HopaSuS

C O U N T R Y R E P O R T

Erasmus+ HopaSus project

Reference number 101049653 - HOP

Sport diagnostic center Sabac - Serbia

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Introduction

HopaSus Erasmus+ sport project was born out of the need of teachers and youth workers from four European countries to develop their digital skills and become more resilient in times of pandemics by using sport video games in their virtual or face-to-face classrooms. The aim of the project is to encourage sport teachers to recognize the potential of video games and sport applications and experiment with new strategies for incorporating them into their gyms and classrooms, and to promote the inclusion of "video games addicted youth" by changing the paradigm of persistent stereotyping of video games as predominantly mindless, violent forms of entertainment, into seeing the potential of video gaming technologies as instructional tools that takes out the children from the desk chair out into the sport field.

This Country report contains the information about the issue of the project from the first Google survey, up until the present moment when we are in the WP 2 development – producing educational materials-toolkit for using sport video gaming in education.

KOM in Romania

Kickoff meeting of the project HopaSus Erasmus+ sport - acronym HOP, ref. number 101049653, took place on 26th to 28th of July 2022. in Bucharest, Romania. For the duration of this mobility, following people took part in it: Ms. Adina Geambașu, PhD University lecturer at UNEFS and Ms. Andreea Ionel, Head Manager at Tudor Arghezi School Bucharest Romania, from Serbia, Mr. Milan Djupovac - President of SDCS and Ms. Dragana Drljacic - Leading researcher of SDCS, and from Lithuania Mr. Donatas Versechas - President of TAVO Europa.

On the first day **26 July 2022**, the planned for the process of the accommodation of the partners, alongside with the visit at the National Village Museum Dimitrie Gusti of Bucharest with the introduction into the traditional Romanian culture.

The second day, **27 July 2022** the morning was opened with a tour of National University of Physical Education and Sports in Bucharest. The partners had the opportunity to visit a range of different sport areas - from the main sport yard to the gym, athletics, games, fence, shooting, physical therapy lab at the conference hall and class spaces.

On the same day, the hybrid conference was held, with the online participation also of the Bulgarian partners (represented by *Mrs. Ida Valkova - researcher and youth trainer at Walk Together Association Bulgaria, and Mrs. Vilislava Metodieva - president of Walk Together Association Bulgaria*).

Partners held their own professional and institutional presentation, which improved the communication and also increased the prospect capacity of developing the future project.

The 4-hour conference with 25 participants, held the main actions of: opening the project, general presentation of the project, main objectives and challenges, deliverables, milestones, working packages, detailed budget and

financial aspects, timetable, responsibilities, roles, work agenda and mentimeter quiz and online google forms dissemination to the final discussions with present participants and also the online participants.

Activities from day **28 July 2022**- were held at Tudor Arghezi School in Bucharest, with a tour and the workshop with the digital classrooms and also at the gym room and the outdoor playground. Participants during the workshop had also tested their abilities for an Ubisoft sport game called Just Dance for changing experience in a digital manner and also test the new school technologies.

The main tasks between partners were put on the agenda and the doodle meetings have started scheduled with a frequency of 2 weeks feedback. Also, the website and the research roles were accorded for the first educational pilot guide (tool kit) of the project. Organizing the future mobility meetings and also framing the main intellectual outputs and milestones were on the agenda for our first deadline mentioned in the timetable.

European Sport Week

As part of the European Week of Sport, which took part on 23rd to 30th of September 2022, UNEFS organized a series of events in which it was either a leader or a participant. Thus, within this event several types of activities were supported such as: workshops, round tables, media appearances, friendship games, gymnastics at work, etc, in which the HopaSus project was directly involved through the following activities. The SDCS team contribution was by designing the exercises for the participants in the workshops and games.

Research protocol

The Research protocol document was made with a goal to give very clear information about the whole research process, that was conducted in four European countries - Romania, Bulgaria, Lithuania and Serbia, within the project. It was created in September 2022 by the SDCS team of three staff members: **Milan Djupovac**, **Dragana Drljacic** and **Aleksandar Ivanovski**. The idea was to assess the influence of children's playing sport video games on physical activity, healthy behaviour and body posture.

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.

This protocol mandates that the research process consists of 3 phases:

1. Initial test,
2. Implementation of HopaSus recommendations, and
3. Final test.

Initial and final tests were described within the document, and as for the HopaSus recommendations, it was made as a separate, as well as an infographic document.

The plan was that the initial and final test would be done through several instruments: **healthy behaviour**, **physical challenges** and **body posture**. Information about healthy behaviour was collected through an online survey. For the physical challenges, we used home based complex physical exercises in order to assess level of physical skills, and body posture was assessed using participant body photos.

Before collecting, all participants - parents and guardians, in the research were informed that the data will be used for research and educational purposes. That was done before they started doing the online survey about the healthy behaviour of their children.

The recommendations were immediately applied after the initial test, and they had to be active for at least one to two months, after which the final tests were to be concluded.

The pilot toolkit

- **Initial measurements**
- **5 video games implementation**
- **Final measurements**
- **Results and brochure**
- **Dissemination - Serbia Mobility**

The pilot tool that the SDCD Sabac team created is meant to show how video gaming is an untapped resource for enhancing young people's motivation and ability to participate in a wide range of sports and other movement-based activities.

Like stated, we have created a set of five tests, i.e. challenges for children in order to measure their motorical aptitudes: strength, coordination, agility, equilibrium, resistance and speed. Also, APECS postural tests were uploaded together in a HOP application guide for teachers and parents, that we used as initial and final measurements.

As a pilot work tool in the field of video game applications, we detected 5 sports games that we have disseminated online in schools with a brochure:

- FIE Swordplay,
- I'm Ping Pong King,
- Tennis World Open 2022,
- Grand Mountain Adventure,
- Biathlon Mania.

Research indicates that video games can be used to enhance spatial abilities, motor skills, knowledge structures and transfer, visual selective attention and problem-solving skills.

Using this new paradigm will also allow teachers/educators/youth workers to "speak more the language of their children/students", to understand their needs and to pass more easily to a digital transformation of their organization, as children and youth nowadays are more connected to the digital skills/news, and they can pass their knowledge to their educators, teachers.

Incorporating video sports games into physical education is a new approach for the consortium organizations. Even though the partners are promoters of ICT strategies, and they spread awareness of ICT technologies to their target groups, they haven't yet used video sports games in their teaching/training in a structured way.

If we mark communication as the basis of interpersonal relations, then it is clear that it can be an essential tool for achieving our goals with children. For parents, the most important thing is to adopt an assertive style of communication about all important issues with their children, even when they are in regard to the contents of the games they choose and the sports activities they engage in.

Joint family activities are extremely important for good communication with children, that's why conversations are ongoing shared games, whether it is a video game or a sports game, is a good opportunity to implement parental suggestions.

- *METHODS*

The first instrument we used was the questionnaire that was created for parents of the participating children, as a research method for gathering data about the current situation and the behaviour of their children concerning the video games. Before the research, SDCS team has created the questionnaire, it was disseminated amongst the consortium in order to be translated in each native language. The one that was used in Serbia, and that has 47 responses, can be found on this **LINK**.

By starting the HopaSus protocol testing pilot tool kit, we have created a battery of 5 tests and a visual digital posture measurement with APECS application that we have used as an initial and final battery test:

- *HEALTHY BEHAVIOUR SURVEY*

The survey is intended for children's parents/guardians, where we collected 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 sign that their child can continue participation in research.

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

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

- *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 practising of challenges. So don't try it! Children can do challenges after parents complete a survey!

Implement the initial test before recommendations!

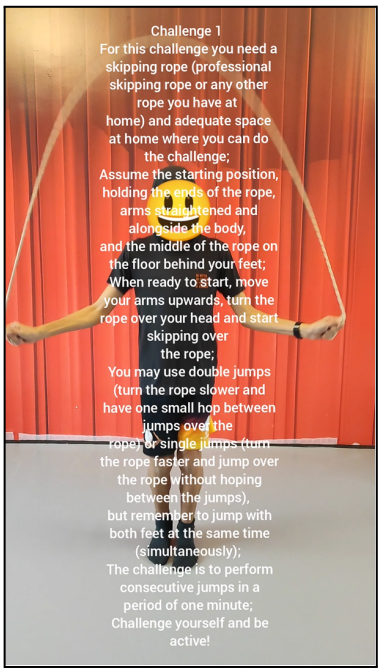
All challenges are video recorded by parent/guardian or coordinator in the way that participant is visible all the time during the challenge.

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*



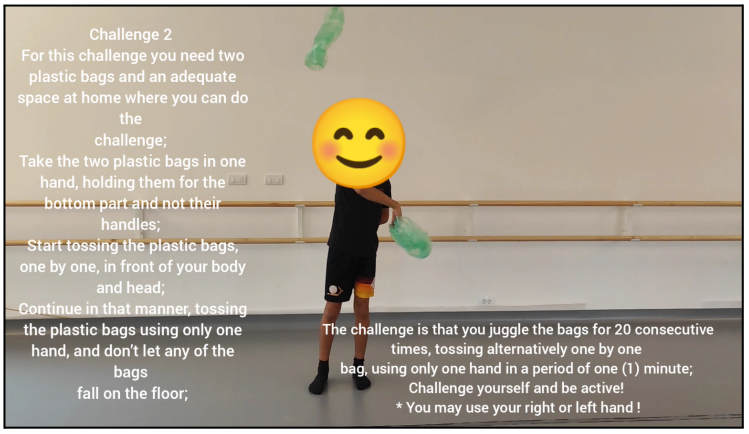
[Challenge 1]

- 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!

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!

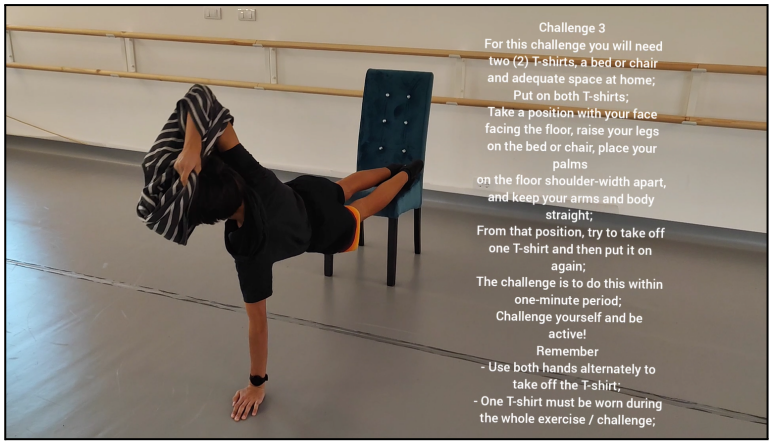


* You may use your right or left hand !

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;



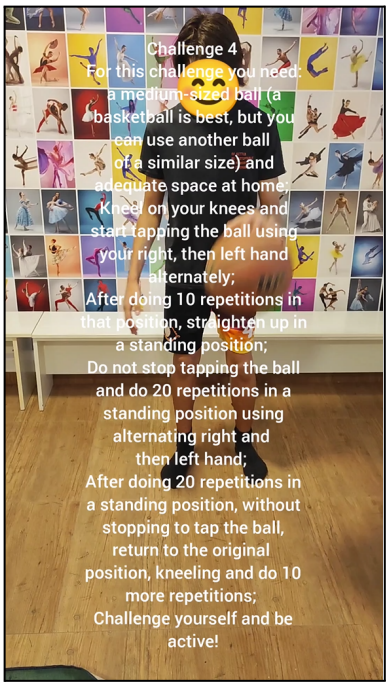
- Challenge yourself and be active!

Remember

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

Challenge 4

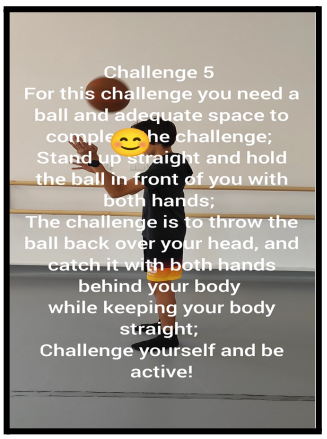
- For this challenge, you need: a medium-sized ball (a basketball is best, but you can use another ball of a similar size) and adequate space at home.
- Kneel on your knees and start tapping the ball using your right, then left hand alternately.
- After doing 10 repetitions in that position, straighten 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!



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!



- *BODY POSTURE*

The postural assessment was 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).

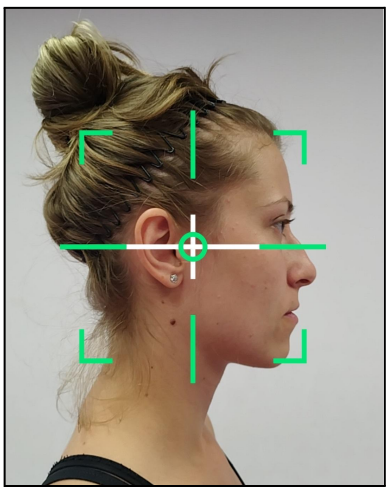


Figure 1. *Frankfurt plane. The horizontal line represents the right position of the Frankfurt plane during assessment.*

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.

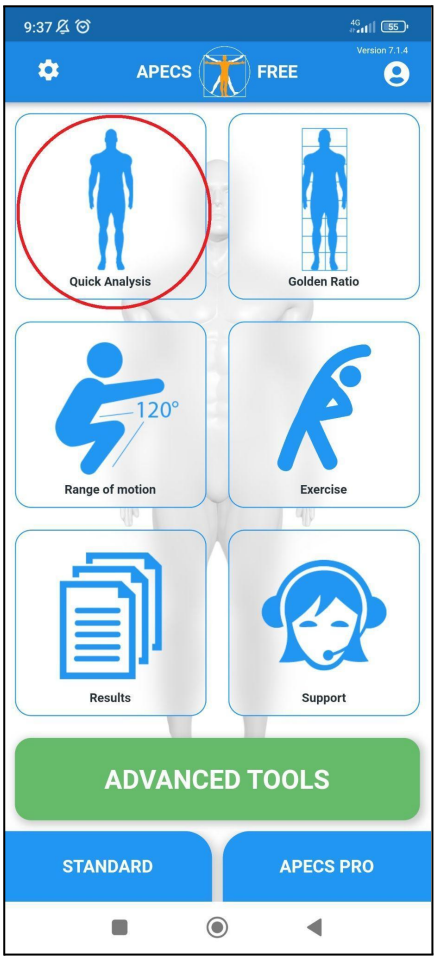
The portable device has to be set on a tripod (camera stand), two to three meters away from the line marking the position of the child. The height of the tripod has to be adjusted, so the middle of the objective lens is at the level of the centre of the body (referent point can be the child's navel).

We recommend that photos be taken 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: **LINK**. 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 centre 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).

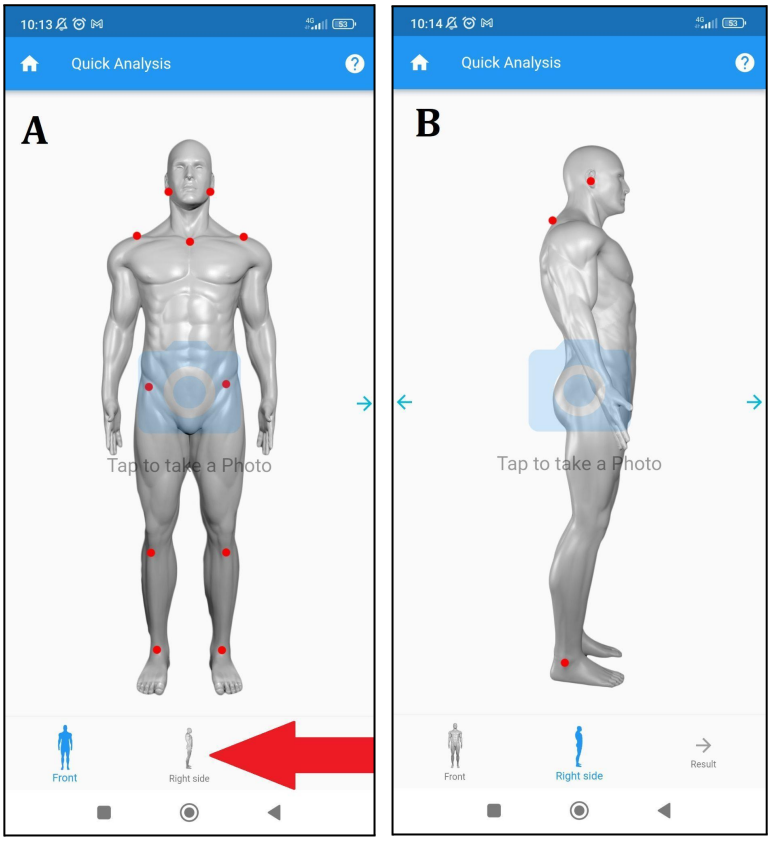


Figure 3. *Screenshot of Quick analysis screens. A - front and B - right side position of subject. The red arrow indicates the place where the buttons are to be pressed in order to select the desired position for photography.*

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".

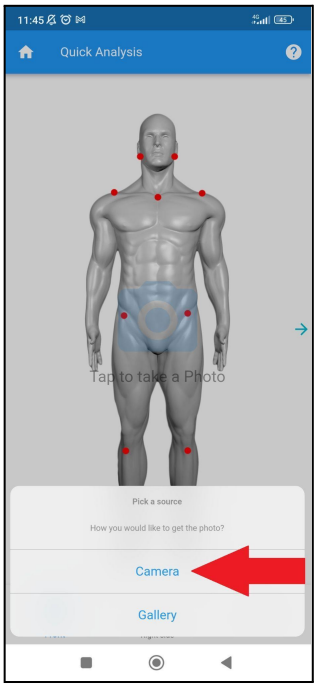


Figure 4. *Selecting a photo source.*

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 centre, 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 centre 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.

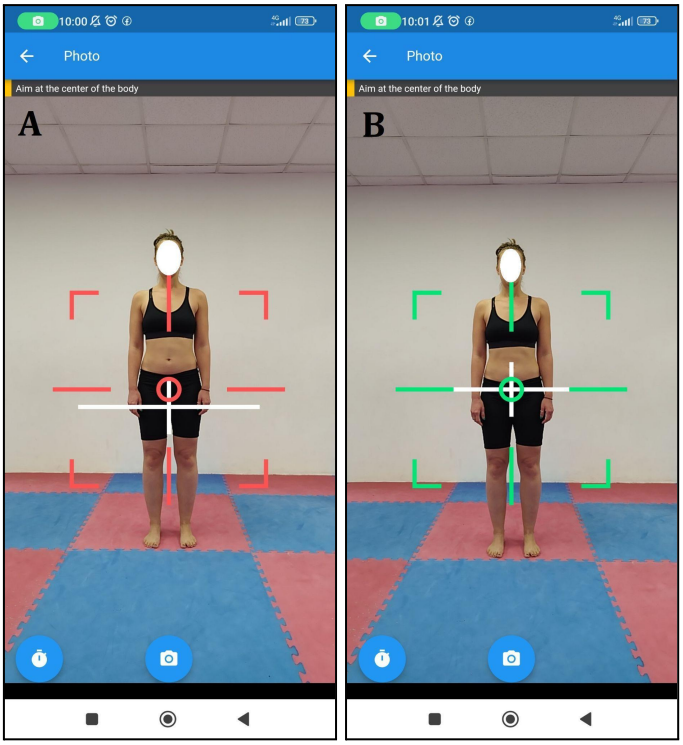


Figure 5. *A. Positioning camera lens for shot. B. Moment for taking a shot, when the lens is positioned at the centre of the body.*

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).

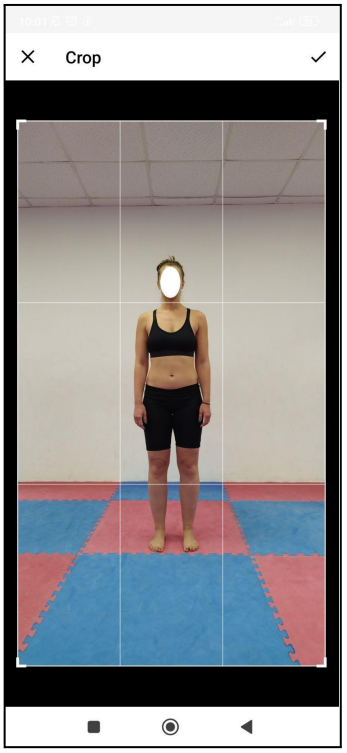


Figure 6. *Screenshot of the photo taken in the front view. The application offers a crop, but actually the photographer needs to make a screenshot of the photo at that moment.*

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).

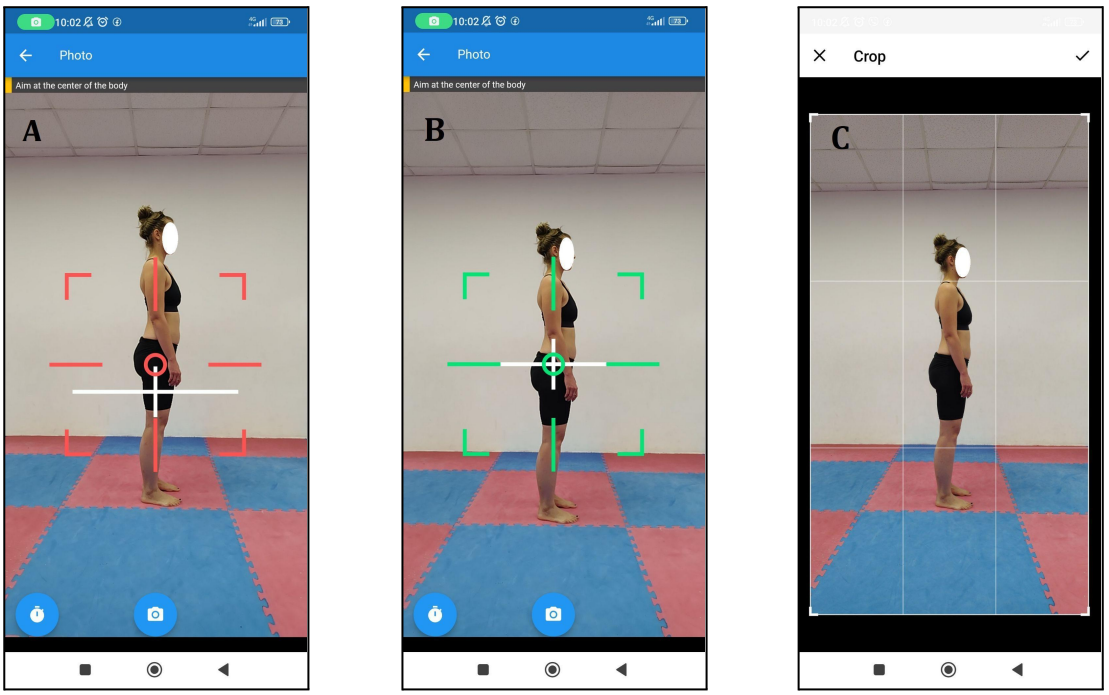


Figure 7. *Taking a photo from the right side. A - Positioning camera lens for shot, B - Moment for taking a shot, C - Taking screenshot of the photo.*

References:

- APECS: All Posture Evaluation and Correction System - LINK
- Roggio F, Ravalli S, Maugeri G, Bianco A, Palma A, Di Rosa M, Musumeci G. Technological advancements in the analysis of human motion and posture management through digital devices. World J Orthop 2021; 12(7): 467-484 [PMID: 34354935 DOI: 10.5312/wjo.v12.i7.467]

HopaSuS research report

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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).

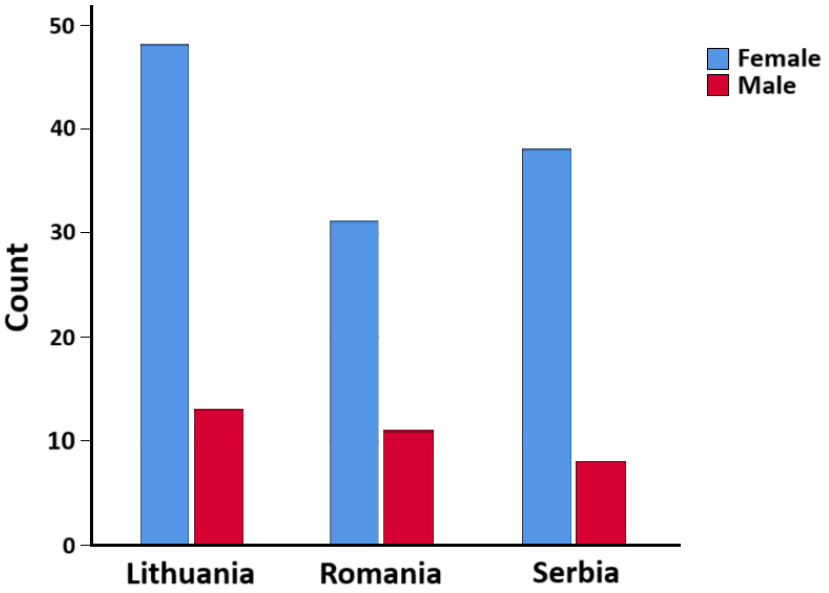


Fig. 1. *Gender of involved parents.*

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).

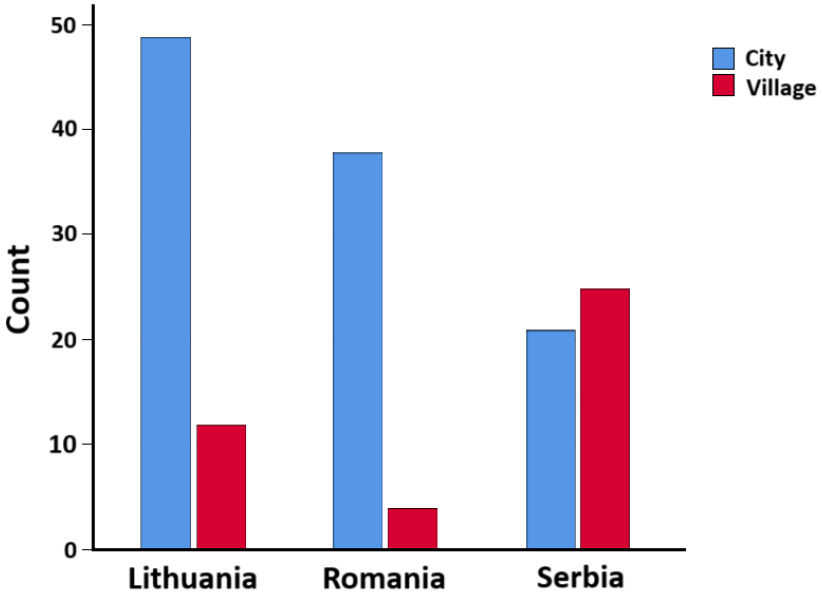


Fig. 2. *Place of residence.*

- *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.

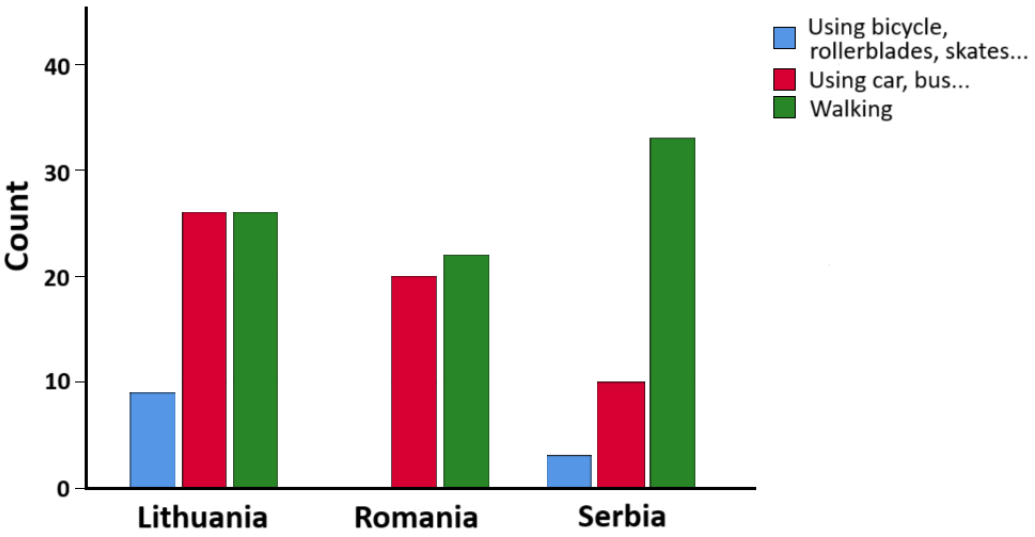


Fig. 3. *Transportation to school*

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 kilometre. In all three countries, there are the fewest children who travel more than 3 km.

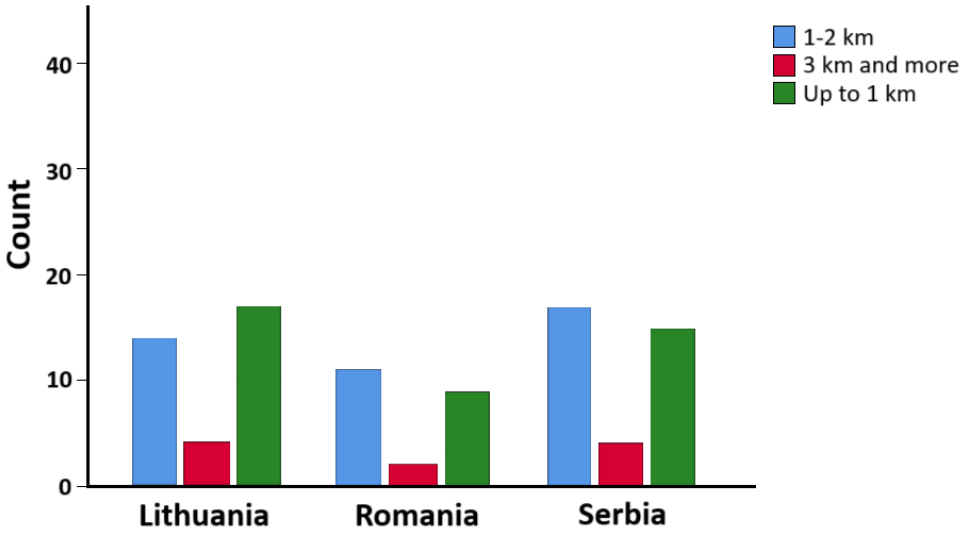


Fig. 4. *Kilometers of transport.*

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).

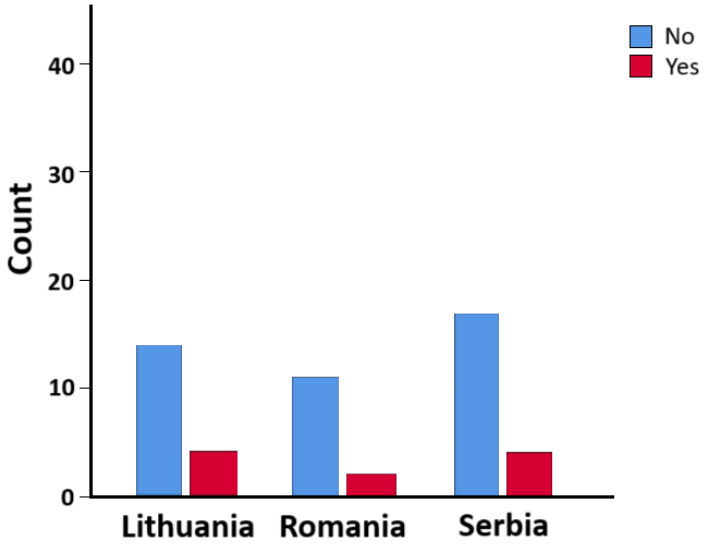


Fig. 5. *Practicing sports.*

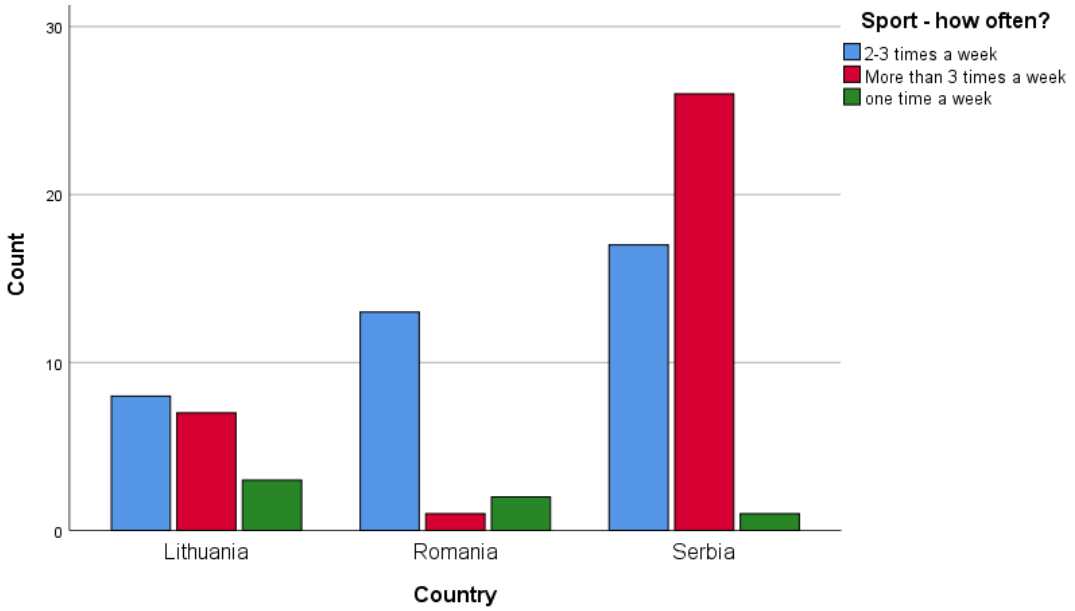


Fig. 6. *How often children practice sports weekly.*

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.

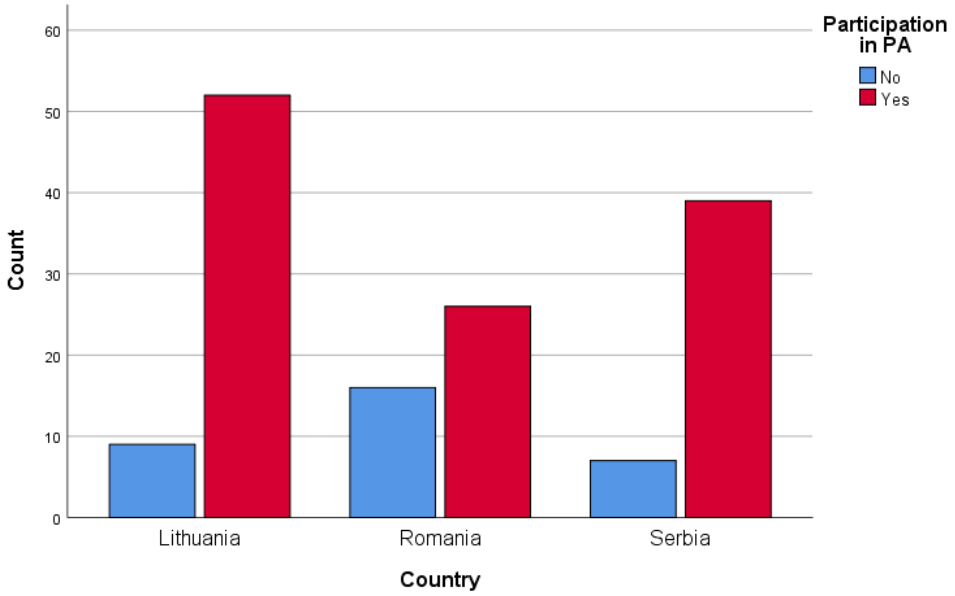


Fig. 7. *Participation in PA.*

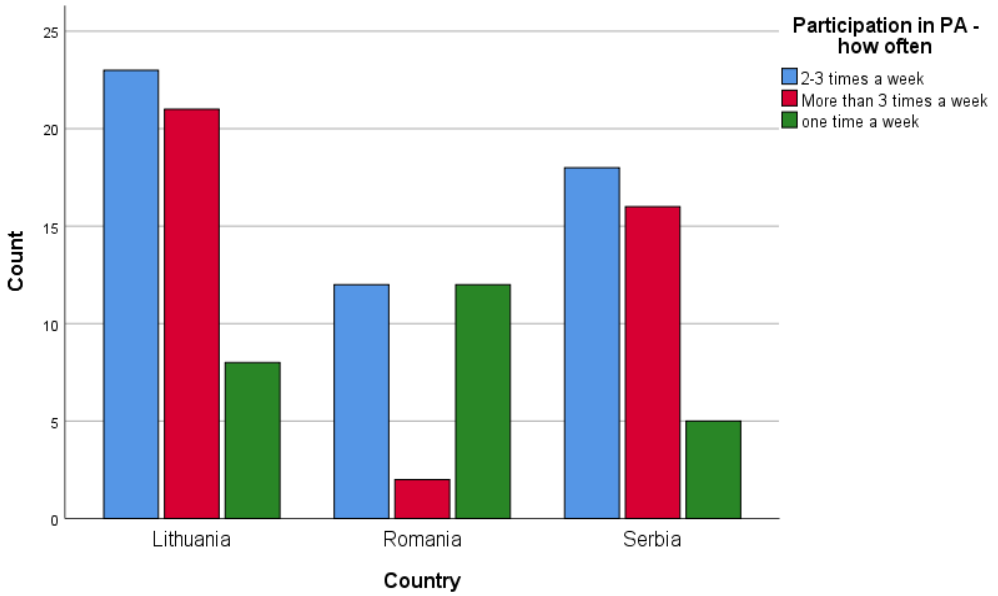


Fig. 8. *How often children practice PA weekly.*

- *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%).

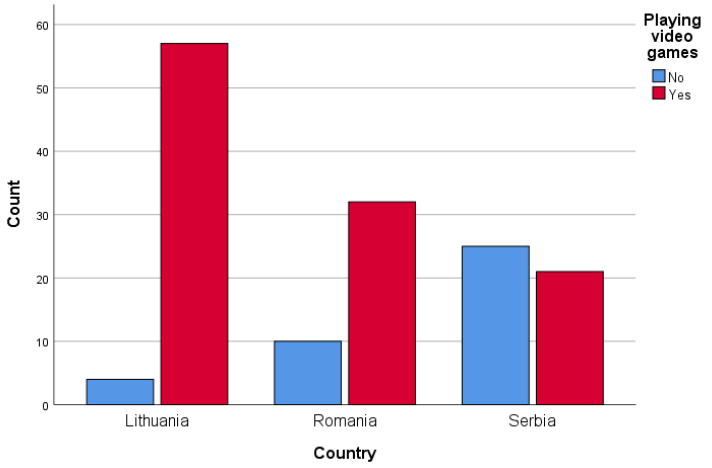


Fig. 9. *Playing video games.*

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 ($x^2 = 14.30$, $p < 0.01$).

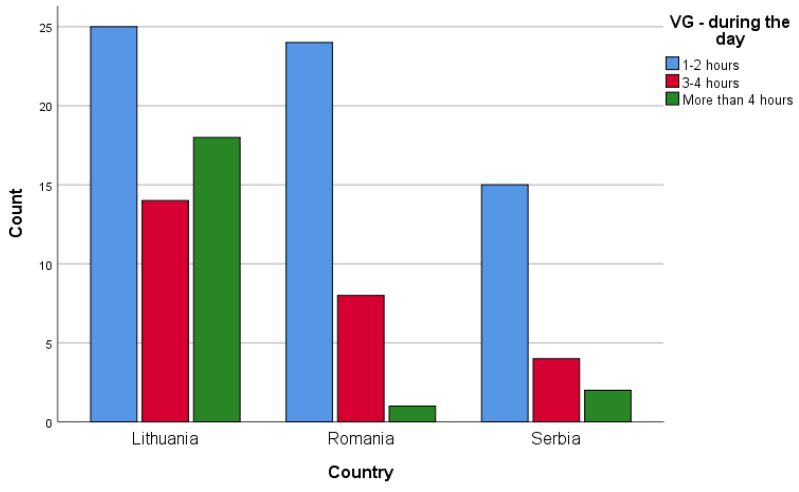


Fig. 10. *Playing video games during the day.*

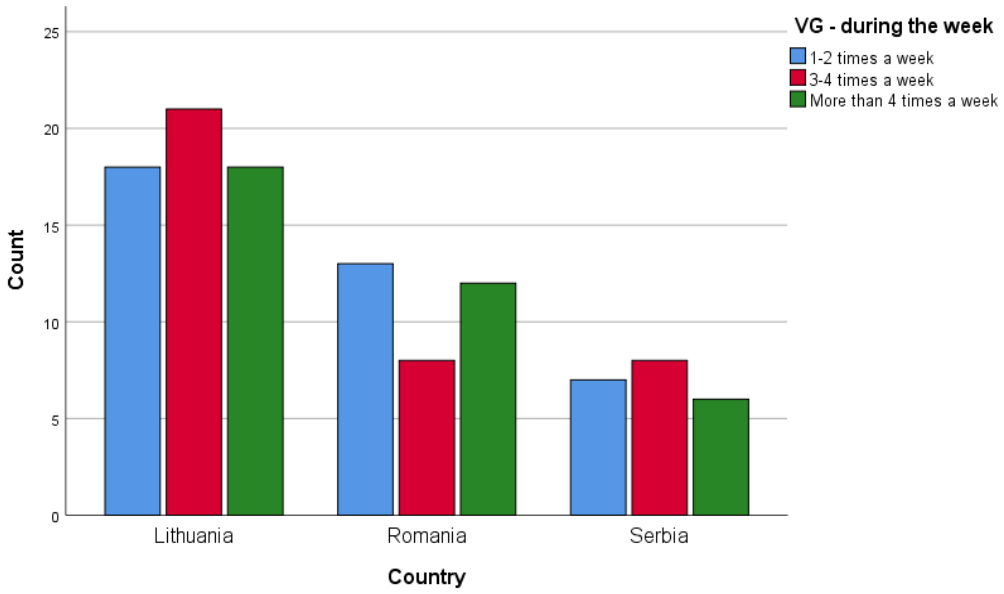


Fig. 11. *Playing video games during the week.*

Lithuanian and Serbian children in the 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).

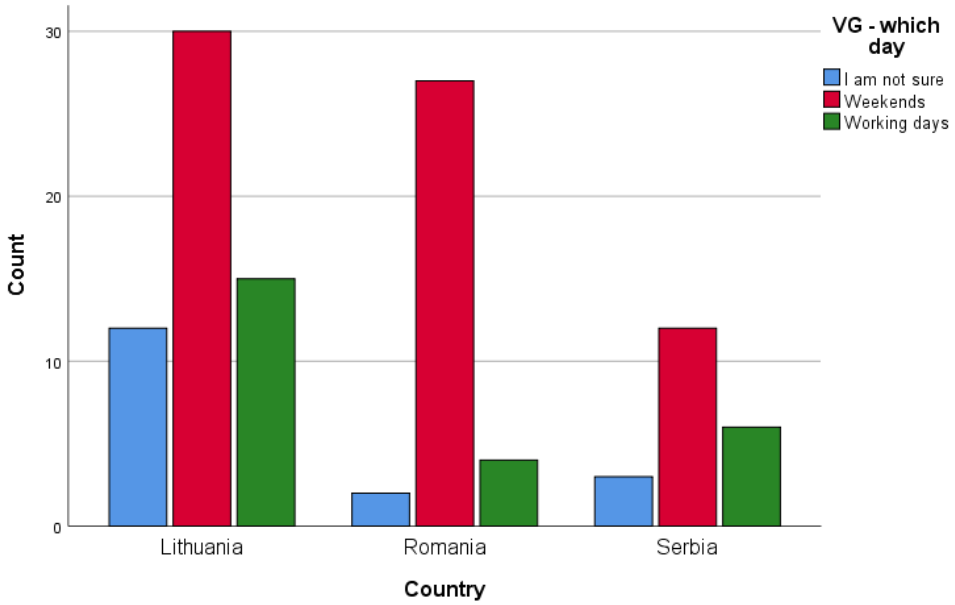


Fig. 12. *Days of playing video games.*

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.

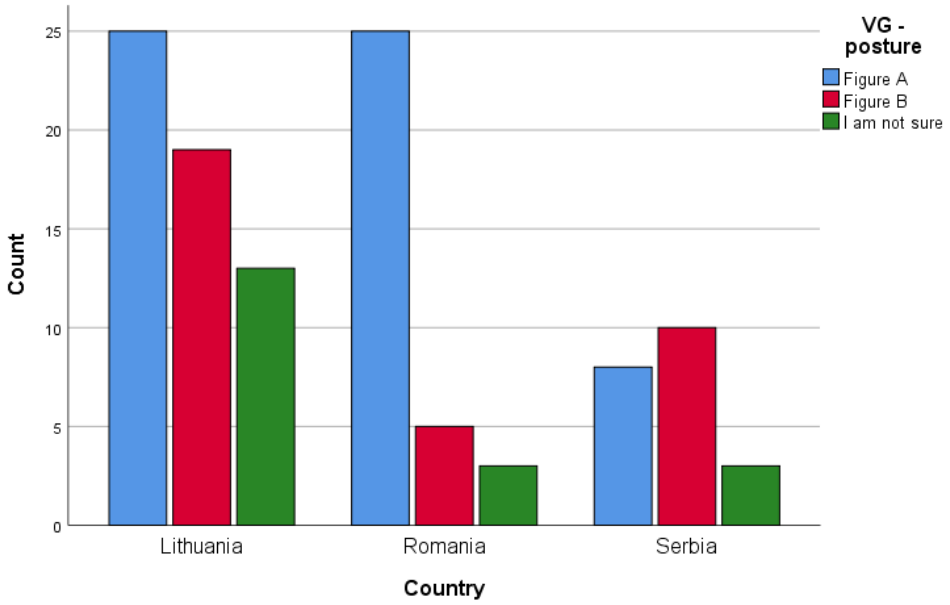


Fig. 13. *Posture of children while playing video games.*

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%).

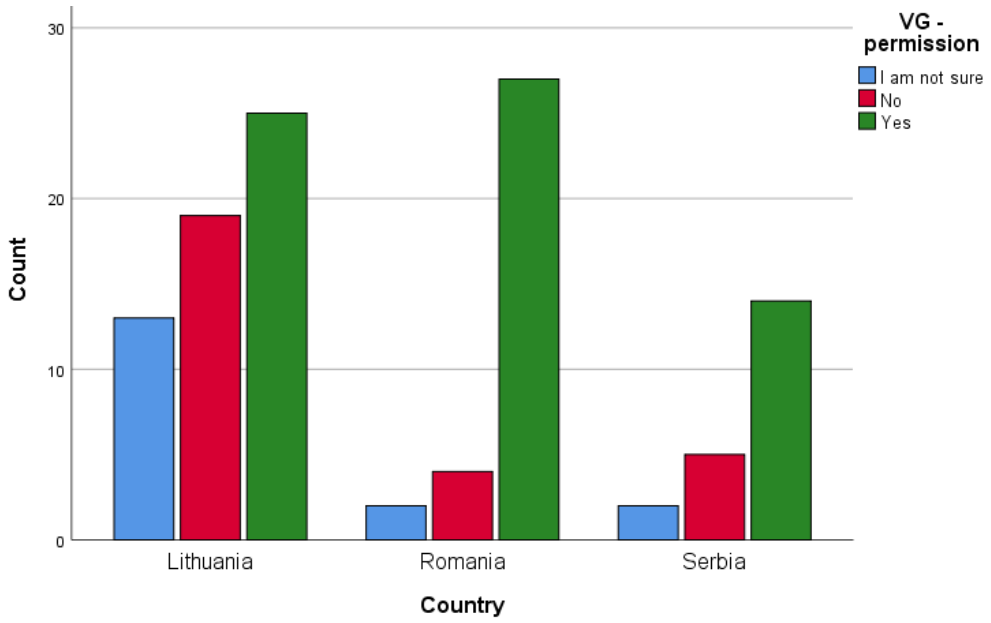


Fig. 14. *Parental permission to play video games.*

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).

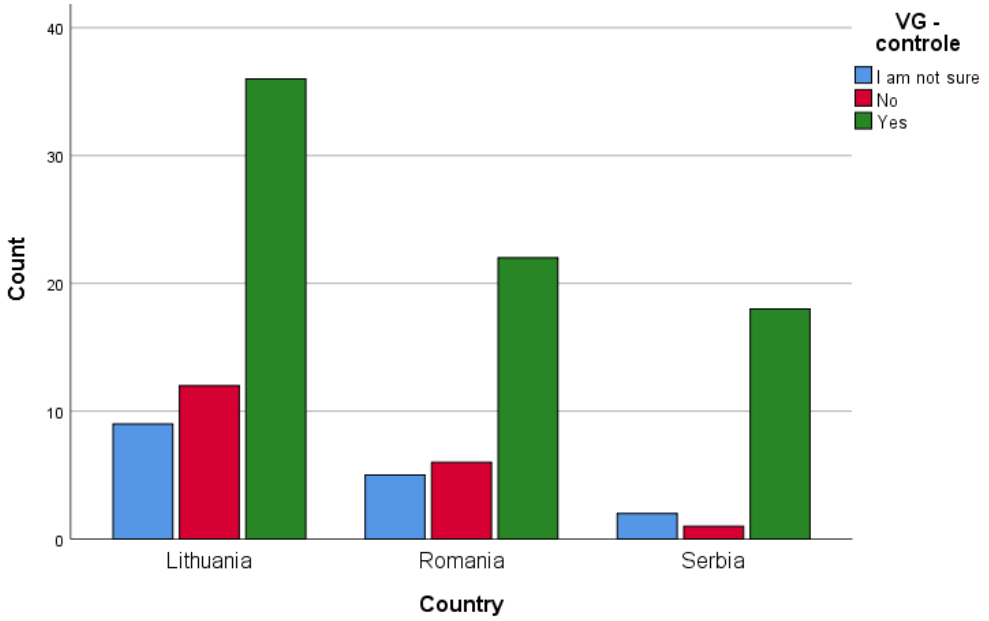


Fig. 15. *Parental control of playing video games.*

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 ($x^2 = 15.24$, $p < 0.01$).

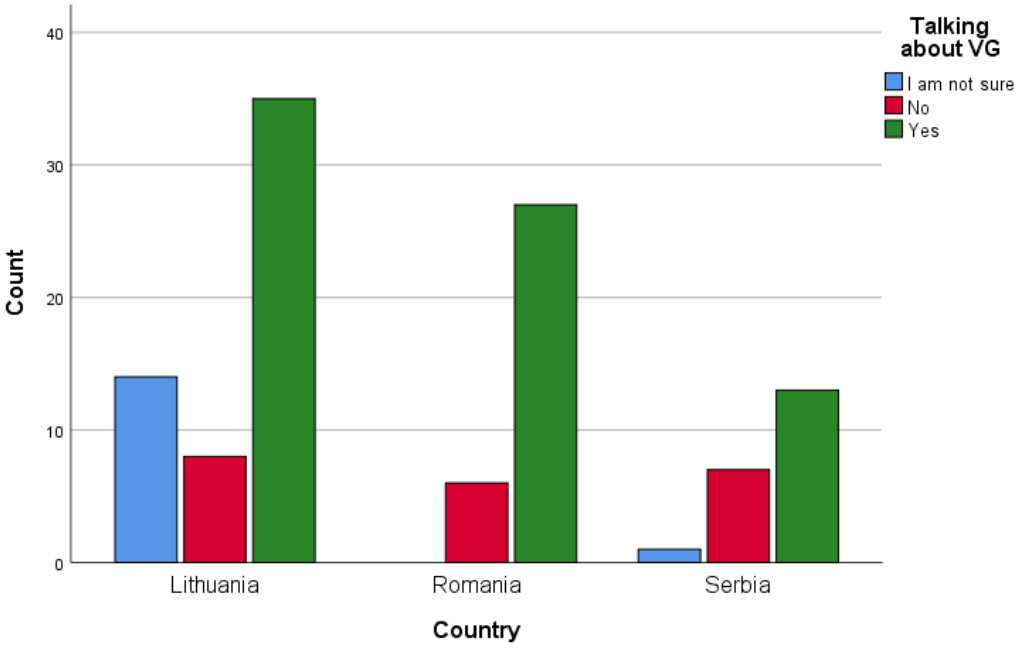


Fig. 16. *Talking about video games.*

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).

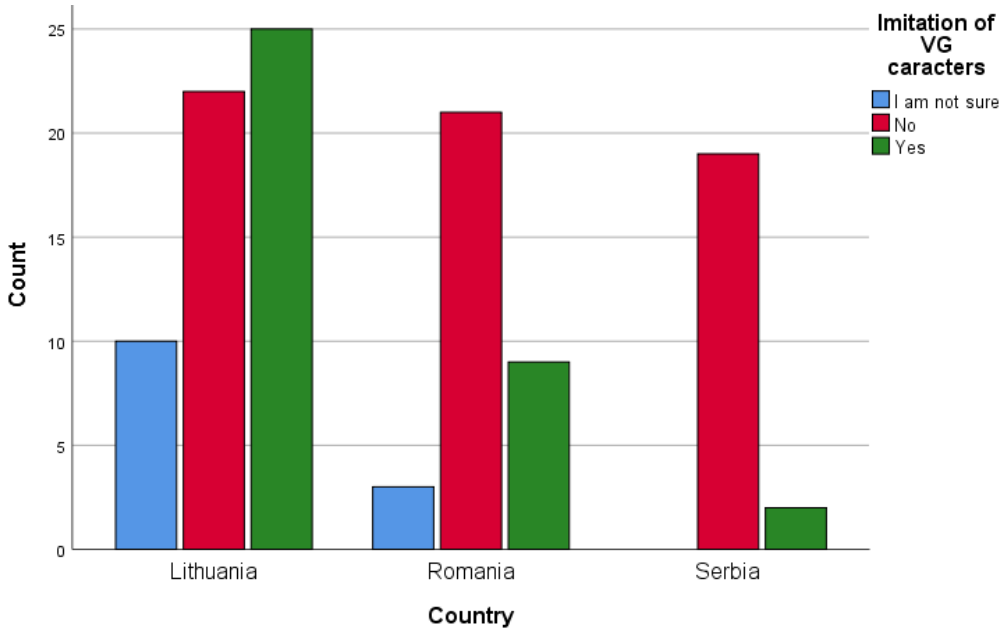


Fig. 17. *Imitation of video games characters.*

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).

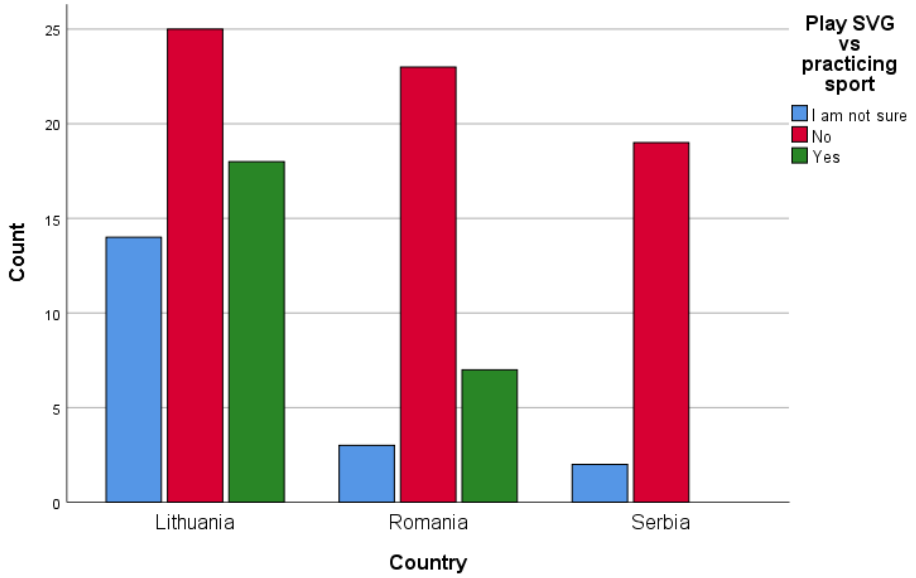


Fig. 18. *Play sports video games versus practicing sports.*

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.

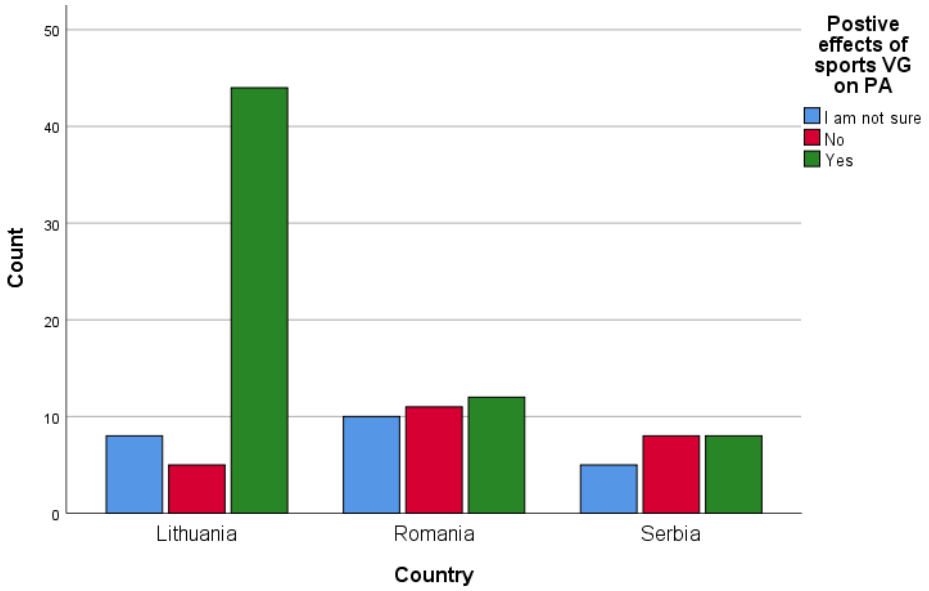


Fig. 19. *Positive effects of playing sports video games on the physical activity level of children.*

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 of 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 do 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 favour 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 practising some kind of physical activity beside regular physical education classes. Also, children from Serbia who 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 also had performance improvement 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).

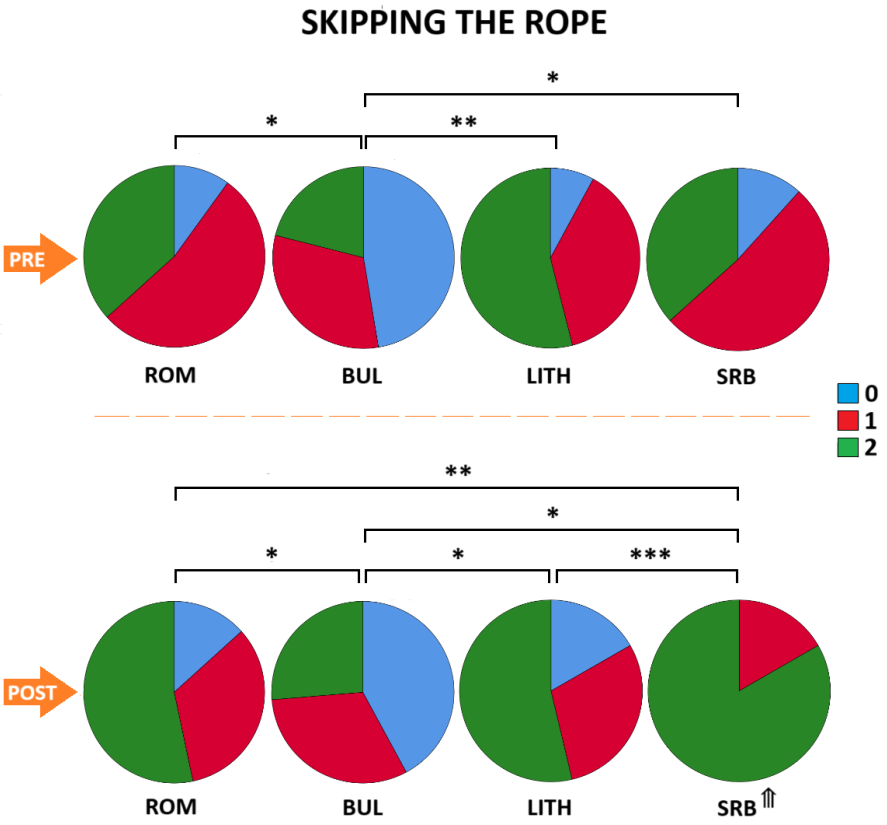


Fig. 20. *Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using the skipping the rope HopaSus test. Symbols * indicate*

*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).

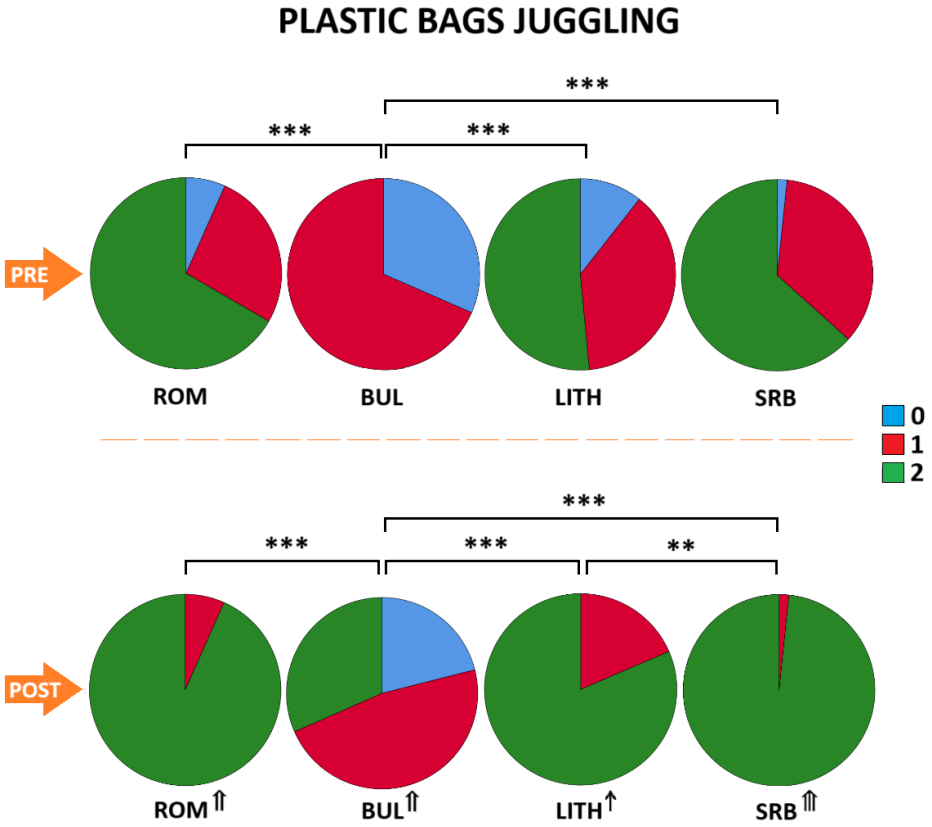


Fig. 21. *Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using the plastic bags juggling HopaSus test. * - differences significant at the level p < 0.05, ** - differences significant at the level p < 0.01, *** - differences 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).

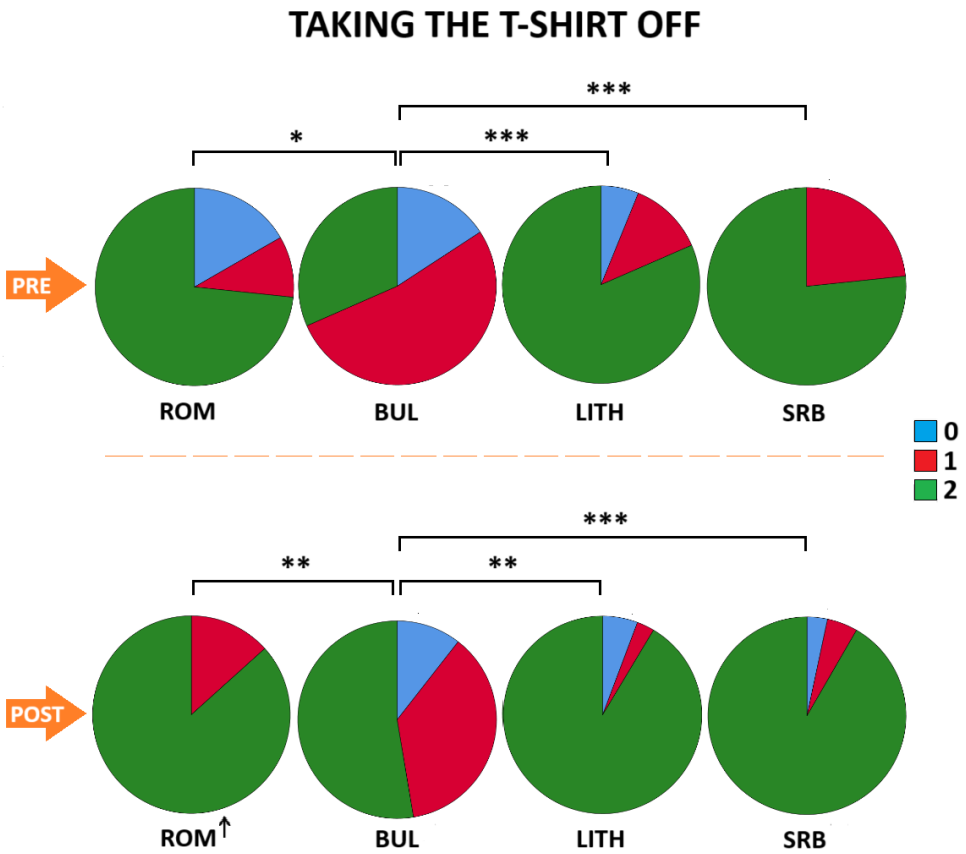


Fig. 22. *Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using taking the T-shirt off HopaSus test. * - differences significant at the level p < 0.05, ** - differences significant at the level p < 0.01, *** - differences significant 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 the *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).

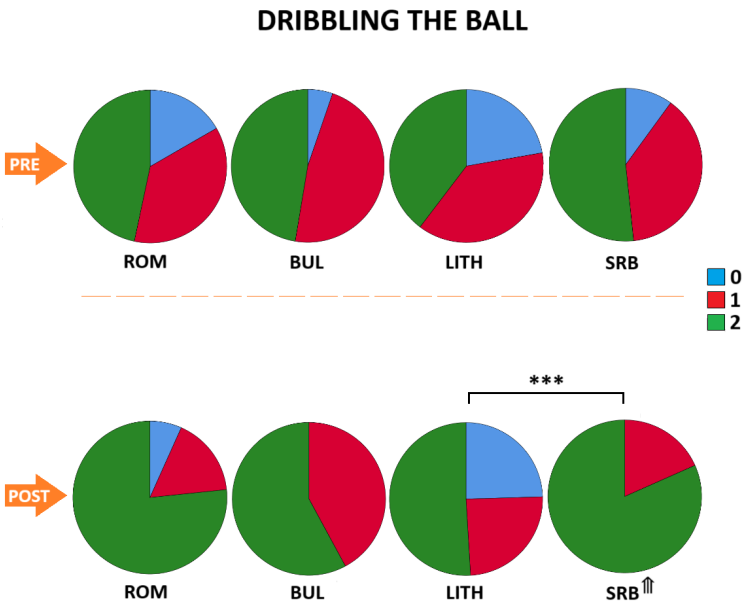


Fig. 23. *Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using dribbling the ball HopaSus test. *** - differences between subsamples significant at the level p < 0.001. Arrow symbol (⇑) indicates the difference of the results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

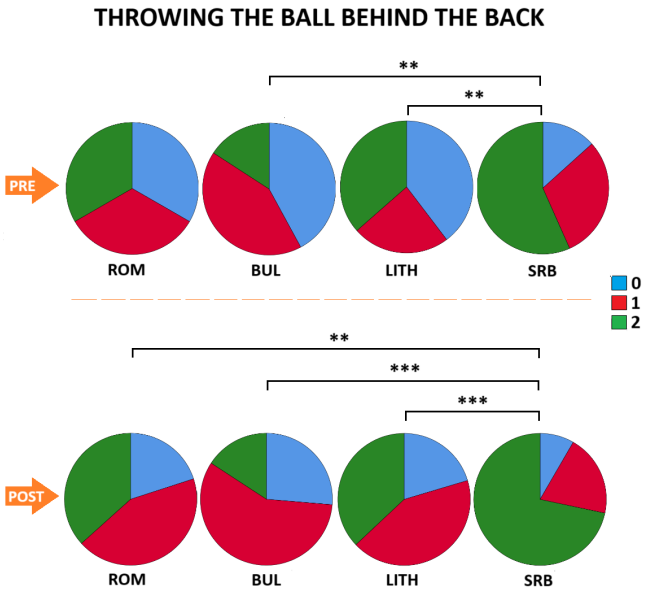


Fig. 24. *Results of comparison of subsamples' (ROM, BUL, LITH, SRB) performance at the initial (PRE) and at the final (POST) testing using throwing the ball behind the back HopaSus test. Symbols **, and *** indicate differences between subsamples significant at the level p < 0.01 and p < 0.001, respectively. (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 test battery total score	**Below Average**	**Average**	**Above Average**
	<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.

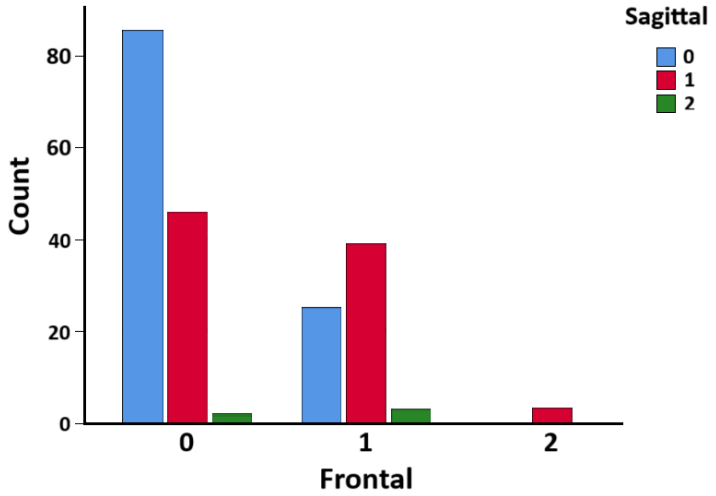


Fig. 25. *Contingency table of total sample results of postural status assessment obtained from the front (frontal) and from the side (sagittal) view. Note that "0" indicates the best score - good posture, absence of postural disorders, "1" - minor deviations, the presence up to two postural disorders 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, $z = -4.67$, $p < 0.01$).

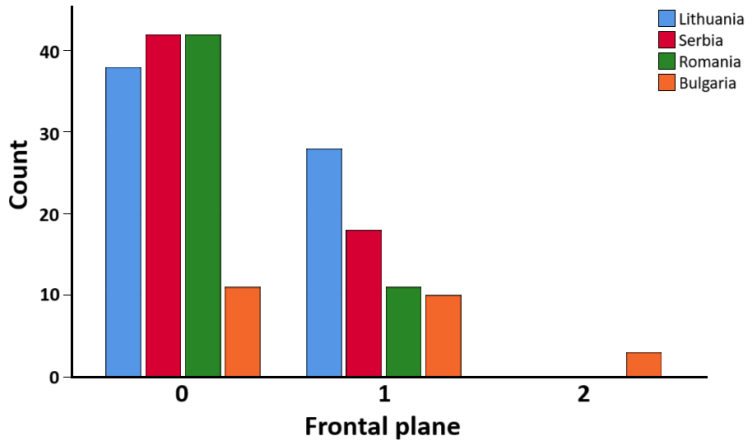


Fig. 26. *Frequencies of the results of postural status assessment by country, assessed in the frontal plane (from the front). "0" - good posture, "1" - minor disorder, and "2" major deviations of good posture.*
** - differences between countries at the level $p < 0.05$.*

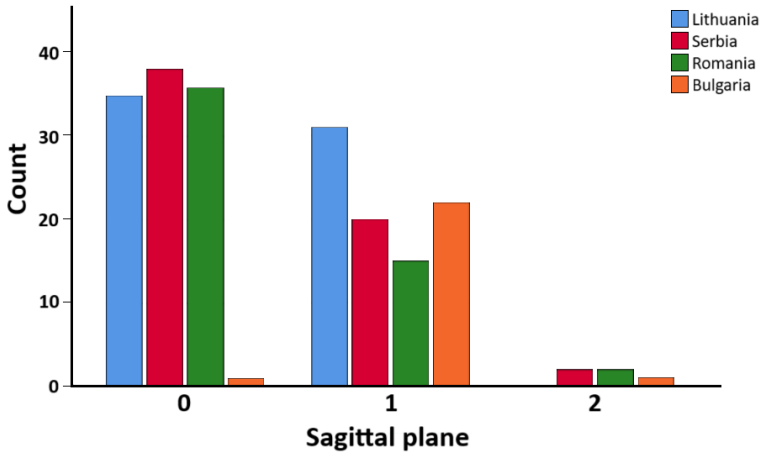


Fig. 27. *Frequencies of the results of postural status assessment by country assessed in the sagittal plane (from the side). "0" - good posture, "1" - minor disorder, and "2" major deviations of good posture.*

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.

Partners and human resources in research in Serbia

In order to carry out the research process and collect the necessary data, we looked for partners, with different locations, who would be happy to participate in the realization of this activity, and therefore the project as a whole. We found them in four organizations and institutions: Volleyball club "Zaslon" Šabac, Gymnastics club "Kami" Šabac, Ballet studio "Art centar" Surčin and Primary school "Milivoj Petković - Fećko" from Platičevo. The goal was for each of them to give part of the sample,

Sports experts, four of them, were engaged before these organizations, who would participate in collecting the sample: **Jelena Srećković Popović** (Zaslon), **Sanela Mićić Opačić** (Kami), **Ivana Ivanovski Ilić** (Art Center) and **Milivoj Branković** (Primary School). The process of collecting the results was carried out primarily at the locations that these organizations and schools use to carry out their activities - the sports halls of elementary schools and the associations themselves and the Sokolski dom in Šabac.

HopaSus recommendations

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

by Ph.D. Ivana Markov Čikić

**The following text is written for parents, but it can be transferred to all HopaSus users.*

If we mark communication as the basis of interpersonal relations, then it is clear that it can be an essential tool for achieving our goals with children. For parents, the most important thing is to adopt an assertive style of communication about all important issues with their children, even when they are in regard to the contents of the games they choose and the sports activities they engage in. Joint family activities are extremely important for good communication with children, that's why conversations are ongoing shared games, whether it is a video game or a sports game, is a good opportunity to implement parental suggestions.

1. Open assertive communication with children regarding video games and sports

Assertive communication would mean open communication with children in which we stand up for our own goals, for example to recommend sports content both virtual and in real life, but at the same time taking into account their own wishes. The child should be given to say what he likes and should encourage the development of his self-confidence. Communication with children should be the "golden middle" between aggressive and passive communication, one must not insist on exclusive satisfaction of the parents' needs, and also the parent must not withdraw with the aim of not reproaching the child.

2. Involvement of parents in children's digital life

Although excessive consumption of digital content causes a number of negative psychological and physical consequences for children, we cannot expect that by taking away phones and digital devices, we will solve the problem. It is necessary to develop communication with the child regarding his favourite digital devices game, educate yourself, familiarize yourself with the same and only then suggest that sports content is better and higher quality than various other aggressive and violent ones.

3. Involvement of children in real sports activities, following the example of parents

Learning by imitation is an indispensable form of socioemotional and cognitive development of children, basic patterns of communication are learned in the earliest periods of life. Children have a need to imitate roles and if family members play sports and are physically active, it is higher the probability that exactly such behaviour will affect the child. Even parents' talk about sports can motivate children to get involved in sports.

4. The ability to actively listen to the child's wishes and the wishes of the parents

One of the main prerequisites for good communication with children is the parents' ability, will and willingness to listen to the interlocutor (child). Successful verbal and non-verbal communication implies a high level of trust, appreciation and empathy. If a parent develops your abilities, it is more likely that the child will be ready to listen and adopt the suggestions of the parent's various life situations, and especially related to nice activities such as sports and sports video games.

5. Avoiding “over” explanations regarding video games and the importance of sports activities

Communication as the basis of relationships in the family, in which thoughts and emotions are exchanged and built relationships, requires parents to be in a good mood and very patient. On the other side of the new one, digital generations have less and less the gift of patience and concentration, which is why we need to work with children to speak briefly and clearly, concisely draw their attention to a problem or behaviour, without posturing lessons. Sometimes short and positive suggestions "you will be more popular" or "you will be more beautiful" if you work sports give better results than a detailed explanation of how long-term consumption of aggressive, or violent video games negatively affect their psycho-physical health.

HOPASUS SPORT VIDEO GAMES RECOMMENDATIONS

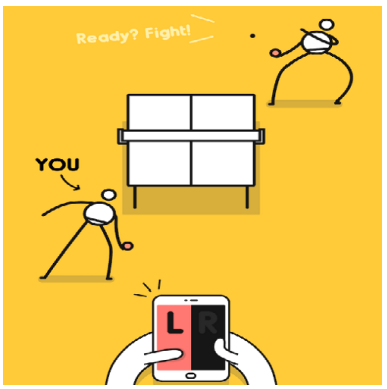
Beside communication recommendation, we give recommendations for simple and free of charge sport video games that can be played on smartphones. Based on your experience and wish of children, other sports

video games can be played. Feel free to explore the world of sports video games!

Clicking on the text, above and under the image, will link you to the video game on the Play store:

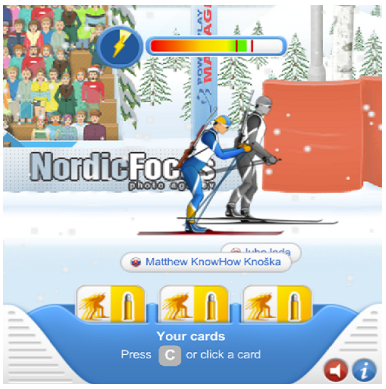
[FIE Swordplay]

[I'm Ping Pong King]



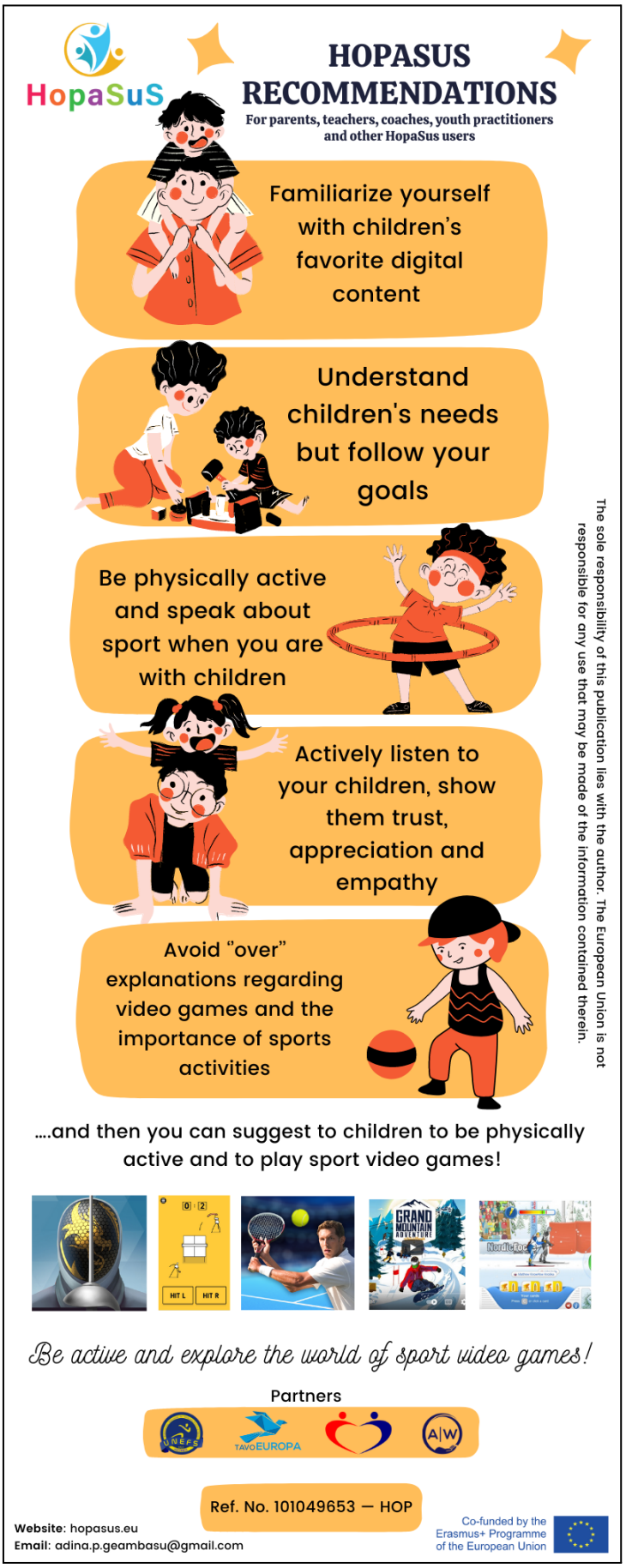
[Tennis World Open 2022]

[Grand Mountain Adventure]



[Biathlon Mania]

The meetings between partners for the preparation of the project were held online, all the documents were filled in Google Drive, and we worked in a collaborative way, with no printing; as the projects recommends the utilization of sport video gaming in education of children and youth – that will mean less documents printed, less administrative burden for the sport teachers as they can see the performance of their students directly in the sport video gaming platforms; transport of children/students to do practical sport activities at school can be reduced; the promotional materials and IOs will all be done in a digital format. Also, the multiplier sport events for the dissemination of the project results will be held online in order to reach wider audiences and to get them used with online sport communities, team sport video gaming as a tool for education. Please find below the brochure guide for HopaSus recommendation video games.



HopaSus recommendations - in Serbian

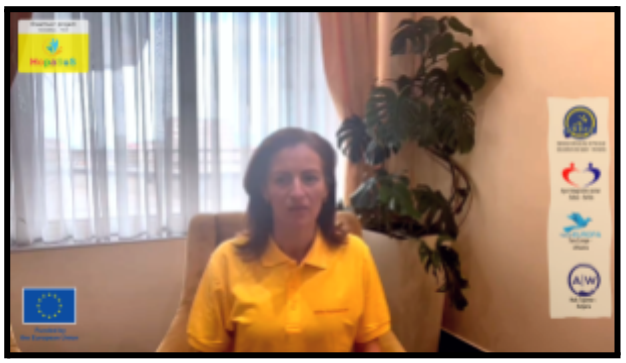
HopaSus recommendations - in English

Transnational meeting in Serbia

With the first days of spring, from 24th to 26th of March 2023, we had the opportunity to organize the second transnational meeting within the project. Besides the workshop, all the project activities were conveyed within Hotel Sloboda. Organizations were represented by following staff members: **Adina Geambasu**, **Andreea Ionel**, **Raluca Costache** (UNEFS, Romania), **Greta Paskočiumaitė**, **Lina Bartaševičiūtė**, **Pauline David**, **Mariangela Cardone** (Tavo Europe, Lithuania), **Vilislava Metodieva**, **Ida Valkova**, **Lora** (Walk Together, Bulgaria), **Milan Djupovac**, **Dragana Drljacic**, **Aleksandar Ivanovski** and **Nemanja Milutinovic** (SDCS, Serbia).

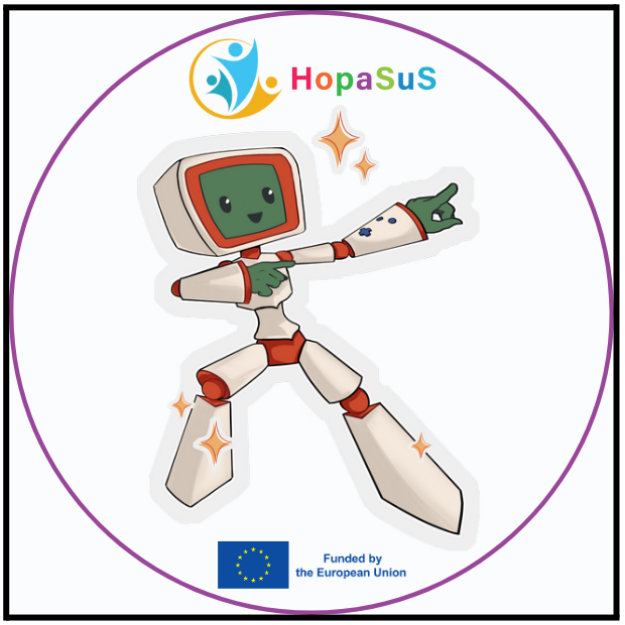
Summary report of the project, part presentation of the research results and future project activities were on the top of the agreed agenda.

On the second day of the TPM, partners from Bulgaria and Lithuania took the lead on presenting their Communication and Public Media Strategy, one of the deliverables for this project. For the last part of the meeting, each representative took part in making of the videos that will later on be used for dissemination purposes.




Four project videos can be found on this LINK

As a part of mobility, and in cooperation with the **Association "Healthy and Fit Kids"**, a workshop was held in which more than 42 children of this sports school participated. Project mascot, which has been used for various events in Romania, was also used for this occasion. As a form of gratitude, to all the participants of the workshop, we gave out diplomas and project badges that we made for the TPM itself.



HopaSus badges

Diplomas for workshop participation




Pictures from the Workshop that was organized in
Elementary school "Janko Veselinović

Fifth Conference College of sports and health

Another great opportunity where the dissemination was carried out was **5TH INTERNATIONAL SCIENTIFIC CONFERENCE "SPORT, RECREATION, HEALTH" COLLEGE OF SPORTS AND HEALTH** which took place on 19th of May 2023 in Belgrade and online. This is a Conference in which professors, students, sport and scientific workers from Croatia, Romania, Bosnia and Herzegovina, Russia, Macedonia, Montenegro, the Philippines, Algeria and the Czech Republic took part to present their latest research. Two SDCS members, **Aleksandar Ivanovski** and **Dragana Drlajčić**, also professors in this college, participated in it as moderators, while **Adina Geambasu** had the honours to be one of the introducers on this conference. While talking on the topic of "**The evolution of digitalization - HOP UP FROM VIRTUAL TO REAL GAME**", she presented the HopaSus project.

Communication and dissemination

By working with the local graphic designer in Serbia **Jovana Stepanović**, we have managed to create several HopaSus emoticons. Also, based on the illustrator's design, the HopaSus mascot was created and used at several project events. Later on, each partner disseminated them among schools, teachers, children and universities on WhatsApp, Viber and other social communication media tools.

For transparency and communication between partners, we used the online way of meetings through the Google meet platform. For a better transmission of information and discussions, we also have a WhatsApp group and a Google Drive where we upload all relevant data and documents for the project. Also, we keep all necessary information contact by email address. The website www.hopasus.eu page was launched by partners from Bulgaria and Lithuania in August 2022 is up and running, and updated with all the relevant news. SDCS made its contributions toward website updates with several articles. Also, the organization used its own social media and other channels, on a regular basis, to promote all the important news regarding the project.

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.