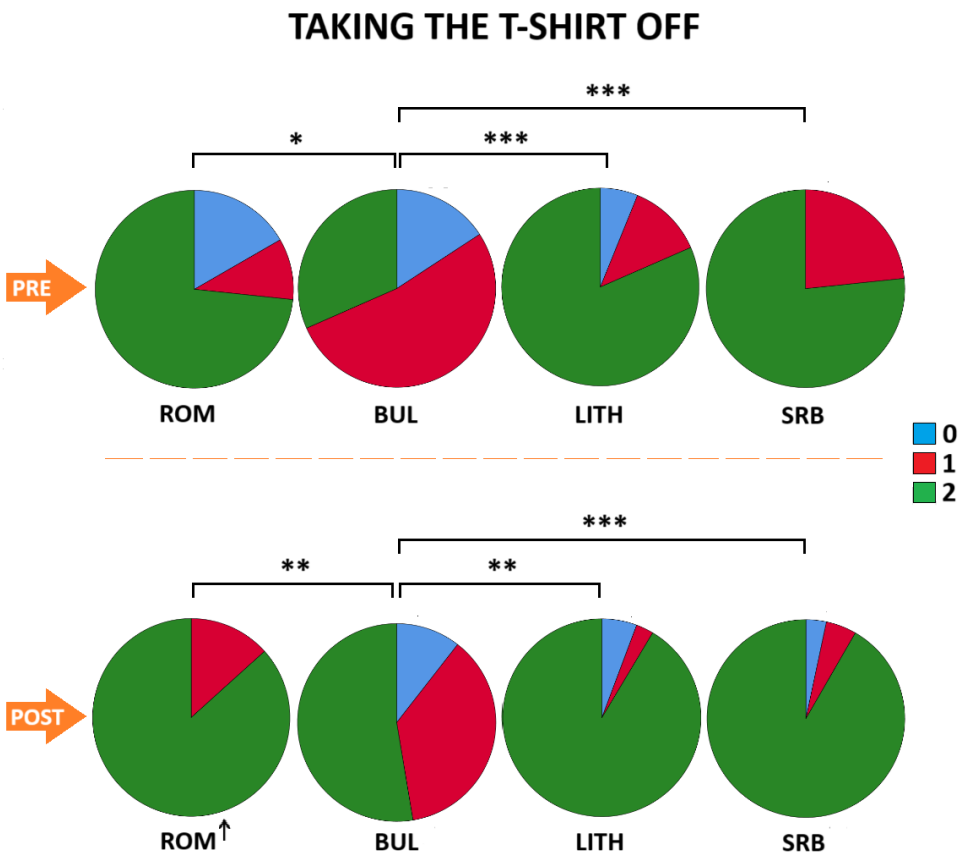


Fig. 22. Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using *taking the T-shirt off* HopaSus test. * - differences significant at the level $p < 0.05$, ** - differences significant at the level $p < 0.01$, *** - differences significant at the level $p < 0.001$. Arrow (↑) indicates the difference of the results of the same subsample PRE and POST at the level $p < 0.05$. (Note that "0" indicates the lowest, and "2" the best score).

Using tha *dribbling the ball* test at the initial testing between subsamples there were no significant differences recorded ($z = -3.40$, $p > 0.05$). At the final testing Serbian subsample showed better results than the Lithuanian one, as a consequence of statistically significant improvement in performing the test POST vs. PRE of Serbian children ($z = -3.89$, $p < 0.001$).

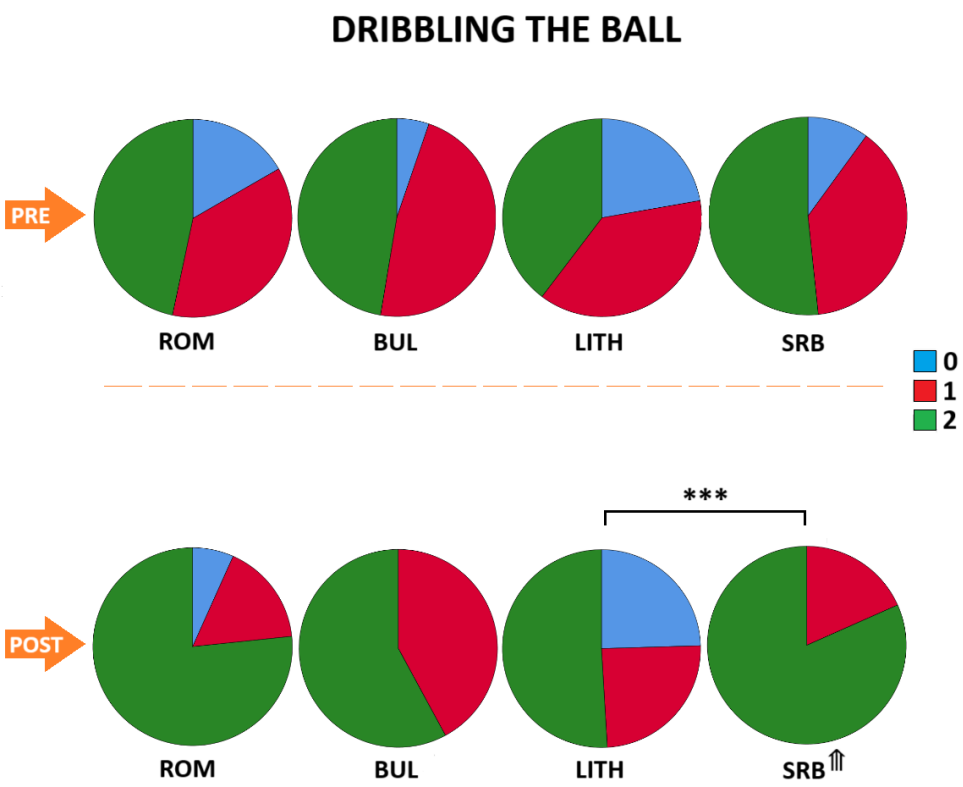


Fig. 23. Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using *dribbling the ball* HopaSus test. *** - differences between subsamples significant at the level $p < 0.001$. Arrow symbol (⇑) indicates the difference of the results of the same subsample PRE and POST at the level $p < 0.001$. (Note that "0" indicates the lowest, and "2" the best score).

Comparisons in performing *throwing the ball behind the back* test (Fig. 24) showed that at the initial testing Serbian children had better results than Bulgarian ($z = -3.39$, $p < 0.01$) and Lithuanian children ($z = -2.98$, $p < 0.01$). After implementing of HopaSus recommendation, at the final testing Serbian children showed better performance than Bulgarian ($z = -4.18$, $p < 0.01$) and Lithuanian ($z = -3.61$, $p < 0.001$), as well as Romanian one ($z = -3.16$, $p < 0.01$), even though none of the subsamples did not statistically improve the performance after the period of implementation of recommendations (POST vs. PRE).

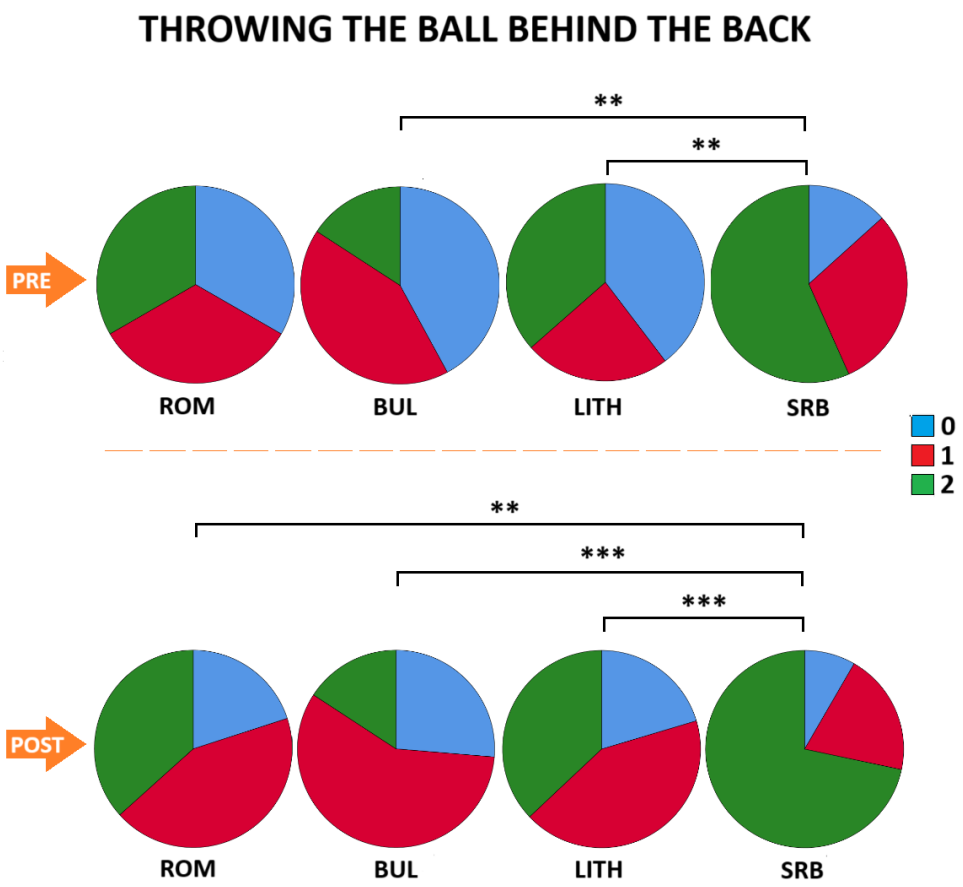


Fig. 24. Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using *throwing the ball behind the back* HopaSus test. Symbols **, and *** indicate differences between subsamples significant at the level $p < 0.01$ and $p < 0.001$, respectively. (Note that "0" indicates the lowest, and "2" the best score).

Determining the level of physical skills

Based on the sum of the results of all five tests (total score) at the initial testing, which was a minimum of 3 and a maximum of 10, the norms for determining the level of physical skills were formed. A total score between the 25th and 75th percentiles, was considered average. Below and above the average were considered results below the 25th and above the 95th percentile, respectively. Table 4 represents the norms of physical skills performance.

Table 4. Norms of HopaSus test battery based on the results of the research.

NORMS			
HOPASUS	**Below Average**	**Average**	**Above Average**

test battery total score	<5	5-8	9-10

Table 5. Distribution of results of physical skills assessment by subsamples in relation to categories (below average, average and above average).

	Below average		**Average**		**Above average**	
	PRE	**POST**	**PRE**	**POST**	**PRE**	**POST**
ROM	10%	3%	73%	47%	17%	50%
BUL	53%	16%	47%	79%	/	5%
LITH	17%	9%	60%	57%	23%	34%
SRB	5%	/	72%	25%	18%	75%

Resume of the results of the physical skills assessment

Summarizing results of the physical skills assessment it can be generally concluded that HopaSus recommendations had a positive impact on physical skills of children from all four countries that participated in the research. It is notable that after the period of implementation of recommendations children show better performance in all five physical challenges (POST vs. PRE), even though statistically significant differences between initial and final testing for throwing *the ball behind the back* test were not recorded.

At the initial testing children from Romania, Lithuania and Bulgaria showed better results than Bulgarian ones mainly in all tests except in the *dribbling the ball*, (where subsamples did not differ from each other) as well as regarding the average score of all five tests. Serbians also had better results than Lithuanians regarding *throwing the ball behind the back* test. These results suggest that children from different subsamples were not on the same physical skills level when research was started. It is obvious that children from Bulgaria had a lower level of physical skills than children from other three countries.

After implantation of HopaSus recommendations (final testing), greater differences between the subsamples were recorded. Still, children from Romania, Lithuania and Bulgaria showed better results in all tests except *dribbling the ball.* Further, Serbian children had better performance than Romanian and Lithuanian at *skipping the rope* and *throwing the ball*

behind the back, and also than Lithuanian children at *dribbling the ball*. Regarding average score at the final testing Serbian children showed better performance than Romanian, Bulgarian and Lithuanian children, and Romanian and Lithuanian were better in tests' performing than Bulgarian. Such results, as will be explained further, do not necessarily mean that the HopaSus recommendations had the least impact on children from Bulgaria, it is just in accordance with the fact that before the recommendations were implemented, children from Bulgaria were at a lower level of physical skills than children from the other three countries.

If the results of the comparison between the initial and final testing of the same subsample are reviewed it can be seen that children from Serbia improved significantly in the performance of *skipping the rope*, *plastic bags juggling*, *dribbling the ball* and at the average score. Romanian children improve their performance at *plastic bags juggling* and *taking the T-shirt off,* Lithuanian at *plastic bags juggling*, and Bulgarian at *plastic bags juggling*, *taking the T-shirt off*, as well as at the average score of all five HopaSus tests. These results suggest that HopaSus recommendations had a positive impact on children's physical skills which varied from subsample to subsample.

Generally observing, the greatest progress after the implementation of the HopaSus recommendations was noted in children from Serbia and Bulgaria. Since the Hopasus recommendations for parents and coaches were based on recommendations, not on an obligation, and since we did not have the possibility to control the extent to which they were implemented, we are not able to draw clear conclusions regarding the origin of differences in performance between children of different subsamples. As far as the Bulgarian sample is concerned, the explanation is not difficult to give considering that the sample consisted of children with a lower level of physical skills, so a targeted physical exercise program could have had a positive impact on their performance to a greater extent than is the case with the Romanian and Lithuanian subsamples.

When it comes to the Serbian's subsample, if we look back at the results of the survey that was part of this research, we will first notice that the sample consisted of children who were largely involved in sports (or have positive attitude about physical activity in general), and we can assume that they have developed a desire to prove themselves, to compete etc., by overcoming their own limits and that in this regard they were more motivated to apply the recommendations consistently and with dedication. Second, the results of the survey may indicate that parents from Serbia, as they already have a high positive attitude towards sports/physical activity and their impact on children's health, possibly approached the implementation of the recommendations more seriously than other parents.

Based on the overall results of the physical skills assessment with a large degree of confidence we can generally conclude that:

- *HopaSus recommendations could have a positive impact on physical skills of children ages from 11 to 15, regardless of geographical origin.*

- *Children who are distinguished by the qualities necessary to achieve sports achievements (resilience, motivation, commitment, etc.) will show better results in the assessment of physical skills using the HopaSus test battery, as well as the improvement of physical skills after recommendations implementations*.
- *Parents' approach to sports/physical activity have a large impact on their children's achievement results.*

RESULTS OF THE POSTURAL ASSESSMENT

Postural status assessment was performed from the front and from the side view, frequencies and contingency tables as well as the Kruskal-Wallis test were used for comparison of the results between countries (ROM, BUL, LITH, and SRB). In the case of significant differences between subsamples, additional Mann-Whitney U tests were applied.

Fig. 25 represents the contingency table of total sample results obtained from the front and from the side view. Results show that Most children (54%) showed good posture (grade 0), minor deviations (grade 1) had 43% and major deviations (grade 2) were present in 3% of the total sample.

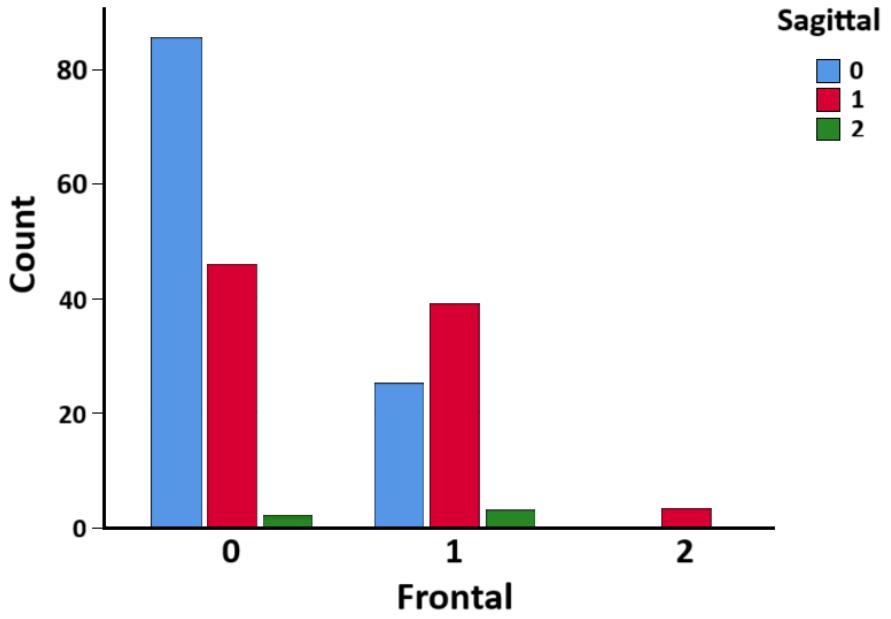


Fig. 25. Contingency table of total sample results of postural status assessment obtained from the front (frontal) and from the side (sagittal) view. Note that "0" indicates the best score - good posture, absence of postural disorders, "1" - minor deviations, the presence up to two postural disorders and "2" the lower score, major deviations - presence of more than two postural disorders.

Analyzing data by country results showed that children involved in research from Romania, Lithuania and Serbia mostly have good posture from the *front view* (ROM = 79%,

LITH = 58% and SRB = 70%). Minor deviations were present in 21% of Romanian children, 42% of Lithuanian and 30% of Serbian children while major deviations have not been recorded for these subsamples. Contrary, postural status of Bulgarian subsample were as follows: grade 0 - 46%, grade 1 - 42% and grade 2 - 13% of children.

Assessing from the *side view* results showed that children from ROM, LITH and SRB also have mostly good posture (ROM = 68%, LITH = 53% and SRB = 63%). Minor deviations were present in 28% of Romanian, 47% of Lithuanian, and 33% of Serbian children, while major postural disorders were present in 4% of Romanian and 3% of Serbian children. Lithuanian children had no high level of postural disorders from the side view. Results for BUL subsample indicate that there are most of the children with minor postural deviations (92%). Good posture from the side view as well as major postural disorders were present in 4% of children each.

Analyzing obtained results significant differences in body posture between the subsamples had shown (front view, $z = 12.39$, $p < 0.01$; side view, $z = 28.31$, $p < 0.001$). From the front view (Fig. 26) statistically better results show a ROM subsample compared to the Bulgarian one ($z = 3.16$, $p < 0.05$). From the side view (Fig. 27) greater differences were found in terms that ROM, LITH and SRB subsamples show better results than BUL (ROM, $z = -4.86$, $p < 0.01$; LITH, $z = -4.29$, $p < 0.01$; SRB, $z = -4.67$, $p < 0.01$).

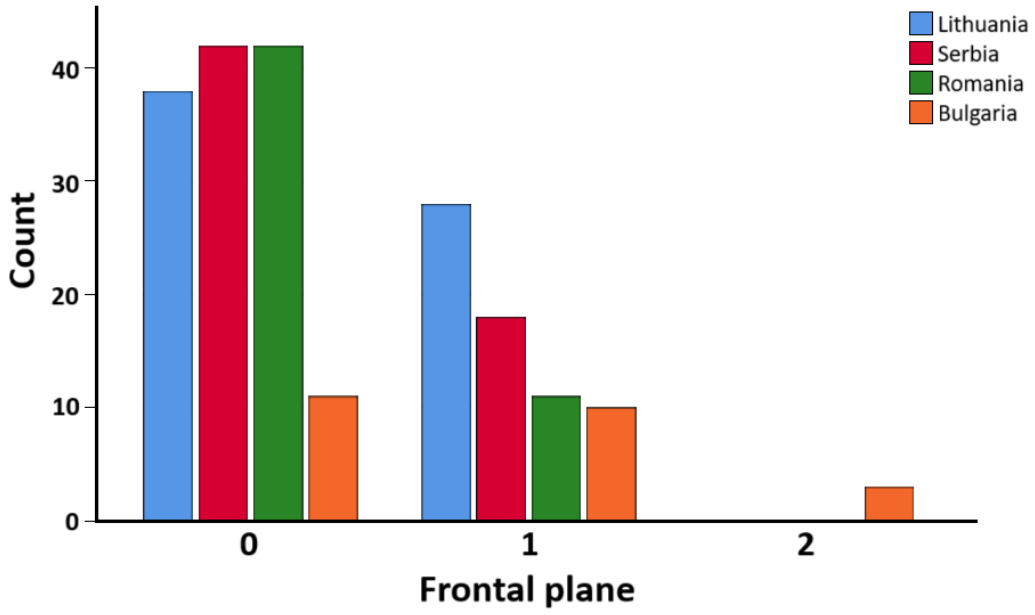


Fig. 26. Frequencies of the results of postural status assessment by country, assessed in the frontal plane (from the front). "0" - good posture, "1" - minor disorder, and "2" major deviations of good posture. * - differences between countries at the level $p < 0.05$.

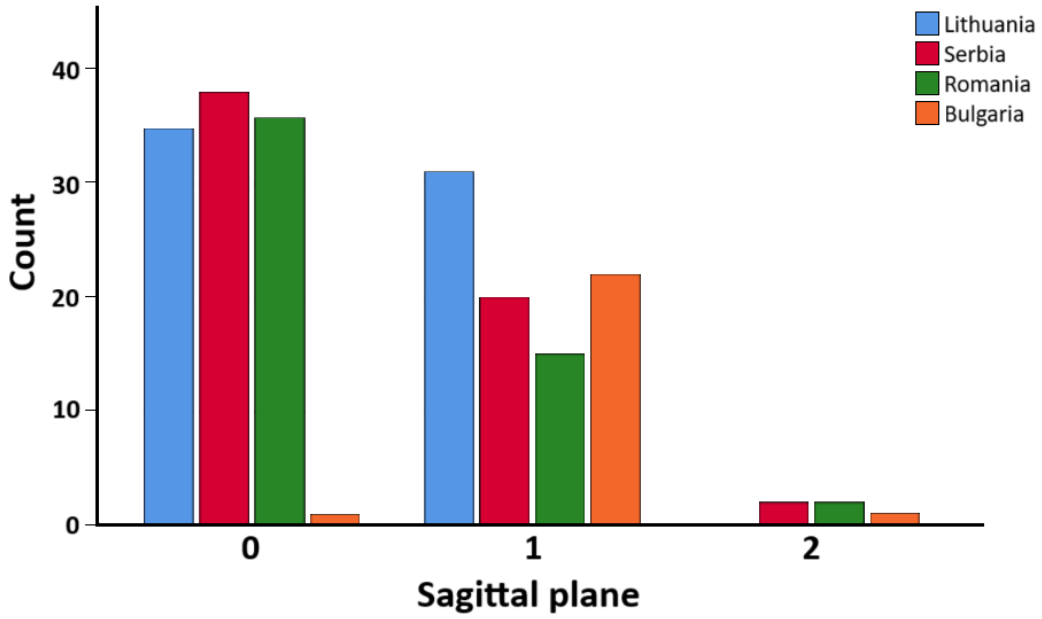


Fig. 27. Frequencies of the results of postural status assessment by country assessed in the sagittal plane (from the side). "0" - good posture, "1" - minor disorder, and "2" major deviations of good posture.

Resume of the results regarding postural assessment

Results of the assessment of postural status of children from four European countries indicate that most children have good posture. Minor disorders are present in lower percentages, and there are also some children with major deviations of good (normal) posture.

Even statistical analysis did not reveal differences between ROM, LITH and SRB subsamples, considering the ratio of good posture versus the presence of minor postural disorder, it is observed that it is high in favor of normal posture of children from Romania and Serbia, and slightly lower in children from Lithuania than ROM and SRB children. Children from Bulgaria generally had worse posture than children from other three countries, especially in the sagittal plane (side view) where only 4% of children had normal posture and 92% had minor postural disorder. However, it is encouraging that this disorder stage is known to be correctable with physical exercises so we assume that with a programmed physical activity aimed at correcting body posture it could be improved. Contrary, it is worrying that 13% of BUL subsample (as well as 4% of ROM and 3% of SRB) had postural disorders that are not easily correctable by physical activity.

As in recent decades there has been a trend of increasing postural disorders in children, it can be concluded that the results of this research are in the line with the results of previous studies that dealt with the assessment of body posture in children and youth. Also, the results of current research indicate that Bulgarian children generally have worse

posture than children from Romania, Lithuania and Serbia. Still, interpreting the results it should be borne in mind that it refers primarily to the children who participated in the study and that we should be careful about generalizing the findings to the entire population of children aged 11-15 years.

As could be noticed, the distribution of the results has a similar trend in all four subsamples (the most are children with good body posture, followed by a smaller number of children with the first stage of the disorder and the least are those with greater deviations from normal body posture). The distribution is only disturbed in children from Bulgaria, and that is in the sagittal plane where the largest number of children have some kind of deviation. However, we cannot generalize this data to the entire population of children from Bulgaria aged 11-15 as the subsample consisted of only 24 children, mostly aged 13-15 years. As adolescents they are in a transition stage of life with a dramatical physical, psychological and emotional changes which reflect on their behavior, change of mood, motivation, interests, etc. Also, this is the period of life when youngsters tend to act in some way just to draw attention, or to fit into society. Also, in this period of life, a role model is of great importance for children, someone with whom they feel the need to identify. Sometimes it could be positive, but often negative role models. And what does it have to do with body posture?

Posture is much more than just engaging our muscles and bones at static and dynamic conditions. It involves our perception, emotions and the environment we are in (Dunk, Callaghan, & McGill, 2005). Therefore, there are many factors that can affect body posture, from the time of day when the assessment is made, to fatigue, bad mood, impaired physical and mental health (e.g. depression, anxiety, stress) etc. With all this in mind, if we relate these findings to the results of the posture assessment of the Bulgarian subsample, we can better explain the findings of this research. For example, it was enough for one child to want to draw attention by disobeying the instructions on taking an adequate position for assessment with bad posture, for the other children to follow him/her. Another child may have been emotionally affected because of the break up of a love relationship so that felt as "everything fell apart" to him/her. Another one maybe spent the whole night on social networks, so came to the testing sleepless and tired. And so on and so forth.

Since during the postural assessment we were not able to control all the factors affecting body posture, when interpreting results we have to take it into account and suggest that in future research, better control of the research inclusion criteria as well as a larger sample, should be provided.

Now, it is interesting to look back at the results of the survey and parent's attitude on sitting their children while playing video games. Just to remind, Romanian and Lithuanian parents mostly declare that their children sit correctly, while the majority of parents from Serbia believe the opposite. Results of postural assessment did not show differences in postural status of Serbian children vs. Romanian and Lithuanian, just opposite - most of the Serbian children had good posture. Furthermore, Serbian children had also slightly higher ratio "normal vs. minor disorders" than Lithuanian children, so results of the survey

regarding this issue could refer to it that Serbian/Lithuanian parents their attitude that playing video games, at the very least, cannot have (or "have", as in the case of LITH parents) a positive effect on the physical status of children, project as a behavior of their children while playing video games. Also, these findings may be the result of parents' prejudices, lack of knowledge or setting high/low criteria etc.

Based on the overall results of the postural assessment we can generally conclude that:

- *Children that were involved in the research have good posture, or have minor disorders that can be corrected by physical exercises.*
- *During the postural assessment it has to take into account children's psychophysical health, as well as the environmental conditions.*

CONCLUSION

Research that had the main goal to assess the influence of HopaSuS recommendations and children's playing sport video games on physical activity, healthy behavior and body posture of children actively involves a wide range of participants: children, parents, coaches and teachers of physical education from four european countries. All of them contributed to the conclusion that can be drawn at the end of the research:

HopaSus protocol can be a useful tool both for collecting data (of children's habits regarding physical activity and playing video games, of physical skills level and of postural status of children) and for a development of physical skills, as well as for strengthening the parent-child-sport coach relationship.

Refference

Dunk, N. M., Callaghan, J. P., & McGill, S. M. (2005). Lumbar spine movement patterns during prolonged sitting differentiate low back pain developers from matched asymptomatic controls. *Work, 24(2)*, 181-188.