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# **Curriculum and Teaching in Physical Education and Geography: interdisciplinary and international perspectives**

Hana Svobodová,  
Petr Viček (eds.)

Masaryk University  
Brno 2018



Book of Proceedings

**Curriculum and Teaching  
in Physical Education and Geography:  
interdisciplinary and international perspectives**

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Hana Svobodová, Petr Vlček (eds.)



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# Intergrating Geography and Physical Education through Mountain-oriented Education – Formal integration of MOE into Geography school curricula and Geography textbooks in Slovenian primary schools

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## **Abstract**

Paper presents results of two research studies regarding formal integration of mountain-oriented education into Geography school curricula and Geography textbooks for primary schools. First study focuses on quantitative and qualitative analysis of Geography school curricula for primary schools, within which we searched for references, learning objectives, competencies and teaching methods, which are connected to mountain-oriented education. The second study focuses on analysis of Geography textbooks for primary schools, where we analyzed text and photographs, which are connected to mountain-oriented education. The paper presents important findings of how mountain-oriented education is currently presented within Geography lessons in Slovenian primary schools.

**Key words:** mountain-oriented education, outdoor education, Slovenia, curriculum, textbooks, Geography, Physical Education

## **Introduction**

Mountain-oriented education is an education where teachers can effectively combine two school subjects – Geography and Physical Education. In Slovenian primary school education both subjects are compulsory – Physical Education from grade 1 and Geography from grade 6. Each school subject has its own curricula, where learning objectives, learning content, competences and teaching methods are defined. In Slovenian educational system school curricula for each school subject are obligatory documents for every educator, therefore teacher has to teach according to the learning objectives written in the curriculum. Nevertheless, curriculum is also a basis for school textbooks authors, who compose their textbooks according to the learning objectives and competences written in the curriculum. But on the other hand, authors can include into their school textbooks also some learning contents which are not defined in the curriculum. There are two

reasons for that choice. First, authors think that the content, which they choose to include into their textbook, is important for pupils to get some wider perspective of the school subject or specific topic. And secondly it is important to mention that in Slovenia the last renovation of school curricula for all school subjects happened during the period 2008–2011, which means that nowadays some school curricula in Slovenia are 10 years old. Because some textbook authors want to include into their textbook also new findings of the science and take into account the didactic principle of actualization, authors include into their textbooks some up-to date topics, which are not defined in school subject curricula. Through analyzes of both type of pedagogical documents, curriculum and textbooks, we can get a very good perspective of: 1) which topics are taught in each grade and 2) which learning objectives and competences pupils will achieve and develop at the end of each grade.

When thinking of formal school education, most people connect school to classroom teaching and learning, while less of them connect school also to outdoor education. Nevertheless, outdoor education set up its basis in 19<sup>th</sup> century it became more official part of formal school education in the second half of 20<sup>th</sup> century. In Slovenia, outdoor education has an important part of primary school education since 1960s. In 1962 Jože Beslič suggested, that “children in the fourth grade should get a 10 days swimming course and children from the fifth grade should obtain a one week skiing course” (Burnik, Mrak, 2010, p. 13). That means that in Slovenia in the 1960s primary school outdoor education was focused on teaching pupils two basic sport activities, swimming and skiing, which are connected also to natural characteristics of Slovenian (back then Yugoslavian) landscape – Adriatic Sea and mountains. But it took 30 years till outdoor education in Slovenia was formally recognized. In November 1992 the government of Slovenia passed the Law for establishing so-called CŠOD centers (Centers for School and Outdoor Education in Slovenia), which main purpose was the outdoor education. In 1996 the Law for primary school was passed where the outdoor education became part of extended primary school program. In 2001 the final concept of outdoor education was accepted and 10 years later, in 2011, the Law for primary schools, where the outdoor education is the obligatory part of primary school education in Slovenia was passed (CŠOD, 2018). Nowadays, primary schools in Slovenia are obliged to organized at least two outdoor education activities per school year (Burnik, Mrak, 2010).

One part of outdoor education is also mountain-oriented education, which is education about mountains and with mountains. The main purposes for setting the basis for mountain-oriented education are:



- 1) many parts of the world are mountainous;
- 2) in some countries mountains became part of national/local symbols and identity;
- 3) through mountain-oriented education we can promote and keep natural and cultural mountain heritage;
- 4) through mountain-oriented education we can teach youth about sustainable development because mountain regions are more sensitive;
- 5) through mountain-oriented education we can promote outdoor (sport) activities for children and youth, which improve health;
- 6) since formal education has been too deeply involved into indoor teaching and promoting sitting methods of learning/teaching and since the nowadays computer-oriented lifestyle, the majority of young people do not have sports active lifestyle;
- 7) because of nowadays computer-oriented lifestyle young people do not develop mountain-oriented competences (being able to hike independently, being able to valuate mountain environment, being able to recognize safe mountain paths etc).

When presenting Slovenia to foreigners, the first association is “Slovenia is a small European country, which lies on a sunny side of the Alps”. Mountains, especially Alps, have played an important role in lifestyle, history, political decisions etc. in Slovenia. Nevertheless, Alps are also part of national symbols. For example, Triglav, which is the the highest mountain in Slovenia, is part of the coat of arms in the flag of the Republic of Slovenia and it is also the name of numerous Slovenian public and private companies and organizations in Slovenia and abroad. Even though Alps are limited mostly to the north-eastern and central-northern part of Slovenia, “the alpine landscape is one of the prevailing stereotypes for Slovenia” (Burnik, Mrak, 2010, p. 16) and mountaineering “also contributed to developing Slovenian national identity” (Burnik, Mrak, 2010, p. 16). But on the other hand, while in Slovenia mountains, especially Alps, have been important part of local/regional identity, the question how deeply mountain-oriented education is part of Slovenian formal education arise. One of the aims of the INTERREG Alpine Space project YOURALPS (2016–2019) is also to research how mountain-oriented/Alpine-oriented education is presented in different European countries, also in Slovenia<sup>1</sup>.

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<sup>1</sup> The INTERREG Alpine Space project YOURALPS started in 2016. It connects 12 project partners from 5 Alpine countries and is funded by European Regional Development Fund. The main aim of the project is to develop Alpine school model.

## Methodological approaches

To answer the question “How mountain-oriented education is presented in Geography primary school subject in Slovenia?”, two studies were obtained. The first study focuses on quantitative and qualitative analyzes of Geography primary school curricula. In Slovenia Geography primary school curricula was published in 2011. To get in-depth perspective on how topics related to mountain-oriented education are presented in the curriculum we conducted two types of analyzes. The first one was quantitative, within which we counted the number of references, which are connected to mountain-oriented education (see Table 1), while the second was qualitative analyzes. Within that type of analyze we were interested in the content of operational learning objectives and competences, written in the curriculum, which are connected to mountain-oriented education. That analyzes shows us what, regarding to mountain-oriented education, pupils have to learn, know or be able to do at the end of each grade at primary school. Through both studies we can get a wider perspective on how mountain-oriented education is presented in Geography lessons in primary schools in Slovenia. We have to stress that one of the important teaching methods, which are defined in Geography primary school curricula, are also excursions and fieldwork, which can be defined as one part of outdoor education (mountain-oriented) activities, which can also effectively combine two school subjects – Geography and Physical Education.

**Table 1: References, connected to mountain-oriented education**

References			
mountain	mountaineering	to move in nature	health
highlands	Alps	excursion	to move (being physically active)
hill	trip	fieldwork/field trip	orientation
hike/hiking	outdoor learning/outdoor education	walking	health
Physical Education	mountain-oriented education		

As written in the introduction, curriculum is the basic and obligatory document for each teacher, who has to design his/her lessons according to the operational objectives and competences, written in the curriculum. When teaching, every teacher in Slovenia uses textbook, which helps him/her to teach school subject and

which helps pupils to better understand learning content. In Slovenia each teacher has a right to choose textbook for his/her school subject. There are three main publishers who publish Geography textbooks – Rokus-Klett, Modrijan Založba and Mladinska Knjiga Založba. Within the research we analyzed 12 textbooks, which are currently available for Geography lessons in primary schools (see Table 2).

With the combination of results from both types of analyzes we can get in-depth information how mountain-oriented education is presented in Geography primary school curricula in Slovenia and if that presentation encourages young people to be physically active.

**Table 2: List of analyzed Geography textbooks**

<b>Author</b>	<b>Title/Publisher</b>	<b>Year of publishing/pages</b>
Helena Verdev	Raziskujem Zemljo 6/Rokus Klett	2016/55 p.
Eneja Baloh, Bojan Lenart	Geografija 6/Mladinska Knjiga Založba	2016/79 p.
Jurij Senegačnik	Moja prva geografija 6/Modrijan Založba	2012/64 p.
Helena Verdev	Raziskujem stari svet 7/Rokus Klett	2015/103 p.
Eneja Baloh, Bojan Lenart, Milivoj Stankovič	Geografija 7/Mladinska Knjiga Založba	2015/96 p.
Jurij Senegačnik	Geografija Evrope in Azije/Modrijan Založba	2010/130 p.
Helena Verdev	Raziskujem novi svet 8/Rokus Klett	2015/87 p.
Eneja Baloh, Bojan Lenart, Milivoj Stankovič	Geografija 8/Mladinska Knjiga Založba	2015/87 p.
Karmen Kolenc-Kolnik, Ana Vovk Korže, Marta Otič, Jurij Senegačnik	Geografija Afrike in Novega sveta/Modrijan Založba	2010/115 p.
Helena Verdev	Raziskujem Slovenijo 9/Rokus Klett	2015/103 p.
Eneja Baloh, Bojan Lenart, Milivoj Stankovič	Geografija 9	2016/101 p.
Jurij Senegačnik	Geografija Slovenije	2012/137 p.

## Results

### *Results from Geography primary school curriculum analyzes*

As explained in methodological approaches we analyzed Geography primary school curriculum with two different types of analyzes – quantitative and qualitative. The quantitative analyzes shows that in Geography curriculum in total 89 references, which are directly or indirectly connected to mountain-oriented education appear (Table 3). Most often presented references are: excursion (20), Alps (15), fieldwork (14) and orientation (12). From those, three are part of so-called active methods of learning – excursion, fieldwork and orientation.

**Table 3: Results from quantitative analyzes of Geography curriculum<sup>2</sup>**

References	GEOGRAPHY primary school									
	6		7		8		9		G	Total
	C	LO	C	LO	C	LO	C	LO		
mountain	-	-	-	1	-	1	-	-	-	2
highlands	-	-	-	1	-	-	-	-	-	1
hill	-	-	-	-	-	-	3	-	-	3
hike/hiking	-	-	-	-	-	-	-	-	1	1
mountaineering	-	-	-	-	-	-	-	-	-	0
Alps	-	-	-	-	-	-	7	8	-	15
trip	-	-	-	-	-	-	-	-	1	1
outdoor learning/outdoor education	-	-	-	-	-	-	-	-	2	2
to move in nature	-	4	-	-	-	-	-	-	-	4
excursion	1	4	-	1	-	-	-	1	13	20
fieldwork/field trip	-	3	-	-	-	-	-	1	10	14
walking	-	-	-	-	-	-	-	-	-	0
health	-	1	-	-	-	-	-	-	6	7
To move (being physically active)	-	4	-	-	-	-	-	-	1	5
orientation	3	2	-	-	-	-	-	-	7	12
Physical Education	-	-	-	-	-	-	-	-	2	2
mountain-oriented education										
<b>TOTAL</b>	<b>4</b>	<b>18</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>1</b>	<b>10</b>	<b>10</b>	<b>43</b>	<b>89</b>

<sup>2</sup> C=curriculum; LO=learning objectives; G=general

Quantitative analyzes of Geography primary school curriculum showed, that active methods of learning and teaching (excursion, fieldwork) are presented in primary school Geography lessons. The analyzes also showed that in the curriculum the reference “outdoor learning/education” is mentioned twice, but on the other hand there is no “mountain-oriented education” reference in the curriculum. Instead of that phrase, some other references appear, which can be directly or indirectly connected to mountain-oriented education—mountain, highlands, hill, hike, Alps, trip, to move in nature, health, to move (being physically active).

To get more in-depth information to what learning content above mentioned references refer to, we conducted qualitative analyzes of the curriculum. The results showed that references: mountain, highlands, hill and Alps are according to the geography primary school curriculum mainly part of indoor education, when pupils have to obtain the knowledge of terminology. None of the four mentioned references are part of active outdoor teaching/learning methods. But on the other hand, the qualitative analyzes showed that during the Geography lessons, there are lots of opportunities for outdoor education, since excursions and fieldwork are part of primary school Geography lessons. Nevertheless that quantitative analyzes showed, that the reference “outdoor learning/education” is mentioned only twice, there are many learning objectives/contents, where outdoor education can take place during primary school Geography lessons. Qualitative analyzes showed that excursions and fieldworks have an important part of primary school Geography lessons. There are two very important learning objectives, written in the curriculum, which directly refer to the importance of active outdoor education:

*“Within the framework of the regular curriculum, the teacher often recognizes and conducts field works and excursions” (Geography curriculum, 2011, p. 31).*

*“... learning objectives of Geography can be realized during all-day or short excursions...” (ibidem, p. 32).*

Which means, that teacher can organize his/her Geography lessons as fieldworks if pupils can, during the fieldwork, achieve learning objectives, written in the curriculum. But nevertheless, at least one interdisciplinary excursion, as active teaching method, has to be organized per school year.

The qualitative analyzes of the curriculum also showed that Geography primary school subject tries to encourage pupils for active lifestyle: there is one reference for “hike” and “trip”, where pupils have to plan their hike or trip, four references for “moving in the nature” and five for “moving – being physically active”. All four references refer to physically active learning methods. And those can be combined to the subject Physical Education.

### ***Results of Geography textbook analyzes***

As explained in the introduction curriculum is the obligatory pedagogical document for every teacher, who organizes and plans his/her lessons according to the learning objectives, written in the curriculum. Almost every teacher uses also textbook for his/her lesson, but they are not obligatory. The content of the textbook is prescribed by the curriculum, but the authors or publishers can include into their textbook some additional learning content, which we explained in the introduction.

In the following we present the results of the textbook analyzes, within which we analyzed 12 textbooks for primary school Geography (see Table 4). In general, the textbook analyzes showed that only in grade 9 there is text about mountain-oriented education. That is because the Alps region is part of the obligatory learning content in grade 9, which is prescribed by the Geography primary school curriculum. But at the same time, we have to stress, that in the text there is a lack of encouraging pupils for mountaineering and sport active lifestyle. Nevertheless, pictures in the textbooks are more encouraging and connect mountain-oriented education with Physical Education through different sport or touristic activities in the mountains, especially in the Alps. The analyzes also showed that in the textbooks mountains are presented in a positive way – with beautiful views they can arise positive emotions. The most pictures, which connect mountain-oriented education with Physical Education are presented in grade 9, mainly because of the obligatory learning content about the Alps. In total, Geography textbooks from Rokus Klett include 57 pictures from grade 6 to 9, which we can connect to outdoor and mountain-oriented education, Geography textbooks from Mladinska Knjiga Založba 87 pictures and Geography textbook from Modrijan založba 79. Majority of them represent natural (mountains, hills, vegetation, animals, etc.) and cultural (alpine houses, mountain architecture etc.) aspects of the mountains, while less of them promote different outdoor and mountain sport activities (hiking, mountaineering, biking, skiing etc.).

**Table 5: Results of Geography textbook analyzes**

Grade	Title of the textbook	Text (outdoor education/mountain-oriented education) YES/NO	Pictures (outdoor education/mountain-related education) YES (No.)/NO
6	Raziskujem Zemljo 6	NO <sup>3</sup>	YES (16)
6	Geografija 6	NO <sup>4</sup>	YES (13)
6	Moja prva geografija	NO <sup>5</sup>	YES (9)
7	Raziskujem stari svet 7	NO	YES (15)
7	Geografija 7	NO	YES (26)
7	Geografija Evrope in Azije	NO	YES (23)
8	Raziskujem novi svet 8	NO	YES (3)
8	Geografija 8	NO	YES (19)
8	Geografija Afrike in Novega sveta	NO	YES (10)
9	Raziskujem Slovenijo 9	YES	YES (23)
9	Geografija 9	YES	YES (29)
9	Geografija Slovenije	YES	Yes (37)

### Findings and conclusions

Analyzes of Geography primary school curriculum and Geography textbooks showed that outdoor education and mountain-oriented education are parts of primary school subject Geography. With analyzes we showed that outdoor education is within Geography subject in primary school organized as interdisciplinary excursions and fieldworks, while it is also, in some way, promoted in geography textbooks with the learning content, especially by pictures. While on the other hand, active mountain-oriented education, which would promote mountaineering and different sport activities in the mountains, is so far not part of Geography primary school curricula. But nevertheless Geography textbooks analyzes showed that mountain-oriented education is presented also in Geography textbooks, mostly by pictures, which promote different sport activities in the mountains.

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<sup>3</sup> Exception: the terms hill, hills, mountain, mountains, orientation are explained.

<sup>4</sup> Exception: the terms hill, hills, mountain, mountains, orientation are explained.

<sup>5</sup> Exception: the terms hill, hills, mountain, mountains, orientation are explained.

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# Cross-curricular integration of geography and physical education in the case of mountain-oriented education

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## Abstract

Many years ago, Jacobs (1989) defined cross-curricular instruction as a conscious effort to apply knowledge, principles, and/or values to more than one academic discipline simultaneously. Today we know that when students see the connections between individual subject areas, the material becomes more relevant. There are many ways in which to integrate different subjects or content into a constructive holistic unit.

The author presents an approach to mountain-oriented education that includes contributions from geography and physical education. Through the presentation of YOUrALPS (*Educating Youth for the Alps: (re)connecting Youth and Mountain heritage for an inspiring future in the Alps*) project results, the author discusses a cross-curricular approach in the school activities of both subjects when dealing with key issues viewed from different disciplinary perspectives.

The author provides an educational vision through a proposal for effective teaching that aims to enable more successful learning and achievement by students. The proposal is based on cross-curricular investigations of the geography and physical education curricula (objectives, abilities, skills and competencies connected with the mountain-oriented topics of each discipline) and is enhanced with suggestions for integration either in indoor or outdoor activities. A survey of teachers who attended the Summer School on Mountain-Oriented Education (Slovenia, 2017) reveals that this type of integration requires – in addition to extensive planning and cooperation among teachers – a high degree of teacher commitment, which works well so long as there is high enthusiasm for the project.

**Key words:** cross-curricular integration, geography, physical education, mountain-oriented education

## Introduction

Interdisciplinary integration is becoming an increasingly important part of the educational process and is an important instructional approach, helping to provide students with lasting and above all practical knowledge. It can partially lighten the load of curricula, while also enhancing the experiential aspect of activity days (Vlček et al., 2016). Various terms appear in the professional literature (Georgescu, 2000; Lake, 1994): cross-curriculum approaches, cross-disciplinary approaches, cross-curriculum objectives and issues, integrated curriculum, interdisciplinary teaching, interdisciplinary curriculum, thematic teaching, synergistic teaching, skills across the curriculum, and others. The definitions of these terms are not completely unambiguous, as some authors (Georgescu, 2000) distinguish inter-subject (linking subjects from the official curriculum) and interdepartmental integration (which means, in particular, the interweaving of objectives and contents of different fields, such as learning to learn, education for democratic life and respect for human rights, lifelong learning, health education, environmental education, communication skills, education for peace and tolerance, social skills, etc., with the objectives and content of official subjects), as well as linking with extra-curricular activities of children.

One of the most comprehensive definitions was given by Shoemaker (1989, p. 2), who defined cross-curricular connections as "...an education that is organized as the intersection of the contents of different objects; it combines different views of the curriculum into a semantic link so that it can focus on broad areas of learning. Learning and teaching are dealt with in a comprehensive way that involves the student's body, thoughts, feelings, past experiences, intuition; all this helps the student to discover the interactive real world."

Cross-curricular planning is based on integration of subject areas. In this type of planning, teachers first find those goals that are common to the subjects. They then record the remaining objectives of each subject. Cross-curricular planning is demanding for the teacher, because it requires a good knowledge of the curricula for all subjects, discernment and breadth, and must be based on the psychosocial development of the child and build on the student's prior knowledge. Teachers who are not provided with adequate in-service or time to thoughtfully develop an integrated curriculum may go to an unstructured, "a little of everything" approach (Jacobs, 1989).

The findings support the positive effects of curriculum integration (Lake, 1994). Lipson summarizes the following findings: an integrated curriculum helps students apply skills; an integrated knowledge base leads to faster retrieval of information; multiple perspectives lead to a more integrated knowledge base; an integrated

curriculum encourages depth and breadth in learning; it promotes positive attitudes in students; and it provides for more quality time for curriculum exploration (Lipson et al., 1993).

In many countries, interdisciplinary integration is frequently mentioned in programme documents, while practice shows that it is insufficiently implemented in schools. For example, in Slovenia curricula include a specific chapter on interdisciplinary integration that directs individual subject teachers on teaching subjects that can be interconnected and defining which teaching material from other subjects can complement their own subjects. Accordingly, in primary schools geographic and sports subject matter is incorporated into various curricula, and certainly interdisciplinary integration serves as an important basis for improving the quality of teaching in both subject areas. The study of landscapes, landscape processes and phenomena is inextricably linked to physical activity, and good physical fitness often forms the basis for quality fieldwork. Likewise, a number of outdoor sports activities are inextricably linked to environmental conditions, as well as being dependent on them, such that it is necessary for participants to have a basic knowledge of geographical features of the place where a certain activity takes place. In addition, many outdoor sporting activities (hiking, mountaineering, running, skiing, ski touring, climbing, sailing etc.) benefit from knowing and being able to interpret landscapes in a variety of ways, such that the appreciation of place is elevated, and the basic activity (in this case physical activity) is enriched (Ilc Klun et al., 2016).

The main aim of this paper is to present ways for integrating geography teaching and physical education in the field of mountain-oriented education (MOE), which follows the principles of education for sustainable development and environmental education. It emphasizes the interrelationships of mountain regions in general, and the Alps in particular, with society. MOE is about enabling Alpine youth to face present and future global challenges by means of capacity, competence and resilience building on the basis of the rich cultural and natural heritage of the Alps. Participation, action-orientation, self-determination, lifelong learning, identification with the Alpine environment as well as the integration of formal and non-formal education are the main principles which support the transformation of the education system and at the same time of the whole Alpine Space towards sustainability. Unfortunately, there is little awareness of the values and opportunities offered by the natural and cultural heritage of the Alps among young generations. Therefore projects such as YOUrALPS (Educating youth for the Alps: (re)connecting Youth and Mountain heritage for an inspiring future in the Alps) take up the challenge to bring together young people with the Alps. Thirteen project partners from six Alpine countries work together to give structure to the

field of mountain-oriented education and incorporate the values and knowledge of mountains and the Alps more fully in practices into educational curricula as well (YOUrALPS, 2017).

## **Methodology**

The research was done in three steps following the objectives set. Quantitative and qualitative analyses scrutinized the institutional/formal level (using Slovenian curricula as an example), the implementation level (teachers' work and attitudes – international survey), and, most importantly, the possibilities of cross-curricular integration in mountain-oriented education.

## **Results**

### ***Curricula Analysis***

We identified several opportunities in the curricula to draw connections between Physical Education and geographic subject matter, incorporated in the subjects Learning About the Environment, Social Studies and Geography. In particular, it can be seen that the two groups of subjects most closely interconnect when active teaching approaches and methods are used, but nevertheless we cannot ignore the theoretical content, such as knowledge of orienteering, concern for the preservation and appreciation of natural and cultural heritage, care for the environment and one's own health. Geography teachers can include sports content in all forms of teaching, including in class (classroom lessons, project days/activity days), as well as in the field (class excursions, fieldwork, sports days) and the same applies for teachers of physical education. The overall objectives of physical education comprise proper movement efficiency and the creation of a healthy lifestyle; the acquisition of skills that enable participation in various sports activities; understanding the usefulness of regular exercise and physical education, and their role in providing quality free time and the creation of positive patterns of behaviour. Through its objectives, contents and methods of work physical education contributes to the harmonious development of the young person. It aims to educate and teach him/her about the importance of a healthy lifestyle (Ilc Klun et al., 2016).

Regarding mountain-oriented content there are, with the exception of curricula, no official documents on MOE implementation in formal education in Slovenia, while cross-curricular planning is usually used in schools when planning project weeks and carrying out activities of natural, cultural, and technical days (Novak, 2005).

The geography curriculum highlights not only active teaching methods and approaches, but also the role of geography in the maintenance and enhancement of students' physical skills and abilities. Among the operational objectives for

compulsory geographic education, starting in grade six, and outlined in the geography curriculum, it is stated that students “exercise in a healthy and effective way in nature while undertaking field work and excursions” (Učni načrt. Program osnovna šola. Geografija, 2011, p. 8) in order to “orientate themselves using a map and move through the landscape” (ibid.), and that through geography lessons “[students] get to know the natural and cultural heritage of Slovenia and the importance of exercise in nature” (ibid.). Knowledge standards in the curriculum also state that students “care for their own health and healthy surroundings” (ibid., p. 22), emphasizing that geography teachers should encourage students to engage in active learning not just as part of school lessons but also when students study and learn independently.



**Photo 1: The rocky model of Mount Triglav as an object for interpretation of mountains (Photo: M. Ogrin)**

In the curriculum for physical education quite a lot of content can be found that sensibly and relevantly interconnects with the subjects Learning About the Environment, Social Studies and Geography. Particularly noticeable is the material dealing with Slovenian folk traditions as well as content linked to hiking. In primary school (6–15 years old) every year each student must participate in five sports days, two of which include hiking. The subject matter for sports days that include

hiking tends to focus on environmental characteristics of the hiking venue, including its geographical, historical and natural features, and includes hiking and orienteering using a compass and map (Učni načrt. Program osnovna šola. Geografija, 2011). The knowledge standards which students are expected to reach by the end of each three-year cycle also list connections to geographic content, specifically, that students at the end of the first stage should be able to “move along a marked trail” (ibid., p. 32). In the second three-year cycle, knowledge standards state “[students are] able to determine cardinal directions... act in accordance with the principles of environmental protection” (ibid., p. 34), and in the third cycle, “know how to orientate oneself with a map... is aware of conservation problems and actions that preserve natural and cultural heritage” (ibid., pp. 36–37).

Regarding mountain-oriented objectives, they are mostly included into geography curricula for primary and secondary schools. Of the mountainous regions all around the world (e.g. Rocky Mountains, Appalachian Mountains, Andes, Himalayas, Urals etc.), the Alps, being a part of Slovenian territory, are most frequently mentioned. Although the main emphasis is on knowledge concerning the physical and human-geographical elements of Alpine landscapes, the importance of fieldwork in geography teaching and the resulting didactic principle of direct observation are also emphasized.

### ***Teachers' opinions, attitudes and preferences***

We chose a qualitative method of gathering data through a questionnaire. The questionnaire included 18 questions of different types: 11 closed and 7 open questions. The survey was carried out in August 2017. An online questionnaire (1KA) was completed by 34 participants of the Alpine summer school organized in the frame of the YOUrALPS project. The respondents were mostly (90%) teachers in primary and secondary schools. A total of 22 women and 12 men were from the following countries: Slovenia (8), Austria (5), Germany (4), France (7) and Italy (10). 14 respondents (41%) were aged 45 to 54, 11 (32%) 34 to 44, 6 (18%) 55 to 64, 2 were 25 to 34 years and only one respondent was younger than 25 years. 77% of respondents had a Bachelor of Science or higher degree.

According to the respondents the most usable knowledge, ideas, methods etc. gained through the summer school, aimed at integrating different school topics/subjects for the purposes of mountain education, were the following: 1) to be able to understand the difference between information, interpretation and experimental learning; 2) to fully embrace the importance of outdoor learning and fieldwork; 3) to understand and feel how important experience, cooperation and motivation were; 4) to embrace the importance of networking among colleagues

and group work management. When teachers experienced the theory themselves through outdoor learning and fieldwork, they realized how important the suggested approaches might be for their students no matter which country or school system they come from.

The respondents were convinced that it was very important for young people to explore different territories and experiment with their elements, thereby enabling them to experiment and use the professional skills acquired during the course of studies. Through a cross-curricular approach in formal and non-formal education, we can encourage them to expand their mental borders. The survey revealed that this type of integration required – apart from extensive planning and cooperation among teachers – a high degree of teacher commitment, which worked well when there was high enthusiasm for the project.

***Cross-curricular integration and mountain-oriented education***

Our research shows that within different learning approaches and methods, physical education teachers and geography teachers can effectively integrate geographic and physical education subject matter in general as well as in the field of mountain-oriented education. Table 1 presents a few options that can be used for the cross-curricular integration.

**Table 1: Options for the cross-curricular integration of geography and physical education through the MOE perspective**

WHAT?	HOW?
Class lessons	In line with interdisciplinary integration of geographic content and physical education, teachers can prepare some simple physical/sports activities in the course of regular lessons in the classroom. Thus, for example, when learning about Alpine region(s) students may learn traditional dances of certain countries, teachers may also organize orienteering exercises using QR codes on the school grounds. Furthermore, the content in both courses also interconnects when it comes to attaining theoretical knowledge – learning about cultural and natural heritage, caring for the environment, taking care of one’s own health etc. Sporting performance of a region or country can often be talked about in geographical terms (for example, most mountaineers tend to come from Alpine or mountainous regions, Scandinavian and Alpine nations traditionally have good skiers, Canadians are good hockey players).
Class excursion	Teachers may plan a class excursion allowing students to acquire and consolidate geographical knowledge, while students on the excursion will also engage in a lot of physical activity/sporting activities (hiking

	in hills offering good views and potential for orientation; the bus should wait at a stop a bit further away so that students walk for a longer period and simultaneously meet the objectives of physical education, for example, building up endurance; at specific stops teachers can initiate a variety of physical/active sports and games). On excursions to particular mountainous/Alpine regions students can be introduced to and learn traditional dances, manners and customs that involve physical activity. In this way, students also learn about the cultural heritage of an area/region/landscape.
Fieldwork	Teachers can organize fieldwork that takes place in a mountainous/hilly/Alpine region and includes active learning methods (orientation during a treasure hunt, involving various physical/sports activities; taking various measurements – wind, path of the Sun, rainfall etc.).
Project days, activity days, sports days	During these days students and teachers can present varied geographic content (e.g. Alpine landscape, alpine/mountainous geographical phenomena), which teachers connect with physical/sports activities (climbing, mountaineering, mountain-biking, walking, skiing, cross-country skiing, skating etc.). There is also a strong focus on raising awareness about conservation of nature, landscape features and different ways of orientating oneself on maps and in nature.

Source: Ilc Klun et al., 2016; Resnik Planinc & Ilc Klun, 2016; Fridl & Resnik Planinc, 2016.

## Discussion

Factors that need to be considered in an integrated curriculum are as follows: common definitions of terms (such as theme, strand, or outcome); available resources; flexibility in scheduling; support services; subjects and concepts that will be integrated; links between integration and broader outcomes; curricular scope and sequence; how evaluation will occur; parent and community support; themes that promote the transfer of learning and connections and team planning time that is used to exchange information about content, students, special areas of teacher expertise, and teaching methods (Gehrke, 1991; Jacobs, 1989; Lipson et al., 1993; MacIver, 1990).

It is important that teachers avoid themes of convenience that have no meaningful, larger concepts when they select themes. While an individual teacher may or may not have expertise in each content area, members of teacher teams are able to work together to find connections that cut across single content areas (Lipson et



al., 1993). Themes that promote the linking of concepts and lead to deeper understanding are more effective. A theme is more than a series of activities; it is a way to facilitate student learning and understanding of conceptual connections. Activities that are arbitrarily connected are not helpful (Brophy & Alleman, 1991). Thus, an integrated curriculum is a means, not the end result. Poorly designed units do not achieve this end of deeper understanding and thorough learning. Each of these elements needs to be considered as teachers look at curriculum integration.

It is necessary for each school to determine the best procedure to meet the needs of the particular student body. A secondary school may face different constraints than an elementary school (Lake, 2014). Cross-curricular planning should not be based solely on content links in the function of motivation, upgrading, and linking existing knowledge with new, but also and above all within planned activities of learners through which they achieve so-called process or lifelong knowledge (Bevc, 2005, pp. 50–59).

Accordingly, we would like to propose some recommendations which are based on the curricula for geography (Učni načrt. Program osnovna šola. Geografija, 2011; Učni načrt. Program gimnazija... Geografija..., 2008), since these go furthest in terms of including objectives linked to mountain-oriented education. We suggest that teachers addressing themes related to mountains start by talking about the role of mountains in our daily lives. Following this they should make sure to continually motivate students and foster a positive attitude towards mountains/Alps and sustainable development. To this end, teachers can refer to the recommended activities which facilitate the achievement of goals relating to the development of positive attitudes towards mountains/Alps. Teachers are encouraged to individualize and differentiate approaches based on the specific characteristics of individual students. When introducing certain social topics, social sensitivity on the part of teachers can be important. Students should gather information about mountains/Alps using all their senses, while teachers should take into account their different cognitive abilities. They should be given the opportunity to participate in various projects, research activities etc. We recommend that teachers forge interdisciplinary or cross-curricular links and use information and communication technologies to facilitate the work of both students and teachers.

It is advisable to focus on personal experience and take into account experiences and ideas that students have encountered and developed in and away from school. Their ideas and experiences could be a starting point in lesson planning. Lessons should be organized so that students can discover new knowledge and skills through concrete activities carried out in a way they can relate to. Teachers should also encourage them to reflect on how they learned something. Students should

develop attitudes and values, learn effective problem-solving strategies and communications capabilities as well as how to critically gather and assess information. Teachers should put great emphasis on interconnectedness and interaction between the individual elements.

Teachers should devote special to helping students obtain and master social skills and abilities (e.g. taking responsibility, teamwork, understanding and respect for diversity, care for oneself and others, developing habits that help individuals live in a community, development of decision-making capacity and ability to express opinions, emotional self-control) and help them to develop core values and critical thinking (e.g. posing questions, engaging them in research, defining concepts and problems, investigating the evidence for a specific thesis, analysing assumptions and attitudes about individual conclusions, allowing for different interpretations, facilitating openness, etc.) attention (Učni načrt. Program osnovna šola. Geografija, 2011; Učni načrt. Program gimnazija... Geografija..., 2008). It is essential to avoid emotional closure and excessive simplification.

### **Conclusion**

Students should learn that people through their everyday decisions and behaviours influence the natural and social environment. A deeper understanding of our relationship with the environment and having more detailed knowledge about the effects our actions have on the environment are essential for students' futures and for the future of society. Evaluations of everyday practices and decisions of people within the school community, hometown, home municipality, Slovenia and elsewhere should also include an evaluation from the perspective of mountains/Alps and sustainable development.

Lake (2014) believes that movement from a traditional, subject-specific curriculum to an integrated curriculum should not happen in one sudden sweep, since schools find more success when they make gradual changes, making sure that everyone involved feels a sense of ownership of and commitment to the changes. Being more and more involved in integration, teachers find that they see connections that they had not seen initially. "As teachers see these connections and develop learning experiences and assessments built around the connections, students also understand them" (Lake, 2014, p. 13). This understanding leads to learning that is more successful, complex, permanent and sustainable. Consequently, we will educate the individual to be capable of critical judgment of impacts and of critical argumentation of the future consequences of today's actions, habits, and lifestyles.

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# Are Czech students of teacher training prepared for interdisciplinary teaching?

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## **Abstract**

In accordance with the changes in the Czech curricular documents, there is increasing pressure to strengthen cross-curricular links. While the problematics of cross-curricular cooperation began to be solved abroad in the 1980s and is actually implemented in a number of countries, in the Czech environment it has been the topic of professional discussions of the last few years and its implementation is hindered by a number of barriers. At the same time, there is a lack of research in the Czech environment to capture the implementation of cross-curricular education or its comparison in an international context. Klein and Newell (1998, p. 3) consider the interdisciplinary approach as “a process of answering questions, solving problems or topics that are too broad or complex to be appropriately addressed by a single discipline”, notwithstanding that “interdisciplinary studies are based on disciplinary perspectives and integrate their knowledge through the development of a more complex perspective”. Since interdisciplinarity remains often an underestimated concept in the Czech environment, the first partial aim of the paper is to introduce the possibility of integration of partial geographic and other professional disciplines through the topic of “movement”.

In order for the interdisciplinary cooperation to be more applied by teachers at schools, their training needs to be taken already in the course of study. In order to determine whether future teachers are able to implement this form of teaching, an investigation has been carried out with students of the follow-up master’s studies for primary and secondary school teachers by a method of free writing on pre-assigned questions. Due to the qualitative nature of the students’ answers, their answers were coded and subsequently analyzed. The second part of the paper is to evaluate the results of the survey with the students in which they express their opinion on the preparation for the cross-curricular education.

**Key words:** interdisciplinary cooperation, transdisciplinary cooperation, geographical thinking, student, free writing

## Introduction

In keeping with changes to Czech curricular documents, by which we mean, for example, the classification of subjects into educational fields or the integration of so-called cross-cutting topics, ever increasing pressure is being placed on the strengthening of interdisciplinary relationships (Hofmann, Vodová 2017). Abroad, the issue of interdisciplinary cooperation has been tackled since the 1970s and 80s (see Hayes Jacobs 1989; Fairbairn & Fulton 2000; Tabulawa 2017) and is actually applied in a number of countries (e.g. Australia, Botswana, Denmark, etc.). Hayes Jacobs (1989, p. 8) describes it as *“...a knowledge view and curriculum approach that consciously applies methodology and language from more than one discipline to combine a central theme, topic, issue, problem, or work.”* In the Czech environment, interdisciplinary cooperation has been the subject of expert discussions (Podroužek 2002; Hejnová 2011; Slavík, Janík, Najvar & Knecht 2017) for the past several years, including the implementation of several examples of integrated teaching projects (Hofmann 2003; Hofmann et al. 2011) and projects with this theme (Svatoňová, Hofmann et al. 2012), while it also occurs in the didactics of individual subjects (Janás 1985), but its comprehensive realisation and implementation into the curricula of primary and secondary schools continues to hit a number of barriers.

Interdisciplinary relationships have been and are grounded most in the teaching of lower primary school pupils, where pupils learn the foundations of natural and social sciences in the subjects of basic science, national history and natural science. The current curriculum puts these subjects into a wider educational field entitled “Humans and Their World”. The curriculum in the Czech Republic in the form of Framework Educational Programmes has also set strengthening interdisciplinary relationships at upper primary schools and secondary schools as one of its aims. This is manifested in the fact that individual subjects are grouped together into educational fields, where “Humans and Nature” comprises the subjects of physics, chemistry and geography, while the field “Humans and Society” combines the subjects of civic education and history. While at lower primary schools, integration also manifests itself in textbook creation, where basic science, natural science and national history textbooks comprise knowledge of both natural and social sciences, Czech textbooks for upper primary schools and secondary schools remain single-subject. The only exceptions are textbooks from the publisher FRAUS (published in 2005), which issues a range of thematic exercise books where interdisciplinary relationships can be applied. The topics of these textbooks are: Energy, Water, Soil, Weather and Climate, and Information Technology. As part of the project “Integrated Natural Science” (Svatoňová, Hofmann et al. 2012), thematic textbooks

were created for teaching at primary schools in the South Moravian Region, examining topics devoted to “Humans and Their Contemporary Lives”. These are: “We Travel by Car”, “The Household – A Small World”, “The Town and the Countryside”, “The Tailor Makes the Man” and “Robinson Crusoe Today”. No such textbooks or thematic exercise books exist in the Czech Republic for secondary schools.

### **Aims and Methods**

As yet, the Czech environment lacks research into the implementation of interdisciplinary teaching or a comparison of such teaching in an international context. Klein & Newell (1998, p. 3) define an interdisciplinary as “a process of answering a question, solving a problem, or addressing a topic which is too broad or complex to be dealt with adequately by a single discipline”, regardless of the fact that “interdisciplinary studies draw on disciplinary perspectives and integrates their insights through construction of a more comprehensive perspective”. Since interdisciplinarity often remains an undervalued concept in the Czech environment, **the first partial objective of the paper is to present possibilities for integrating partial geographical disciplines and other expert disciplines through the topic of “exercise” both in a direct and indirect form.**

In order for interdisciplinary cooperation to be more applied by school teachers, professional training is essential as part of their university studies, ideally including model implementation at a primary school. To determine whether future teachers are capable of implementing this form of teaching, 24 students on a master’s study course for teaching at upper primary schools participated in research conducted by way of free writing to pre-set questions. The free writing method is a brainstorming method where, for several minutes, respondents write down anything that occurs to them on the particular topic in full sentences. The aim is to write down as many ideas, opinions, experiences etc. as possible. It is especially used in the evocative stage, where pupils/students realise what they already know about the discussed topic.<sup>6</sup> Due to the qualitative nature of the students’ answers, their answers were coded and subsequently analysed and interpreted. **The second partial aim of the paper, therefore, is to evaluate the results of the research with the students, in which they express their opinion on preparation for interdisciplinary teaching.**

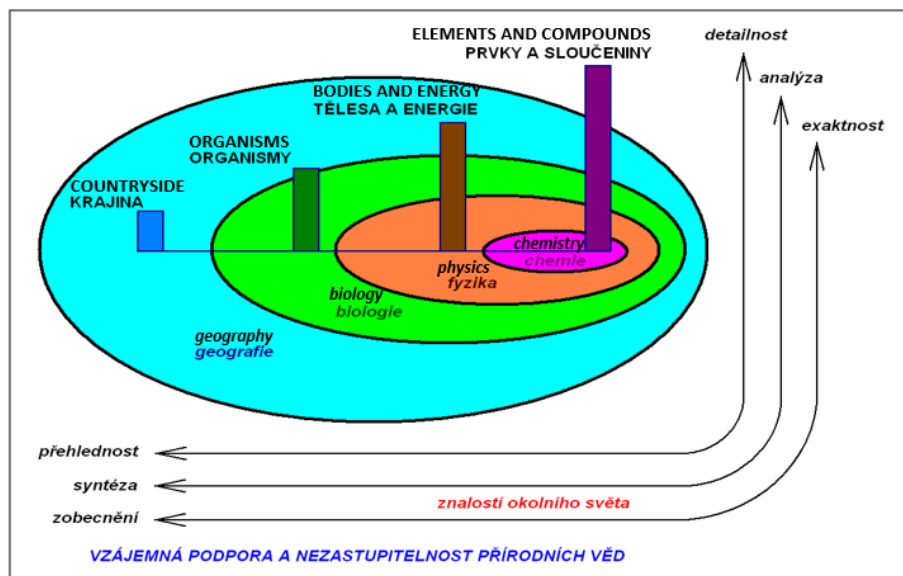
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<sup>6</sup> Free writing. Framework Educational Programmes methodological portal. URL [http://wiki.rvp.cz/Knihovna/1.Pedagogick%C3%BD\\_lexikon/V/Voln%C3%A9\\_psan%C3%AD](http://wiki.rvp.cz/Knihovna/1.Pedagogick%C3%BD_lexikon/V/Voln%C3%A9_psan%C3%AD) [3. 6. 2018]

## Results

### *Exercise as a Possible Theme for Integrating PE and Geography*

Given its complexity and overlap into other fields, geography is often criticised for “robbing” other scientific branches. We believe that this is not the case and that today the contrary is true. Geography is an intelligent borrower and “integrator” of science subjects in particular, but also of history, civic studies, physical education and other subjects. Above all, geographers have to know what to look for from other branches and what extent of knowledge and skills is needed from them in order to achieve optimal solutions to problems which exist in the real landscape.



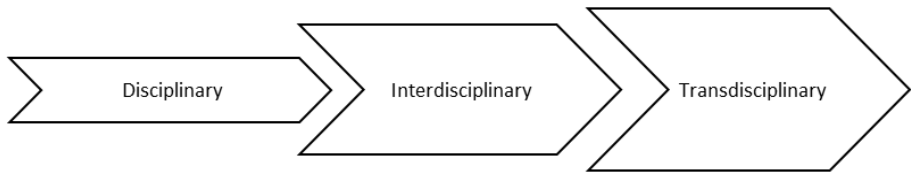
**Fig. 1: Position of geography in the system of natural sciences**

Source: Kolečka, 2008

According to the concept of authors Slavík, Janík, Najvar & Knecht (2017), teaching can be divided between **branch (disciplinary)**, **inter-subject (interdisciplinary)** if we consider the cooperation of two subjects, **and transdisciplinary** in the event that a teaching strategy exceeds even interdisciplinary dimensions. **Transdisciplinarity** connotes a research strategy that crosses many disciplinary boundaries to create a holistic approach. It applies to research efforts focused on problems that cross the boundaries of two or more disciplines. The transdisciplinary concept of fieldwork can be identified with the concept of integrated teaching, which



constitutes an “**interconnected**” model, ideally linked to disciplinary and interdisciplinary activities. Podroužek (2002) adds that integrated teaching interconnects content from the curricula of various subjects in a single thematic educational unit aiming to provide comprehensive knowledge which is useful for practical life.



**Fig. 2: Separating Teaching from Disciplinary to Inter- and Transdisciplinary**

Source: the author in accordance with Slavík, Janík, Najvar & Knecht (2017)

In the case of geography lessons, part of which should ideally take place in the field (fieldwork), Dymnt & Potter (2015) or Potter & Dymnt (2016) ask themselves the following questions: “*Is outdoor education a discipline? Can ‘nature’ alone be enough of a worldview or paradigm to warrant outdoor education being a stand-alone discipline?*” According to these authors outdoor education as a prospective **discipline** is the role, power and potential of the natural environment and the relationships between humans and nature that stand to be formed. These questions can also be asked about geography education itself. We can approach geography education, including fieldwork, as an independent discipline with regard to its methodology. Its content, however, exceeds the bounds of a separate discipline (see above), and so we can speak about an interdisciplinary teaching concept. This concept of interdisciplinarity can be applied to geography fieldwork with a dominant focus on one school subject (in this case geography) with the support of exercise, which is always part of fieldwork in an unstructured form.

Integration with physical education (exercise) can be primarily implemented by means of outdoor (field) activities, which are common to both of them. Mutual relationships between geography and physical education may be **direct** and **indirect**.

Among direct relationships we can include activities where exercise or geographical skills are consciously included in geography or PE. For instance, in geography lessons we can apply a faster walking pace or running when moving in the field. In PE, we can also move around following a map or a compass. Above all, it is

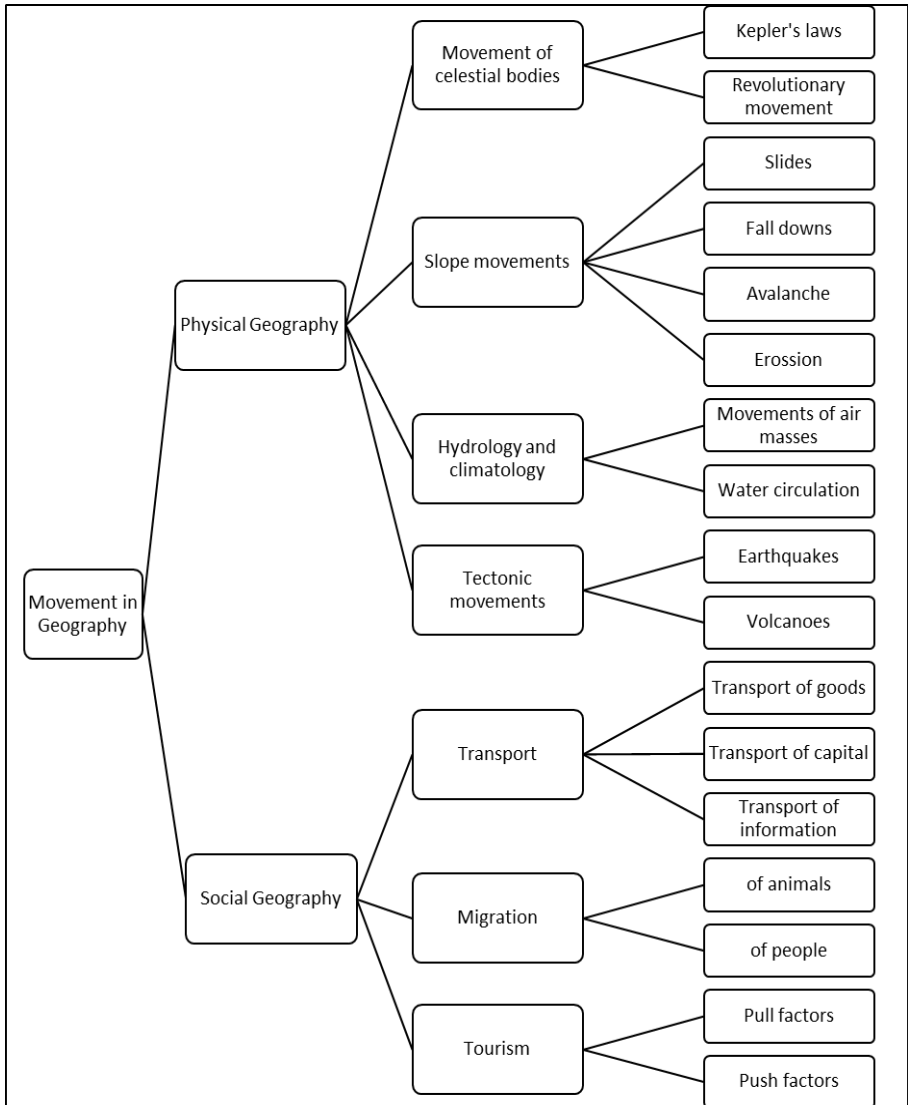
important that this exercise is not a priority for the particular activity and that students do not always even realise it.

Indirect relationships include, for example, practising various skills which will serve as exercise or for practising geography knowledge and skills later. From the point of view of geography, this may include choosing a suitable place for an exercise course, by which we mean selecting a place for various exercise activities. Preparation of maps for orientation in the field (e.g. maps for orienteering, handling a GPS station etc.). As regards PE, this will include, for example, the development of various physical skills, primarily different types of trekking.

The significance of fieldwork is described, for example, by Bierle & Singletary (2008) or Farmer et al. (2007). Dechano & Shelley (2004) present examples of applying sporting activities in geography lessons, while possibilities for using physical games in geography education are summarised by Buriánková (2008). Their work is followed up by Posejpal (2012), who also ascertained an extent and specific form of integration of physical education with geography topics in Czech primary and secondary schools. Various forms of geography fieldwork, primarily concern collecting data from field research. This is carried out in various places, where students use different kinds of exercise depending on the kind of landscape and data which they are collecting.

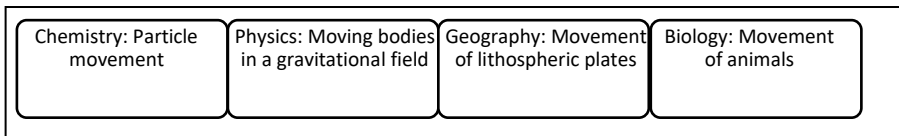
### ***Exercise as a Possible Theme for Transdisciplinarity***

As an indirect element, exercise may be introduced between geography and other sciences or humanities. Exercise can be **a unifying element of the thematic integration of the field itself** – see fig. 3, or also **individual subjects** – see fig. 4.



**Fig. 3: Movement as an integrative theme in geography teaching**

Source: Hofmann & Vodová 2017, adapted by Svobodová, 2018



**Fig. 4: Movement as a (horizontal) integrative theme in the teaching of science and humanities**

Source: authors

A barrier to horizontal integration however, is the Framework Education Programme, which is divided into individual fields where it is relatively difficult to find an integration element. Furthermore, the curricula studied in individual years of various subjects (science/humanities) often do not correspond. It is difficult, for example, to combine the origins of life on Earth, a subject studied in earlier years of biology and geography with physics, which is first taught in the 7th year, and chemistry, which is taught from the 8th year, cannot be involved from the beginning. Integration is therefore prevented by a “pigeonholed” Framework Education Programme. A particular barrier to vertical integration is the fact that the curricula of lower and upper primary schools, and often even the curricula of individual subjects, do not follow-on from one another to a great extent.

#### ***Training of Future Teachers in Implementing Interdisciplinary Education***

Students in teacher training for upper primary school for various combinations of subjects were asked three questions concerning the topic of interdisciplinary cooperation. **The first question ascertained whether students are prepared for implementing interdisciplinary education. How does potential training take place?** Only 6 students stated that students are prepared for interdisciplinary teaching. Some of them then stated that interconnection is automatic for students combining geography and biology, because certain topics such as fauna, flora, soil or climate merge within biogeography, ecology and even geology. Another student saw a connection between geography and history, as well between geography and chemistry or physics. Only one student revealed interdisciplinary teaching within the subject of “Integrated Fieldwork” which the students had taken less than a year before. The remaining 16 students stated that they are not sufficiently prepared for interdisciplinary teaching.

**The second question asked the students to specify barriers to the implementation of interdisciplinary cooperation in teaching.** Students of teacher training for upper secondary schools particularly saw the following as barriers to the implementation of interdisciplinary cooperation/teaching at pedagogical faculties: non-cooperation between individual faculties (8 responses), where in the case of some study

combinations, students even found cooperation hard to imagine (for example interconnecting geography and Czech language). Another significant obstacle is the scope and content of the curriculum which “must be passed on” and its excessive depth and expertise. There is no time left for interdisciplinarity (4 responses). Time demands for implementation (2 responses), insufficient preparation, or unwillingness of teachers were also perceived as barriers.

**The final question aimed to find out whether students think that interdisciplinary cooperation ought to be used in teaching more.** In 17 cases, students answered in the affirmative and commented on their answer further. Students in teacher training for upper primary school see the following in particular as incentives for including interdisciplinary teaching in both teacher training and primary school education:

#### **A) Support for Pupils’ Thinking in Context**

*“life isn’t just a single field, it’s important that part of education takes and interdisciplinary direction”*

*“interdisciplinary cooperation is extremely important... pupils receive information in context and are able to connect knowledge from multiple fields”*

*“the interconnection of subjects and use of interdisciplinary relationships is key in today’s education system... information and awareness are often so isolated that pupils cannot think in context and apply their skills, awareness and knowledge outside a given subject”*

*“pupils have to think about things and combine various matters and information”*

*“we live in an interconnected world where knowledge from one field is not enough. Everything has to be perceived in context”*

*“a general overview and thinking in context which does not close them in a “box” defined by their own field”*

*“thinking in a wider context... it is good to make these overlaps because students remember better if facts fit into some sort of continuity in context and can look at an issue in general”*

*“components which, if we put them together, work together in a certain manner... pupils should know that everything is connected in some way and why that is... and this can teach them understanding in context”*

*“the overwhelming majority of teaching focuses on learning facts, dates and terminology, rather than at least partially explaining relationships, causes and effects etc.”*

**B) The power of cooperation**, or the joint education of teachers from multiple branches (known as team teaching) and the strength of geography as an “interconnector” of other subjects

*“geography is so specific and draws on many other various fields, to which it gives continuity thanks to their position where they cross paths within it naturally, even without interdisciplinary relationships... geography interconnects the majority of school subjects and can be interconnected with virtually all primary school subjects”*

*“in geography, you touch on every field at least partially... (pupils) are taken deeper into a given issue and can better understand the cause and effect”*

*“when pupils encounter information a number of times and from multiple teachers... “The more often pupils hear something, the better they remember it”*

*“there is strength in cooperation”*

### **Conclusion**

The issue of exercise can serve as a topic for both the horizontal and vertical integration of subjects. We can transfer exercise to physical activities which are reflected in the pressure to lead a healthy lifestyle which all school subjects should cross-sectionally encourage (Hayes Jacobs 1989:16, Bugge & von Seelen, 2017:21).

Unfortunately, the Czech education system is not fully prepared for integration, whether in terms of the training of future teachers, or support for these by way of curricular documents. The Czech educational system focuses more on individual branches which have been atomised due to deepening knowledge and are relatively difficult to integrate in the contemporary age. One of the ways of integration, which is currently most frequently used, is project education. In this case, teachers should be aware of the overlap and replenishment of thematic units and take this fact into account when compiling thematic plans and study programmes.

Another path is quality teacher training, while a third path is offered by team teaching. This, however, hits the barrier of teachers’ capacities and the impossibility of paying two or more equal teachers for one lesson. Good-quality integrated textbooks also offer a possible path to integration. A possible model could be textbooks produced in France (Hachette Book Group) which integrate education of geography and history. Although these stand as separate subjects, they cover a partial curriculum together, a fact which is supported by the uniform graphics of the textbooks. In addition, cartography skills are applied when working with historical maps in history lessons. In the same way, civic education or science subjects can be integrated naturally.

The preparation of future teachers for interdisciplinary cooperation is also not ideal. Didactics of individual subjects are taught, but today's university study programmes do not have space for integration. The aim of pedagogical faculties should be to prepare students for the future role of qualified and open teachers. Teachers who are able to communicate with their colleagues and to participate in the creation of a joint curriculum which aims to teach pupils primarily to think in context. Partial integration only takes place in the training of future lower primary school teachers, where teachers act as natural integrators. In the training of upper primary school teachers, we encounter the already mentioned pigeonholing of branches. It appears that, if the Czech education system does not receive a new impetus for innovation, e.g. through a prepared revision of Framework Education Programmes, the issue of integration is likely to remain merely the subject of expert discussions.

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# Elementary Education curricula in the Czech Republic and the Republic of Slovenia – Physical Education and Geography integration

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## Abstract

This paper aims to address the lack of international knowledge and research in interdisciplinary teaching and curriculum development, especially when it comes to the subjects of Physical Education and Geography. The authors analyse and compare elementary school curricular documents from two countries, the Czech Republic and the Republic of Slovenia, to reveal how integration of Physical Education and Geography is embedded at the policy level in the selected countries.

**Key words:** cross-curricular integration, Czech Republic, Republic of Slovenia, geography, physical education

## Introduction

In the pedagogical and didactic fields, interdisciplinary cooperation is one of the main topics that both professionals and teacher-practitioners discuss and write about. This means that interdisciplinary cooperation is increasingly making its way into schools. Hayes Jacobs (1989) describes it as “...a knowledge view and curriculum approach that consciously applies methodology and language from more than one discipline to combine a central theme, topic, issue, problem, or work”. As the debates about interdisciplinary cooperation can differ in different countries according to actual settings of school curricula, the following text presents views and ideas of Czech and Slovene authors contributing to the discussion.

Even though many teachers, teacher educators, curriculum developers, and some politicians see interdisciplinarity as an important issue, there is a lack of knowledge and research concerning the international comparison of curricular documents and outcomes, especially when it comes to the subjects of PE and Geography.

## **Aims of the study**

The aim of this international study focuses on an analysis of the Czech and Slovene elementary school curricular documents (ISCED 1, 2) for PE and Geography and a comparison of the interdisciplinary cooperation between the two subjects in the analysed curricula.

## **Methodology**

This study is based on comparative research in educational sciences (Noah & Eckstein, 1969; Bray & Thomas, 1995; Manzon, 2011) and in physical education and sport (Brandl-Bredenbeck, 2005; Howell, Howell, Toohey & Toohey, 1979). The selection of the countries was motivated by their membership to the international network C.A.L.M.A.Z, but also by differences between the countries (different historical and cultural traditions, state systems, economic development, language, geographical indications etc.) and similarities – both countries have recently introduced changes in schooling involving a modernization of the curriculum, including PE and Geography.

As regards the selection of research methods, the structure of the curriculum as described by Keeves & Adams, (1997) was taken into consideration. The authors describe three forms – intended, implemented and achieved curriculum. As for the intended curriculum the core of the study was based on an analysis of the curricular programmes for PE and Geography and a comparison of the outcomes. The research methodology builds on the classic comparative research methodology proposed by Bereday (1964), which comprises the following steps – description, interpretation, juxtaposition and comparison.

## **Results**

### ***Description***

#### *Curriculum documents analysis*

Since the curriculum documents differed in number and length, those sections in the documents that related directly to PE and Geography were identified.

The following documents which constituted the set of primary sources were compared:

The Czech Republic:

- Framework Educational Programme for Elementary Education (FEP EE, 2016).
- Educational Standards for Elementary Education – Physical Education. (2013).
- Educational Standards for Elementary Education – Geography. (2013).

## The Republic of Slovenia:

- Učni načrt Družba, 2011. Republika Slovenija, Ministrstvo za šolstvo in šport, Zavod RS za šolstvo, Ljubljana (Social Studies Curriculum/Primary School)
- Učni načrt Geografija, 2011. Republika Slovenija, Ministrstvo za šolstvo in šport, Zavod RS za šolstvo, Ljubljana (Geography Curriculum/Primary School)
- Učni načrt Spoznavanje okolja, 2011. Republika Slovenija, Ministrstvo za šolstvo in šport, Zavod RS za šolstvo, Ljubljana (Learning about the Environment Curriculum/Primary School)
- Učni načrt Športna vzgoja, 2011. Republika Slovenija, Ministrstvo za šolstvo in šport, Zavod RS za šolstvo, Ljubljana (Physical Education Curriculum)

In order to determine which learning content from PE and geographical subject matter can connect, interact and complement each other, we performed an analysis of the Sloven (Učni načrt..., 2011) and Czech (FEP EE, 2016) curricula documents. We analysed the operational and overall learning objectives, along with knowledge standards and didactic recommendations, in order to determine in which areas teachers can better integrate subject matter. As there is not enough space in the magazine paper, we present only an example of the juxtaposition of operational objectives and content for interdisciplinary connection between PE and Geography.

**Table 1: Operational objectives and content for interdisciplinary connection of sport – geography in the subjects Physical Education – Geography, Grades 6 to 9**

THEMATIC MODULE GEOGRAPHY	THEMATIC MODULE PHYSICAL EDUCATION	OPERATIONAL LEARNING OBJECTIVES FOR GEOGRAPHY	COURSE MATERIAL <sup>7</sup> FOR PHYSICAL EDUCATION
ORIENTEERING AND SURVEYING THE EARTH'S SURFACE (GRADE 6)	HIKING	Orientate oneself and move through the environment using a compass and a map.	The pace of walking, replacement of lost fluids and thermoregulation. The effects of walking on the human body. Environmental protection, concern for the conservation of natural and cultural heritage. Safety in the mountains. Providing first aid for abrasions, wounds, blisters, contusions (swelling) and insect bites, protection against insects. Emergency responses. Navigating with a map.
LET'S USE THE KNOWLEDGE: A CLASS EXCURSION (GRADE 6)		Visit at least one natural geographical unit of Slovenia (an interdisciplinary excursion); Learn about the beauty and geographical diversity of Slovenia through excursions and fieldwork; Learn about the values and the uniqueness of the Slovenian landscapes, develop a love and respect for Slovenian natural and cultural heritage and a sense of belonging to Slovenia.	

<sup>7</sup> Operational objectives for the subjects Learning the Environment and PE are defined in different ways, thus cross-curricular connections are found by comparing the objectives of Learning the Environment with PE's learning material OR operational objectives. Where connections were determined using operational objectives, it is expressly indicated.

SUBALPINE REGIONS (GRADE 9)		Describe efforts and measures taken to conserve natural and cultural heritage.	
ALPINE REGIONS (GRADE 9)		Describe efforts and measures taken to conserve natural and cultural heritage.	
DINARIC KARST REGION (GRADE 9)		Using the Postojna Cave as an example, students present the efforts and measures taken to conserve natural and cultural heritage.	

Source: Učni načrt Geografija (Geography Curriculum) 2011; Učni načrt Športna vzgoja (Physical Education Curriculum) 2011

### *Questionnaire survey*

The data collection gained from the analysis of curriculum documents were complemented with questionnaire surveys of experts in PE and Geography from both countries. Two experts from each nation agreed to participate in the data collection – one expert for PE and one for Geography. All of them are academics (mainly associate or assistant professors) at quality universities. All respondents received a general information letter (e-mail) and the following qualitative semi-structured, open-ended questionnaire. Their task was to describe the situation of PE and Geography in their country, with a particular focus on ISCED 1 and 2<sup>8</sup>, according to the questions shown in table 2.

### **Interpretation**

The goal of this phase of comparative research is to thoroughly describe the material and understand the connections to the research problem; for example, Holmes (1981, p. 61; see also Noah & Eckstein, 1969) asserts that a valuable

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<sup>8</sup> The authors had a text delivery deadline on June 2016. The first papers varied somewhat in quality and structure. We decided that the answers had to undergo careful revision and comparison with the content of the descriptive chapters. The main goal was to guarantee comparability between statements from different countries.

descriptive study is prepared with a clear problem in mind, which allows for the collection of relevant data and subsequently for comparison. Thus, we compared chosen contextual factors, namely the specifics of the school systems in the Czech Republic and the Republic of Slovenia using codes taken from existing research (deductive coding) as well as new codes (inductive coding) which we present in Vlček's, Planinc's, Svobodová's, Witzel Clausen's et al. (2016) monograph before we started to analyse and compare curricular documents in detail.

As Hendl (2008, p. 223) observes, "a qualitative analysis aims at a systematic, non-numerical data organization whose goal is to reveal topics, patterns, characteristics and relations". The purpose of a qualitative analysis is not to identify the distribution of a phenomenon, but to adduce convincing evidence for its existence and its particular structuring. Hence, the analytical tools used in this research did not rely on quantification, but on creating semantic categories and their description, employing primary and secondary content analysis.

### **Juxtaposition**

**Table 2: Juxtaposition of the questionnaire survey**

<b>PHYSICAL EDUCATION</b>			
<b>Czech Republic</b>		<b>Slovenia</b>	
<b>PE</b>	<b>Geography</b>	<b>PE</b>	<b>Geography</b>
<b>Structure of the educational system</b>			
What is the compulsory age for children to attend school in your country?			
6–15		6–15	
How many compulsory classes shall be held for one week at certain school levels?			
<i>All grades: 2 classes / week</i>	<i>Grades 1–3: "Prvouka" 2–3 hrs/week, Grades 4–5: "Vlastivěda" 1–2 hrs/week, Grades 6–9: Geography: 2-2-2-1 hrs/week</i>	<i>Grades 1–3: 3 classes / week, Grades 4–6: 3 classes / week, Grades 7–9: 2 classes / week</i>	<i>Grades 1–3: Environmental studies, 3 hrs/week, Grades 4–5: Social studies: 2 hrs/week, Grade 6: Geography 1 hr/week</i>
For which of these school levels do you have specific curriculum in your country?			
<i>2 curricula: Elementary school Grades 1–5 Elementary school Grades 6–9</i>	<i>Elementary school Grades 1–5 Elementary school Grades 6–9</i>	<i>There is only one curriculum for PE, covering all nine years of elementary school. It is divided into three parts: Elementary school:</i>	<i>Environmental Studies Curriculum (Grades 1–3) Social Studies Curriculum (Grades 4–5)</i>

		<i>Grades 1–3, Elementary school: Grades 4– 6, Elementary school: Grades 7– 9</i>	<i>Geography Curriculum (Grades 6–9)</i>
What is the current political situation of the subject at school in your country?			
<i>Long tradition. Discourse about launching third class a week. Academic discussion about changing health oriented goals toward physical literacy.</i>	<i>“Stealing” of geography curriculum by other subjects (environmental education, biology, civics, history, ... ).</i>	<i>Nowadays in a rather good position.</i>	<i>As a subject Geography is rather well positioned in the school system although there are sometimes the aspirations to combine geography content with some other subjects.</i>
Have there been any educational reforms done in the last 5 years or are there any going to be the following years?			
<i>2004</i>		<i>2007–2008</i>	
Which are the most urgent problems of the subject?			
<i>Congruence (fidelity) of curricula levels. Low acceptance of new curricula.</i>	<i>Descriptiveness, encyclopaedic learning, lack of practical use – fidelity.</i>	<i>Implementation of the modern educational trends</i>	<i>Beside implementation of the modern educational trends, no urgent problems.</i>
<b>Formal issues of the curriculum (asked for both elementary and secondary school)</b>			
What is the name of the subject?			
<i>Physical (body) education</i>	<i>Prvouka – vlastivěda – zeměpis (Elementary studies – Geography – Geography), Grades 1–3: “Prvouka” (Elementary studies), Grades 4–5: “Vlastivěda” (Geography), Grades 6–9: “Zeměpis” (Geography)</i>	<i>Physical education</i>	<i>Grades 1–3: “Spoznavanje okolja” (Environmental studies) Grades 4–5: “Družba” (Social studies) Grades 6–9: “Geografija” (Geography)</i>
When did the current core curriculum enter into force?			

2004		2011	
Who is responsible for the elaboration of the curriculum?			
<i>National Institute for Education led by Ministry of Education, Youth and Sport</i>		<i>Ministry of Education, Science and Sport</i>	
How centralized or decentralized is your curriculum? (e.g. national level, regional level, school level,...)			
<i>Decentralized: The Framework Education Programme (national level) → The School Education Programme</i>		<i>Centralized on national level.</i>	
What is the structure of the main curriculum and what are the main thematic chapters?			
<p>1) Health enhancing activities.</p> <p>2) Skills enhancing activities.</p> <p>3) Activities enhancing physical activities learning.</p>	<p><i>For Geography 9 thematic units (3 of them contain geography):</i></p> <p><i>Grades 1–5: thematic unit “Man and his world”,</i></p> <p><i>Grades 6–9: thematic unit “Man and nature” contains “Planet Earth, Regional geography of continents, Geography of the Czech Republic and general physical and human geography and cartography”</i></p>	<p><i>Grades 1–3: ABC of athletics, ABC of gymnastics, natural movements, ball games, dance games, outdoor activities, swimming.</i></p> <p><i>Grades 4–9: athletics, gymnastic with rhythmic gymnastics, dancing, volleyball, football, handball, basketball, outdoor activities.</i></p>	<p><i>Grade 6: Planet Earth</i></p> <p><i>Grade 7: Regional Geography of Europe and Asia</i></p> <p><i>Grade 8: Regional Geography of Africa, Australia and Oceania, America and Polar regions</i></p> <p><i>Grade 9: Geography of Slovenia</i></p>
What is/are the key concept(s) that your curriculum is referring to? (e.g. for PE: physical literacy, fundamental movement skills, health education, sports education. For Geography: place, local-global perspectives, interaction of man and nature, ...).			
<p><i>PE was embedded in the educational area related to health promotion. The Current concept of Czech PE is not accepted unievrally by the teachers. According to the</i></p>	<p><i>Recent unsuccessful attempts to understand processes in nature.</i></p>	<p><i>The overall objectives of PE in elementary program: Proper movement efficiency and the creation of a healthy lifestyle. The acquisition of skills that enable</i></p>	<p><i>Geography helps to acquire knowledge, abilities and skills, which can help them to understand the environment.</i></p>



<p><i>latest educational programmes a wide variety of physical activities concerning especially health goals should be used in the PE classes.</i></p>		<p><i>participation in various sports activities.</i>  <i>Understanding the usefulness of regular exercise and PE, and their role in providing quality free time.</i>  <i>The creation of positive patterns of behaviour.</i></p>	
<p>Is the curriculum rather content based or outcome based?</p>			
<p><i>Both content and outcome-based</i></p>		<p><i>More content than outcome based</i></p>	
<p>Does the curriculum define any standards? If yes, in what sense? (you can show an example)</p>			
<p><i>Standards are formulated in a form of expected outcomes; expected outcomes are developed into indicators. There are also separate standards defined for all subjects.</i></p>		<p><i>Standards are formulated in a form of expected outcomes.</i></p>	
<p>Is there any quality control system monitoring the implementation of the provisions of the curriculum? If yes, who is responsible and how is it organized?</p>			
<p><i>Czech school inspection should monitor teaching at schools and implementation of curricula. Though, implementation of the curriculum is not monitored in reality.</i></p>		<p><i>Teachers are obliged to follow the curriculum of the subject they teach. The headmasters can (whenever they decide so) participate during their lessons and check their materials. All that can be checked by school inspectors.</i></p>	
<p>In how far is it possible to detect any difference between the prescribed curriculum and the curriculum implemented in the field?</p>			
<p><i>A low congruence between the projected and realised curricula, which presents a significant problem for the quality evaluation of the subject.</i></p>	<p><i>Teachers do not understand the goals of the reforms or do not want to implement them because it is easier to teach in old, used ways than to implement new things.</i></p>	<p><i>Teacher is obliged to follow the curriculum and to fulfil all its written goals. Teachers should present a written preparation for each lesson. Through lessons preparations, written and oral exams' results of teacher's students, results of final exams on national level the implementation can be checked.</i></p>	
		<p><i>In reality by PE teachers a lot of written goals aren't</i></p>	<p><i>The prescribed curriculum is</i></p>

		<i>realized, which is an important problem for the quality of PE.</i>	<i>implemented in the field</i>
<b>Objectives, content and assessment issues of the curriculum</b>			
Which are the main general objectives defined in the curriculum?			
<i>General objectives of PE in CZR are all concerned with health issues.</i>	<i>Geographical thinking about man and nature, environment, use of energy... – exploration of facts, processes and their context, using various methods of cognition.</i>	<i>PE is directed to pupils' primal needs for exercise and play, personalized development of movement and functional abilities, acquisition of the many and various motor skills and sports knowledge and emotional and rational perception of the sport.</i>	<i>Knowledge and understanding of space, natural and socio-economic systems on Earth, processes in home region, the country and the world in terms of temporal changes.</i>
<p>Do the following development areas appear in some way or another in the curriculum?</p> <p>For example, for PE: forming physically literate individuals; educating children to lead physically active lifestyle; developing the knowledge for health-conscious lifestyle; developing self-knowledge, self-esteem and cooperative attitude; forming responsible behaviour; developing problem-solving, critical thinking.</p> <p>For example, for Geography: Developing of: action competence, citizenship (local-global), critical thinking, problem-solving competence, organize practical work (e.g. experiments or fieldwork, aesthetic awareness)</p>			
<i>Yes, the dominant ones: educating children to lead physically active lifestyle; developing the knowledge for health-conscious lifestyle.</i>	<i>Competence to learn, competence to solve problems, critical/geographical thinking.</i>	Yes	<i>Action competence, citizenship, critical thinking, problem-solving competence, organizing practical work, aesthetic awareness.</i>
Which activities, contents, appear in the curricula content and which are the dominant ones?			
<i>Physical education in the curricula – health issues,</i>	<i>No dominant activities, there are several balanced topics. Geography</i>	<i>Athletics, Gymnastic, Dancing, Natural Movements, Ball Games,</i>	<i>Geography focuses on understanding the world, understanding the</i>

<i>reality is different.</i>	<i>should explain processes in the world in general, but reality is that geography describes the world.</i>	<i>Mountaineering, Swimming, Gymnastic with Rhythmic Gymnastics, Volleyball, Football, Handball, Basketball. There is no dominant activity; all activities are equal.</i>	<i>dynamic interactions of elements that compose it, and in recognition of its continuous development and transformation. The educational mission of the geography is the acquisition of knowledge, thinking skills and practical skills, the formation of attitudes and values.</i>
Is there any kind of central (governmental) assessment on any class level? If yes, in which class level, what is its purpose?			
<i>It is proposed to launch centralised evaluation in Grades 5 and 9.</i>		<i>The National Assessment of Knowledge (NAK) at the end of Periods 2 and 3, i.e. for pupils from years 6 and 9, is compulsory.</i>	
Is there a summative assessment, evaluating students at different moments during the school year and at the end of the year? If yes, on what elements is the assessment based? (e.g. knowledge; skill, attitude, ...)			
<ul style="list-style-type: none"> <li>• The school determines marking – testing is done during school year</li> <li>• In the middle and at the end of the school year students get report card with written assessment (lower grades) or marks</li> </ul>			
<i>There are universally agreed criteria; PE assessment is seldom formalised.</i>	<i>Testing during school year by the teacher. The knowledge is assessed. No other assessment.</i>	<i>At different moments during the school year it is regarded as the determination of the achievement of objectives; achievements are assessed.</i>	<i>Assessment at different moments during the school year. It is regarded as the determination of the achievement of objectives; achievements are assessed.</i>

## **Comparison**

### *Comparison of the PE and geography curriculum – countries experts' answers*

Currently both subjects are in a strong position within the basic education system in both countries. Nevertheless, there are problems in implementing the current curricula for both PE and Geography. In PE in the Czech Republic, it is the low congruence (fidelity) between curricula levels (for example between the goals and educational content) as well as low acceptance by teachers of the new curricula. In Slovenia, there is a problem in implementing modern educational trends. In Geography, the issues are less significant – excessive descriptiveness, encyclopaedic learning and lack of practical use.

Differences were identified in how the curricula (both PE and Geography) were developed – at the national level in Slovenia but at both national and school level in the Czech Republic. There were also differences in how implementation of the curricula was quality assured – by compulsory external exams in Slovenia but not in the Czech Republic, although compulsory testing is currently being debated. The curricula also differed in their educational approach – whether it was more oriented towards content or to outcomes.

In the detailed comparison of the PE curriculum, similarities were observed in the time allocated to PE, in how the PE curriculum changed during primary education, and in the curricula content regarding landscape specifics. However, the concepts underpinning the PE curriculum differed. The Czech curriculum is primarily health oriented whereas in Slovenia the curricula were more movement oriented.

In comparing the Geography curricula, differences were found in what the subject was called in the different school years, and the term “geography” does not appear in any of the curricula until the higher primary grades. We found similarities in subject matter which overlaps with subjects such as Civics, Biology and History. The key concepts underpinning Geography also differ: in the Czech Republic there is a focus on understanding processes in nature; in Slovenia, the focus is on understanding the environment through knowledge, abilities and skills. However, the main objectives of the Geography curricula are very similar in both countries and all the curricula seek to develop certain competences, particularly action competences, critical thinking and problem-solving competences.

### *Integrating PE and Geography in the Czech curricula*

Czech pupils have Geography and PE lessons throughout all the nine years of compulsory education. Thus, the greatest opportunities for integration of the PE and Geography curricula can be found in the primary school curricula.

From the point of view of the Geography curriculum, the integration of Geography and PE can especially be found in the thematic area of Field geographic education, practice and application (educational area Man and Nature) and its subject matter as follows:

- field exercises in and observations of the local landscape, geographical excursions – orientation points, phenomena, aids and devices; standpoint, determining cardinal and intercardinal points, navigation using a map and an azimuth, estimating the distances and heights of objects in the field; simple panoramic sketches of the landscape, layout plans, schematic sketches of a route axis, evaluation of natural phenomena and indicators;
- preservation of life when life and health are endangered – natural disasters; measures, conduct and behaviour when a dangerous situation occurs, namely natural disasters in model situations.

For this thematic area, the FEP EE (2016, p. 79–80) defines the following expected outcomes:

The pupil shall:

- master the basics of practical topography and orientation in the field;
- apply practical methods in the field when observing, depicting and assessing the landscape;
- observe fundamental rules for the safety of activity and sleeping in the open.

This thematic area, as well as the area Geographic information, data sources, cartography and topography (FEP, 2016, p. 75), pervade the whole geography course at the upper primary school level and provide opportunities for integration of geographic subject matter with PE.

From the perspective of the PE curriculum, opportunities for integration can primarily be found in the thematic area of Activities affecting the level of physical skills. For this thematic area, FEP EE (2016, p. 97) defines following subject matter:

- hiking and sleeping in nature – movement to the field and proper conduct in transport vehicles, walking in the field, camping, nature preservation.

Another relevant factor is the subject matter of PE: swimming, skiing, ice skating, snowboarding or other movement activities from the educational area Activities affecting the level of physical skills (FEP EE, 2016, p. 97–98) depending on the conditions of the school and the interests of their pupils. From the geographic point of view these activities can be used to learn orientation, description of land reliefs, assessment of tourism development or other geographical characteristics during

outdoor physical activities. It is also reasonable to assume that the integration of physical education and geography, especially within field lessons, may further develop the content of thematic area of Activities affecting health (FEP EE, 2016, p. 97) in the following ways:

- hygiene during physical education – hygiene concerning exercise activities and the exercise environment, suitable clothing and footwear for movement activities;
- safety during movement activities – organisation and safety of the exercise space, safety in changing rooms and washrooms, safe preparation and storage of gym apparatus, equipment and aids, first aid under physical-education conditions.

Further opportunities for combining PE and the Geography curricula can be found in the Cross-Curricular Subjects. Cross-curricular subjects in the FEP EE (125–136) examine current problems of the contemporary world. PE and the Geography have become a significant and indispensable part of elementary education in the Czech Republic. They represent an important formative element of elementary education, create the opportunities for individual engagement as well as cooperation between pupils, and contribute to the development of the pupil's character, primarily in the area of attitudes and values.

All the descriptions of all the cross-curricular subjects have a similar structure. First, they contain the *Characteristics of the Cross-Curricular Subject*, where the significance and position of the cross-curricular subject in elementary education are emphasised and followed by a specification of the relationship of the cross-curricular subject to the educational areas. Second, they contain the *Contribution of the Cross-Curricular Subject to the Development of the Pupil's Character* both in the area of knowledge, skills and abilities and in the area of attitudes and values.

Cross-curricular subjects are a compulsory part of elementary education. All cross-curricular subjects included in the FEP EE must be incorporated by the school in the education at both Stages 1 and 2. Not all cross-curricular subjects, however, need to be represented at each form. It is the school's responsibility to offer all the thematic areas contained in the individual cross-curricular subjects to pupils in the course of elementary education. However, the extent and manner of their implementation is determined by the school when they develop their SEPs. Cross-curricular subjects may be used as an integrated part of the educational content of a subject or in the form of independent subjects, projects, seminars, courses etc.

The following cross-curricular subjects are included in the FEP EE: Moral, Character and Social Education; Civic Education for Democracy; Education towards Thinking in European and Global Contexts; Multicultural Education; Environmental Education;

Media Education. The most suitable subject for combining PE and Geography is in Environmental Education which often takes place outside the classroom.

### *Integrating PE and Geography in the Slovene curricula*

Recently, “interdisciplinarity”, meaning the integration, complementarity and interconnectedness of content from different subjects, has gained prominence in the Slovenian school system; there is a specific chapter on interdisciplinary connections in curricula to provide teachers with guidance as to which content from other subjects they could use to complement the teaching of their own.

In primary education, physical education and geographic subject matter are in different curricula. During Grades 1 to 5, geographic subject matter is taught as part of ‘Learning the Environment’ (in Grades 1 to 3) and “Social Studies” (in Grades 4 to 5). Geography as a specialist subject starts in Grade 6.

The PE curriculum in primary schools highlights possible interdisciplinary connections with Slovenian Language, Learning the Environment, Music, Natural Sciences (and Techniques), Home Economics, Social Studies, Geography, Biology, Chemistry, Physics, Arts, as well as Civics and Ethics. Hence, PE can also be integrated with practically all the subjects taught in primary school. Furthermore, it can be integrated with material that is not formally part of any specific subject in the program, for example Health Education, Environmental Studies, Traffic Education, Cultural Studies and Information, Communications and Technology (ICT).

Although teachers most often integrate geographic content with History, Natural Sciences, and Civics and Ethics, our analysis of the curricula reveals many possible connections between PE and geographic content. In particular, it can be seen that they most closely interconnect when active teaching approaches and methods are used. Nevertheless, we cannot ignore theoretical content such as knowledge of orienteering, concern for the preservation and appreciation of natural and cultural heritage, care for the environment and one's own health.

Interdisciplinary integration with PE is also emphasized in curricula program documents. For example, the Geography curriculum “(*Učni načrt Geografija* (Geography Curriculum) 2011, p. 5) emphasises that geography as a subject promotes” responsible and active protection of one's own health, and in Geography lessons students develop values that contribute to “ensuring the maintenance... of one's own health”.

The Geography curriculum (p. 35) specifically notes that cross-curricular class excursions and fieldwork provide a “good example for developing procedural and

transferable lifelong knowledge, common to all school subjects, and allow students to acquire new knowledge that they master and develop, as well as apply, such that it takes on an important dimension in how they understand their homeland". The curriculum actually requires planned excursion every year "to at least one geographic region in Slovenia, so that over four years students encounter different natural and human geographic regions".

The PE curriculum (*Učni načrt Športna vzgoja* (Physical Education Curriculum) 2011) also has content that sensibly and relevantly interconnects with the geography based subjects Learning the Environment, Social Studies and Geography. Particularly noticeable is the material dealing with Slovenian folk traditions as well as content linked to hiking. Every year each student must participate in five sports days, two of which include hiking. The subject matter for sports days that include hiking tends to focus on environmental characteristics of the hiking venue, including its geographical, historical and natural features, and includes hiking and orienteering using a compass and map.

The PE knowledge standards (*Učni načrt Športna vzgoja*, (Physical Education Curriculum) 2011, p. 3–35) also connect to geographic content: at the end of the first period students should be able to "move along a marked trail"; at the end of the second period, "[students are] able to determine cardinal directions... act in accordance with the principles of environmental protection"; at the end of the third period, the student should "know how to orientate oneself with a map... is aware of conservation problems and actions that preserve natural and cultural heritage".

#### *Comparison of integrating PE and Geography curricula in the selected countries*

Integration of elementary school subjects is emphasized to varying extent in all the analysed curricula documents and there are considerable opportunities for integration of the Geography and PE curricula. Interdisciplinary integration is frequently mentioned in program documents in both countries, and curricula include specific chapters on interdisciplinary integration. One of the priorities of the Czech FEPs is the rigorous use of interdisciplinary links and integration of individual subjects. Fieldwork, which is an integral part of many subjects in the Czech curricula, is a beneficial teaching method to achieve interdisciplinary links and leads to the cooperation and collaboration of teachers from different educational areas. In relation to the fieldwork, it is up to the teachers which specific activities are included in the school education program. Both short-term and long-term outdoor excursions provide opportunities for fieldwork. In the context of physical education in the Czech Republic, this includes, for example, outdoor excursions such as camping and summer and winter training courses. In



Slovenia interdisciplinary integration is also becoming an important part of the educational process and it is an important didactic approach which contributes in providing students with lasting knowledge and, above all, practical knowledge. It can partially lighten the load of curricula, whilst also enhancing the experiential aspect of activity days. We identified in the curricula several opportunities to draw connections between PE and geographic subject matter in the subjects, Learning the Environment, Social Studies and Geography. In particular, it can be seen that the two subjects most closely interconnect when active teaching approaches and methods are utilised, but nevertheless we cannot ignore the theoretical content, such as knowledge of orienteering, concern for the preservation and appreciation of natural and cultural heritage, care for the environment and one's own health.

The Czech educational system calculates with fieldwork in the framework of education programs starting right from the first grade of primary school especially in the educational area "Man and his world," where the foundations of natural and social sciences are laid. It is recommended to use places where children go to school and where they live as much as possible. Other elements such as practical observations and simple measurements in the landscape are then included in the geographical and natural history basis, for example monitoring weather, phenological observations. Pupils also learn to record entries in field diaries, sketches, herbarium etc. Pupils also experience trips outside of school in physical

education and health education. Fieldwork is firmly anchored in the individual educational areas of the FEP BE (The Framework Education Programme for Elementary Education) for the 2nd grade of primary school and in the FEP G (The Framework Education Programme for Secondary Education). The specific thematic unit, which directly relates to fieldwork is anchored in the FEP BE in the educational area "Man and Nature" in two subjects – geography – "Geographic Fieldwork, Practice and Applications" and in natural history "Practical Understanding of Nature." In the FEP G, outcomes of fieldwork in geography in the thematic area "Geographic Information and Field Instruction" are expected. In biology, fieldwork is not dedicated to any thematic whole or any expected output. Fieldwork may also find a wide application in physical education and health education. In the context of physical education, this includes, for example, nature stays, camping, summer and winter training courses, etc. In all of these activities, either consciously or "automatically" a lot of knowledge from other subjects, such as orientation on the map, identifying poisonous plants or fungi, protection from adverse weather conditions etc. are used. At the gymnasium, it is once again about purposeful and safe behavior during physical activities in an unfamiliar environment etc. The new Education Act put teachers from Czech primary and secondary schools into a new situation – transforming the Framework education program to the level of

a Scholastic education program. One of the priorities of the Framework education program is the rigorous use of interdisciplinary links and integration of individual subjects. Fieldwork, which is an integral part of many subjects, is a beneficial teaching form for the fulfillment of interdisciplinary links and leads to the cooperation and collaboration of teachers from different educational areas. The school level consists of school education programs (SEPs), according to which education at individual schools is carried out. In relation to the fieldwork, it is up to the teachers which activities are transferred to the School educational program. Both short-term and long-term school in nature courses provide a large space for fieldwork. In the context of physical education, this includes, for example, nature stays, camping, summer and winter training courses, etc. One could therefore conclude that the conditions for the application of fieldwork in the Czech educational curriculum are sufficient. Fieldwork is included in the system largely based on historical perspective, but it is not supported and justified by any research and it has a “historic” character at most schools and thus an outdated character.

Within different teaching approaches and methods class teachers, PE teachers and geography teachers effectively intertwine geographic and PE subject matter. Below are just a few examples of how interdisciplinary integration of geographic and PE subject matter can be achieved:

- Class excursion: Geography teachers may plan a class excursion allowing students to acquire and consolidate geographical knowledge whilst simultaneously meeting the objectives of PE, for example, by building up endurance, by engaging in physical activity or sporting activities. Teachers could include hiking in hills that offers good views and the potential for orientation, organising for the bus to wait at a stop a bit further away so that students walk for a longer period; initiating a variety of physical/active sports and games at specific stops). On excursions to particular regions students can be introduced to and learn traditional dances, manners and customs that involve physical activity. In this way, students also learn about the cultural heritage of an area/region/landscape.
- Fieldwork: Teachers can organise fieldwork that takes place in the immediate vicinity of the school and includes active learning methods (orientation during a treasure hunt, various physical/sports activities; measurement – of wind, path of the Sun, rainfall etc.).
- Class lessons: In line with interdisciplinary integration of geographic content and PE teachers can prepare some simple physical/sports activities in the course of regular lessons in the classroom. Thus, for example, when learning about different countries students may learn their traditional dances. Another

possibility if for teachers organise orienteering exercises using QR<sup>9</sup> codes on the school grounds. The theoretical knowledge content in both courses also interconnects – when learning about cultural and natural heritage, caring for the environment, taking care of one’s own health etc. Geographic content can also be integrated into PE lessons carried out in the gym, for example, on outdoor playgrounds, or in the immediate vicinity of the school, for example, an orienteering race. Another possibility is when students assist in setting up the gym and need to manoeuvre gymnastics equipment and props into position based on charts which map out the gym layout and the positions of the equipment. Since each chart has a legend students learn to orientate themselves on paper and in space, along with learning how to read a map and a legend.

- Project days, activity days: During project days students and teachers can present varied geographic content, for example, distant regions of the world and geographical phenomena such as volcanism, earthquakes, which teachers interconnect with physical/sports activities such as creative movement and dance, role play and showcasing the most interesting sports from different countries.
- Sports days: In every year two sports days are reserved for hiking. These have a strong focus on raising the awareness of conservation of nature, landscape features of the hiking venue and different ways of orientating oneself on maps and in nature.
- A minute for health: In all subjects, students should break up long periods of sitting down with a minute of physical activity, during which they perform some movement exercises with the windows open. To effectively carry out such exercises, geography and sports teachers absolutely need to cooperate.

Interdisciplinary cooperation initiatives are aimed at transforming it from a sporadic (occasional) or random approach to a systematic or planned one, and above all, towards connecting subjects. The main purpose of the interdisciplinary approach is to overcome the fragmentation of knowledge and provide students with lasting and useful knowledge and skills. According to Cone, Werner and Cone (2009, p. 2) *“education can be seen as a process of change that continues throughout a lifetime”*. The type of learning experience we have while in school underpins how we integrate everything we learn, as well as how we transfer knowledge and skills from one experience to another. These authors also claim that the foundation of interdisciplinary education is our innate need to make meaning

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<sup>9</sup> A machine-readable code consisting of an array of black and white squares, typically used for storing URLs or other information for reading by the camera on a smartphone.

from discrete pieces of understanding. In 1989 Hayes Jacobs said that “*there is no longer as much discussion among educators about whether to blend the subject areas, as about when, to what degree, and how best to do it*” (Drake & Burns, 2004, p. 1–2).

### **Discussion and Conclusion**

The question examined in this research was the extent of the PE and Geography curricula integration in the elementary school systems in Czech Republic and the Republic of Slovenia., both the intended curricula and the realised.

At the policy level (curricula analysis), interdisciplinary integration of elementary school subjects is viewed as being very important in both countries. It underpins the elementary school curricula in the Czech Republic through the thematic structure and, in Slovenia, it is emphasized through specific chapters and/or sections of the curricula highlighting interdisciplinary integration.

Our analysis also showed that there are considerable opportunities for integration of the Geography and PE course content. In particular, fieldwork, which is an integral part of the curricula for many subjects, can be used to achieve interdisciplinary links. Both short-term and long-term outdoor excursions such as hiking, camping and summer and winter training courses, provide many opportunities for fieldwork that integrates PE and Geography.

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Nevertheless, for various reasons (see Vlček et al., 2016) it is absolutely critical that further research and teacher training in interdisciplinary integration will be undertaken.

Such research projects are currently underway at the Masaryk University (project of Czech Science Foundation, “Fieldwork as a powerful learning strategy – 16-00695S”.) and the Faculty of Education of the University of Ljubljana has established a course in Interdisciplinary Integration. Furthermore, in-service training and summer schools are urgently needed to train teachers in integrated teaching and provide practical experience. Otherwise the goal of interdisciplarity which can provide a basis for life-long integrated learning will not be achieved.

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# Effectiveness of the swimming education of children with autism spectrum disorder

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## Abstract

**Introduction (basis):** Like the common population, also children with autism spectrum disorders (ASD) should be swimming literate – they should be equipped with such skills to be able to safely handle the aquatic environment and consequently to be able to make use of the swimming locomotion as of a lifelong motional activity for maintaining their health. Regarding the content of the swimming education for children with ASD, it is based on the preparatory and on the elementary swimming education programmes. However, it is distinguished by many specialities (suitable material conditions, use of specific methods, teacher-pupil interaction) – all this must be considered while creating such programmes.

**Aim:** Applying structured learning on the concept of common preparatory and elementary swimming education for children with autism spectrum disorders.

**Methods:** Five probands (boys) aged 6–10 years took part in this study. medical diagnosis: Asperger syndrome, infantile autism, atypical autism. The interventional programme lasted for 10 months (school year 2016/2017) and it was divided into two blocks (1st and 2nd term). Each block (term) consisted of 18 lessons once a week. Each lesson was 30 minutes long. In the first lessons, an entry diagnostic was performed by the help of Štochl Scale of swimming skills assessment. At the end of the first block, an output diagnostic was performed by using the same scale. The 3rd assessment took place at the end of the 2nd block. The final assessment of the interventional programme took place three months after the third measurement at the end of the 2nd block (in September 2017).

**Results:** From the assessment of the results of the scale by the help of the sign test all probands have experienced an overall improvement in all swimming skills between the measurements 1 and 2, 3 and 4, 1 and 4.

**Discussion:** According to the above presented results of this study, it can be said that structured learning was a well-chosen technique for the swimming education

of children with ASD. Thanks to the structuralisation, the children have obtained basic swimming skills and they have built up a solid ground for a training of swimming styles. We consider the achieved results for very valuable for other swimming education of children with ASD.

**Key words:** swimming education, autism spectrum disorder

## **Introduction**

Like the common population, also children with autism spectrum disorders (ASD) should be swimming literate – they should be equipped with such skills to be able to safely handle the aquatic environment and consequently to be able to make use of the swimming locomotion as of a lifelong motional activity for maintaining their health. Regarding the content of the swimming education for children with ASD, it is based on the preparatory and on the elementary swimming education programmes. However, it is distinguished by many specialities (suitable material conditions, use of specific methods, teacher-pupil interaction) – all this must be considered while creating such programmes.

Autism spectrum disorders belong into the category of Pervasive developmental disorders which means that the mental development of a child is deeply affected in various areas (Šporclová, 2007). Those are the severest disorders in children's mental development. Nowadays, together with mental disorders, psychical development affections and some behavioral and emotional disorders, autism spectrum disorder counts to the neurodevelopmental disorders (Jelínková, 2008). In most cases, persons with ASD are not capable of an independent life even in adult age and thus are often a huge psychical burden for the whole family. According to the International Classification of Diseases (ICD-10) of the World Health Organization, following disorders fall into the category of Pervasive developmental disorders: Infantile autism, Atypical autism, Rett syndrome, Asperger syndrome, Other pervasive disorders, Pervasive developmental disorder not otherwise specifík. In most cases, infantile autism, atypical autism and Asperger syndrome are diagnosed.

### *Specifics of children with PAS*

According to Thórová (2016), the education and training of children with ASD is particularly based on the principles of structured learning. “Structuralisation means an introduction of clear rules, transparency in the activities order and an unique arrangement of the environment where a person with ASD is situated. This specific approach partly compensates this complicated handicap that ASD doubtless happens to be ” (Thórová, 2016, 402).



“The goal of the education is the most possible development of prospective skills and abilities of the client” (Jelínková, 2008, 72). Individuals should feel subjective happiness as much as possible and they should be as much as possible independent and should have a maximum of personal freedom. The swimming education for people with ASD should also be based on these principles. According to Čadilová, Žampachová (2008), Jelínková (2008), Thórová (2016), following principles should be used while creating educational programmes for individuals with ASD: individualisation, structuralisation, visualisation and motivation.

### *Swimming education*

Nowadays, the awareness of the need of swimming abilities as the skill for safe handling of aquatic environment is rising. As already mentioned above, it is necessary for individuals to be swimming literate. This means that individuals should be equipped with such skills to be able to safely handle the aquatic environment and consequently to be able to make use of swimming for protection of their lives while the swimming locomotion also becomes a lifelong motional activity for maintaining their health. This is important not only for common population but also for persons with special needs (Čechovská, 2008). Creation of the basis for safe handling of aquatic environment and consequent training of the swimming locomotion take place within the swimming education. The swimming education is a longlife process of gaining swimming skills and of improving the swimming locomotion through particular swimming styles (Čechovská, Miler, 2008).

Čechovská (2007) divides the swimming education into three phases:

#### *1st phase – Preparatory swimming education*

The goal here is the adaptation on the aquatic environment and managing of the basic swimming skills (swimming breathing, floatation and flowing, submergence and orientation under the water, jumps and falls into the water, stroke movements basics) which are necessary for swimming locomotion training.

#### *2nd phase – Elementary swimming education*

The main goal here is the development of basic swimming skills and swimming locomotion training – sports swimming styles. In particular the back, crawl and breast stroke. The butterfly stroke is being trained after managing the prior strokes. The training does not aim at the competitive techniques, it is much more about the styles in their basic structures.

#### *3rd phase – Perfectioning swimming education*

In this phase, swimming skills are being developed, the swimming styles are perfected and another swimming style – the butterfly stroke is trained. Also the

swimming performance is being raised by the help of straining methods. Lifesaving stroke basics and swimming sports are added.

## **Methodics**

Realization of the interventional programme took place in the school year 2016/2017. The swimming education took place in the swimming pool in the Centre of Permanent Health (centrum trvalého zdraví) swimming pool Cordeus in Prague 6 – Vokovice. The pool size was 12 x 3,5m and the water temperature was 30°C. The 10-months-long course was divided into two continuous parts (1st and 2nd term). Each term consisted of 18 lessons. The lessons took place every Wednesday from 2 to 3 p.m. Each lesson lasted for 30 minutes. The children attended the lesson once a week. In every lesson, three children were taught by two swimming teachers and one assistant who were all present in the water. During the education, regular swimming aids were used as well as educational aids for persons with special needs which were adapted for usage in the water. Children with autism spectrum disorders took part in the study. The research set consisted of 5 boys aged from 6 to 10 years. The boys took part in the whole 10-months-long interventional programme. medical diagnosis of these probands were Asperger syndrome, infantile autism, atypical autism.

In the first lessons of the 1st term (end of September 2016) an entry diagnostics was performed by the help of Štochl Scale of swimming skills assessment (Štochl, 2002). At the end of the 1st term (January 2017), a continuous diagnostics was performed by the help of the same scale. The 3rd assessment took place at the end of the 2nd term (June 2017). The final assessment of the interventional programme took place three months after the third measurement (in September 2017). During the whole interventional programme, interviews with the parents of the children took place about the adaption of the kids on the interventional programme and in case to adapt the programme on the needs of a particular child. In order to be able to perform a quantitative assessment of the gained swimming skills of the probands, we used the above mentioned Štochl scale. The scale includes 7 items: submergence of the head, floating position on the stomach, floating position on the back, breathing out into water, jump from side, pick up of 2 objects and rolling along the longitudinal axis. Each item is rated with 1–5 points (1 point = the exercise was not performed, 5 points = the highest level). The acquired values were assessed with the non-parametric sign test.

## **Results**

From the assessment of the results of the scale by the help of the sign test (Table 1), all probands have experienced an overall improvement in all swimming skills between the measurements 1 and 2, 3 and 4, 1 and 4.

**Table 1: Overall significancy in single observed skills (Sign test)**

	Difference between the measurements			
	1 a 2	2 a 3	3 a 4	1 a 4
1. Submergence of the head	0,01			
2. Floating on the stomach				
3. Floating on the back			0,01	0,01
4. Breathing out into water				
5. Jumps from side				
6. Object pick up				
7. Rolling along the longitudinal axis		0,01*		
Total	0,05		0,05	0,05

\*setback

A significant setback on the significancy level 0,01 has occured in the skill “rolling along axis” between the 2nd and 3rd measurement. In other skills an improvement has occured, yet because of the small number of probands, only the improvements in “head submergence” and “floating on the back” can be regarded as significant in the marked measurements.

In the intraindividual comparison an improvement of the swimming skills has occured in case of two probands between the 1st and 2nd measurement. The 3rd proband has achieved an improvement between the 1st and 2nd measurement. The 3rd proband has achieved the biggest improvement between the 3rd and 4th measurement, the 4th proband between the 1st and 4th measurement. The last proband did not achieve any statistically significant improvement in gaining the swimming skills.

### Discussion

The study deals with the application of structured learning into the preparatory and elementary swimming education of children with ASD. Swimming skills of five children (boys) who took part in the 10-months-long interventional programme were diagnosed with the Štochl Swimming Skills Scale. The results show that significant overall improvements have occured between the 1st and 2nd measurement and between the 3rd and 4th measurement.

The difficulties in the study are in particular the size of the research set. However, it was a very specific group of children. Even despite of the individualisation of the

interventional programme, not all children were able to take part in the whole education. The reason was a lacking adaptation on the aquatic environment. Despite of the slower progress in the motion learning, not all basic swimming skills (head submergence, floating on the back) could be successfully learned. For this reason, these children were not able to adapt on the interventional programme. Another difficulty was the material and organisational support of the study. Because of the fact that there was the preparatory and elementary swimming education, it was necessary to find an appropriate swimming pool. This means a small swimming pool for learning with warm water of a temperature of at least 30° C. Because there were children with ASD, all premises of the pool (changing rooms, toilets, staff etc.) had to be considered. There are not many such pools that were available and would meet these criteria in Prague. For time reasons and for its good availability by means of public transportation, we chose the above mentioned swimming pool Cordeus in the centre of permanent health.

Beside the quantitative assessment of the swimming skills, we also focused on the realisation point of the swimming education of children with ASD. It is characterized by multiple specifics that have to be secured while the realisation. They are related particularly to the requirements the teachers have to deal with: creation of an individual educational programme for children with ASD, preparations for every lesson, selection of suitable teaching methods, motivation, communication with the children during the lessons and outside them, communication with the parents, material support, selection of a suitable swimming pool, providing the participants with appropriate swimming aids, providing the children with ASD with special aids for the education etc.

According to the above presented results and experiences with the realisation of the swimming education for children with ASD, it can be said that structured learning was a well-chosen educational technique for this study. Thanks to the structuralisation, the children have obtained basic swimming skills and they have built up a solid ground for a training of the swimming locomotion. We consider the achieved results for very valuable for other swimming education of children with ASD.

## **Conclusions**

The swimming education of children with ASD is based on the didactics of swimming education for the common population. In many respects however, it is much more challenging regarding the preparation and the whole organisation. The information on this topic is rather rare so far. Therefore we hope that our practical experience will help in creating swimming educational programmes for persons with ASD.

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# The Situation and Perspectives of the Body Mass Index Development in Preschool-Aged Children

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## Abstract

The aim of the research was to determine the prevalence of the body mass index in preschool-aged children and give a perspective of its further development regarding the children's age.

The sample of examinees consisted of 71 preschool-aged children, more precisely 36 boys (43.6%) and 40 girls (56.3%) aged 4 to 7 and attending kindergartens in Croatia. Measurements of their body height, body mass and body mass index (BMI) were done.

The results indicate that the body mass index will increase by an average 0.1 standard deviations for each new generation of children. Boys are averagely of a normal body weight with no significant deviations, while from their fifth year of age girls belong to the category of excess body mass. The perspectives of the body mass index increase for each new generation and the average excess body weight of girls from their fifth year of age indicates the possibility of serious health problems. This research has shown that the body mass index needs to be scientifically monitored by a longitudinal research, and respectively, a multi-year tracking of generations to provide a more accurate insight into the condition of children, especially when it comes to body mass index, since then it would be possible to evaluate prevention programs.

**Key words:** children, body mass index, early and preschool age

## Introduction

The Body Mass Index (BMI) is most commonly used for the evaluation of a person's state of nutrition and is accepted by the World Health Organisation as a measure for the evaluation of obesity and its levels (Mišigoj – Duraković et al., 1999). It is defined with regard to height and weight of a sex, and is calculated so that body weight, expressed in kilograms, is divided by height in meters squared ( $\text{kg}/\text{m}^2$ ). As

any other measure, it has many flaws because it depends only on height and weight, while it does not take into consideration various levels of obesity based on age, level of physical activity and sex, and it does not differentiate the increase in mass in the form of body fat, lean or bone tissue. For children and adolescents, the BMI is not a diagnostic tool. Instead, it is used to depict potential distress or health problems. The children's body mass index value is differently interpreted for children and adolescents, although it is calculated as  $\text{kg/m}^2$ , due to the fact that there are changes in height and weight which come with age, but also in their relation to body fat (CDC, 2015). When it comes to children, the distribution of body fat changes with age, and is different for boys and girls (Whitaker et al., 1997). The levels of the BMI among children and adolescents have to be expressed in relation to other children of the same sex and age and are calculated as percentiles.

Overweight is the cause of a considerable rise in health problems, both in a large number of countries of the world, and in Croatia. It contributes to the development of diseases linked to specific causes leading to illness and death such as heart and coronary diseases, diabetes and some malignant diseases. The occurrence of other chronic complications like degenerative diseases of the joints, endocrine disorders, psychological problems, and others, is also possible. The possibility of developing overweight increases with age. Fat (corpulence, obesity) occurs due to the excess accumulation of fatty tissue in the body, as a result of excessive food intake and a lower energy consumption over a longer period of time. It should be differed from increased body weight, and it represents a health risk (Croatian Red Cross, Ministry of Health, 2010). It is linked to a number of psychosocial problems, loss of self-confidence and depression (Bralic et al., 2010).

All age groups' dietary habits, especially the youth's, are influenced by various forms of social behaviour and the time spent outside their family home, as well as by irregular meals consisting of mixed (cooked) and biologically valuable food (fruit, vegetables, olive oil, fish and similar) which form the base of a proper nutrition (Croatian Red Cross, Ministry of Health, 2010). There are other factors forming the predisposition for the development of obesity, like, for instance, heritage, birth weight, duration of breast-feeding, the age when complementary food was introduced, various socio-economic factors like nutrition, sedentary way of life and various habits (Gillman et al., 2001; Stettler et al., 2002; Faith et al, 2003; Whitaker, 2004; Bralic et al., 2005; Zimmerman et al, 2010). By their actions and examples, parents form and influence their children's lives, from birth to their adulthood, while friends and peers' influence is stronger during adolescence. From an early age, the parents' behaviour linked to food has an impact on the children's body mass. The duration of breast-feeding and the age at which solid food is introduced

greatly influence the degree of fat during the infant period. The excessive feeding of an infant or small child can significantly contribute to a later development of fat (Stipančić, 2004). Moreover, the parents' physical activity is very important for shaping these habits among children. Preschool-aged children whose parents regularly engage in physical activities have a six times bigger probability to be physically active themselves (Durant, 1994).

A regular nutrition and physical activity are the main factors in the promotion and preservation of good health during one's whole life; they are important factors for a regular growth and development and the prevention of non-infectious chronic diseases (Kuzman et al., 2008, 2012).

## **Methods**

*The aim of the research* was to determine the body mass index condition according to age groups of early and preschool-aged children and to predict the further course of its development considering the children's age.

*The sample of examinees* consisted of 71 children of preschool age attending a kindergarten in Croatia. All examinees were divided according to sex and chronological age, which means that the sample of examinees was made of 36 boys (43.6%) and 40 girls (56.3%) aged four to seven.

*The sample of variables* consisted of three morphological measures: body height, body mass and the body mass index (BMI). Body height was measured with an anthropometer with the preciseness of 0.1 cm. Body mass was measured with a decimal balance with the preciseness of 0.1 kg. The body mass index was calculated based on the body height and mass, and it represents the ratio of body mass in kilograms and the body height in meters squared (Mei et al., 2002).

To determine the body mass index condition, body height and body weight according to age groups, the basic descriptive parameters were calculated (arithmetic mean (AS) and standard deviation (SD)). The regression analysis was used to determine the further course of the body mass index development regarding children's age. The statistical significance ( $p$ ) was tested with an error of 0.05.

## **Results and discussion**

The basic descriptive parameters of body height, body mass and body mass index were calculated for all examinees according to their age and sex.

*Table 1* shows the basic descriptive parameters of body height for boys and girls aged four to seven. The average value of body height for four-year-old boys was 109.06 cm (SD = 5.27), at the age of five they were 113 cm tall (SD = 4.66), at the

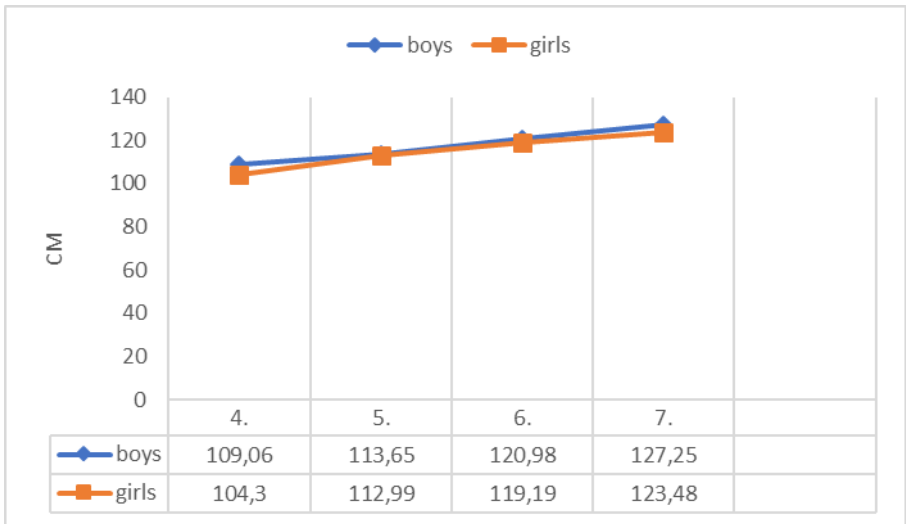


age of six they were 120.98 cm tall (SD = 6.90), while seven-year-old boys were 127.25 cm tall (SD = 11.52).

The average value of four-year old girls' body height was 104.30 (SD = 4.30), at the age of five it was 112.99 cm (SD = 4.94), at the age of six it equalled 119.19 cm (SD = 5.52), while seven-year-old girls were 123.48 (SD = 5.29) centimetres tall.

**Table 1: Basic descriptive parameters of body height for boys and girls**

BODY HEIGHT					
BOYS			GIRLS		
AGE	AS	SD	AGE	AS	SD
4	109.06	5.27	4	104.30	4.30
5	113.56	4.66	5	112.99	4.94
6	120.98	6.90	6	119.19	5.52
7	127.25	11.52	7	123.48	5.29



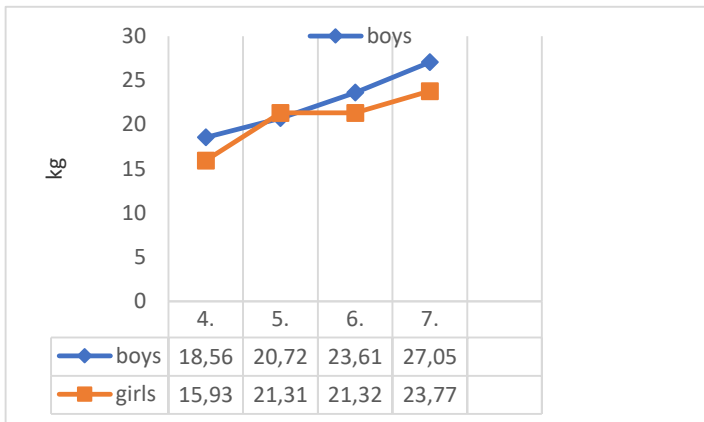
**Chart 1: Comparison of average values in the variable body height for boys and girls**

Table 2. shows the basic descriptive parameters of body mass for boys and girls aged four to seven. The average value of body mass for four-year-old boys was 18.56 kg (SD = 2.04), at the age of five it was 20.72 kg (SD = 2.96), at the age of six it was 23.61 kg (SD = 5.12), while for seven-year-old boys it was 27.05 kg (SD = 3.88).

The average value of four-year old girls' body mass was 15.93 (SD = 1.03), at the age of five it was 21.31 kg (SD = 4.17), at the age of six it equalled 21.32 kg (SD = 1.96), while for seven-year-old girls it was 23.77 kg (SD = 2.85).

**Table 2: Basic descriptive parameters of body mass for boys and girls**

BODY MASS					
BOYS			GIRLS		
AGE	AS	SD	AGE	AS	SD
4	18.56	2.04	4	15.93	1.03
5	20.72	2.96	5	21.31	4.17
6	23.61	5.12	6	21.32	1.96
7	27.05	3.88	7	23.77	2.85



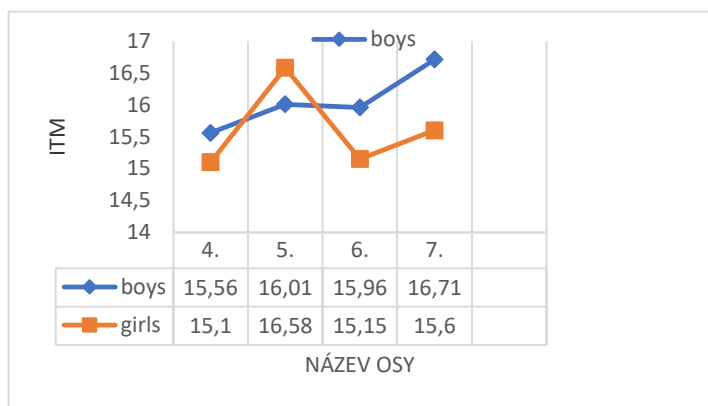
**Chart 2: Comparison of average values in the variable body mass for boys and girls**

Table 3. shows the basic descriptive parameters of the body mass index for boys and girls aged four to seven. The average value of the body mass index for four-year-old boys was 15.56 (SD = 0.71), at the age of five it equalled 16.01 (SD = 1.80), at the age of six it was 15.96 (SD = 2.14), while for seven-year-old boys it was 16.73 (SD = 1.10).

The average value of the body mass index for four-year-old girls was 15.10 (SD = 1.51), at the age of five it equalled 16.58 (SD = 2.25), at the age of six it was 15.15 (SD = 0.99), while for seven-year-old girls it was 15.60 (SD = 1.63).

**Table 3: Basic descriptive parameters of body mass index for boys and girls**

BMI					
BOYS			GIRLS		
AGE	AS	SD	AGE	AS	SD
4	15.56	0.71	4	15.10	1.51
5	16.01	1.80	5	16.58	2.25
6	15.96	2.14	6	15.15	0.99
7	16.73	1.10	7	15.60	1.63



**Chart 3: Comparison of average values in the variable body mass index for boys and girls.**

Regression analysis was used to determine the further course of the body mass index development regarding the children's age. The statistical significance (p) was tested with the error of 0.05.

The further course of the body mass index development with regard to the boys and girls' age is shown in *Table 4*. According to the results obtained by the regression analysis it can be determined that the variables age and body mass

index are correlated in a statistically significant way in this sample. For both sexes the results show that with age the body mass index will also increase by 0.1 standard deviation.

**Table 4: The influence of age on the variable body mass index (BMI)**

BOYS	R	R <sup>2</sup>	F (1.34)	P
		0.13	0.12	0.84
VARIABLE	$\beta$	Standard deviation of $\beta$	T (34)	p
AGE	0.13	0.27	0.81	0.02
GIRLS	R	R <sup>2</sup>	F (1.32)	P
		0.15	0.11	0.67
VARIABLE	$\beta$	Standard deviation of $\beta$	T (32)	p
AGE	0.15	0.28	0.53	0.01

$p < 0.05$

## Conclusion

By comparing the average value results for the variable of four to seven-year-old boys and girls' body height (Table 1. And Chart 1.), it can be noticed that there are no significant differences with regard to sex. The average value results in the variable body mass for boys and girls shows that for five-year-old girls (21.31 kg) the body mass is higher than for boys (20.72 kg). The aforementioned was also confirmed by the results shown in *Table 3.* and *Chart 3.* They show the average values of the body mass index variable for boys and girls, where variance is obvious for girls aged five. The body mass index grew from the fourth (15.1 kg/m<sup>2</sup>) to the fifth (16.58 kg/m<sup>2</sup>) year of age, while in their sixth year a decline (15.15 kg/m<sup>2</sup>) to a normal body weight was recorded. The results varied with boys, from 15.56 kg/m<sup>2</sup> (age four), with an increase at age five to 16.01 kg/m<sup>2</sup>, to decline again at age six to 15.96 kg/m<sup>2</sup>, while at age seven it rose to 16.71 kg/m<sup>2</sup>.

The regression analysis results show that the variable age influences in a statistically significant way the results in the variable body mass index, and with chronological age, there is a growth in the body mass index of 0.1 standard deviation. It is therefore necessary to monitor children's growth and development, recognise those individuals who deviate from the determined levels of a child's nutrition at a certain age (Šelović and Jureša, 2001), and undertake preventive measures in the field of physical activities and exercising, as well as in the area of nutrition and prevention, as to withhold the early occurrence of obesity.

The perspectives of the increase in the body mass index for each next generation and the average excess body weight for five-year-old girls indicate the possibility of very serious health problems. It is known that today there are 43 million overweight or obese children in the world who are younger than five, and since 1990 there has been a constant growth (Extended international, 2017). It has constantly been emphasized that except for the choice of a diet, it is extremely important at this age to promote physical activity and suppress the sedentary way of life.

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# The Prevalence and Differences in the Physical Activity Level in Preschool-Aged Children

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## Abstract

For a longer period of time there has been a diminution in the level of physical activity in the world, which means that each new generation has a lower level of physical activity than the former generation, while results obtained for children are especially worrisome. The level of physical activity is significantly linked to health and has become one of the greatest challenges for scientists throughout the world.

The aim of this research was to determine the level of preschool-aged children's physical activity and define if there was a statistically significant difference according to sex.

The sample of examinees consisted of 98 children (50 boys and 48 girls) aged 2 to 7 and attending kindergartens in the city of Rijeka, Croatia. The children's physical activity was evaluated by the standardized questionnaire *Health Behaviour for Children* filled in by their parents. The percentages of children belonging to a certain category of physical activity level were calculated, and the significance of differences was analysed by the Chi-square test.

The research results indicate that somewhat more than 55% of examinees are active one hour per week, 30% of them are active two to three hours a week, while only 13% of them are active four to six hours a week. The results also show that boys are statistically more significantly ( $p=0.01$ ) active than girls.

This research has shown that even at the preschool age there is a serious problem of insufficient physical activity which calls for intervention programmes. It is clear that contemporary kinesiology in the educational system should be more directed toward health and that movement should not only be a trend, but a way of life, i.e. the way a certain kindergarten functions.

**Key words:** physical activity, nurseries, earliest stages, health

## **Introduction**

We have been witnessing worse results in children's physical activity, which lead to a serious development of diseases such as overweight, various types of cancers, bone diseases, diabetes, etc. (Currie et al., 2012). The information that about 42 million of early and preschool-aged children are overweight or obese is, thus, not surprising (World Health Organisation, 2014). For a longer period of time there has been a diminution in the level of physical activity in the world, which means that each new generation has a lower level of physical activity than the former generation, while results obtained for children are especially worrisome (Jurakić and Heimer, 2012). The level of physical activity is significantly linked to health and has become one of the greatest challenges for scientists throughout the world (Novak et al., 2014).

It is extremely important to start with organised physical activity as early as possible, as to form a habit of regular physical exercising and acquire the basic motor literacy. Organised physical activities from the earliest age can positively affect the general condition of the organism, the prevention of chronic diseases, mental disorders, the mood, occurrence of obesity, and they can even influence the development of certain genetically predetermined diseases (Capiro and Weiss, 2005). Besides, children's motor abilities are directly connected to the development of the central nervous system, so later it is almost impossible to compensate for the lack of movement in early childhood (Pišot and Planinšec, 2010).

Due to a lack of studies done on the population of early and preschool-aged children, this research has a special significance and can become the base ground for further ones.

The aim of this research was to determine the level of preschool-aged children's physical activity and define if there was a statistically significant difference according to sex.

## **Method**

The sample of examinees consisted of 98 children (50 boys and 48 girls) aged 2 to 7 and attending kindergartens in the city of Rijeka, Croatia. The examinees had been randomly chosen, and later divided to sub-groups according to sex and chronological age. The research was conducted during the months of May and June, and a part of July 2017. During the aforementioned months all the children were healthy and physically mobile.

The sample of variables was made by the standardized questionnaire *Health Behaviour for Children*, adapted to the needs of the research about the preschool-



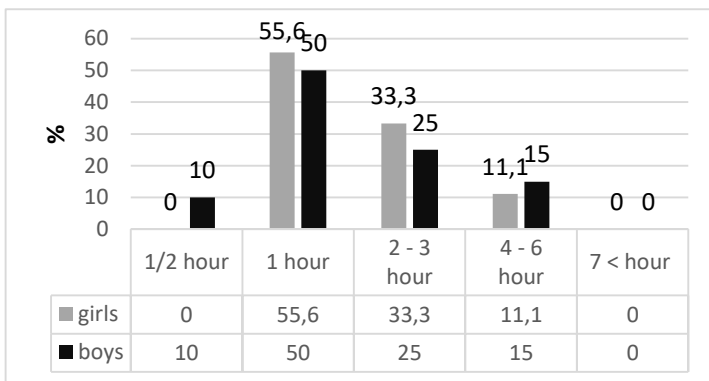
aged children’s level of physical activity. It was anonymous and filled in by their parents of their free will. Its purpose was for the parents to evaluate their children’s physical activity based on the cognition about their free time (when they are not in the kindergarten), including certain house chores, time spent in nature, everyday activities, sport activities, etc.

The results of the state of their physical activities are shown in percentages, in the form of charts and tables. The differences according to sex, i.e. the number of girls and boys of a certain level and intensity of physical activity were calculated by the Chi-square test. The statistical level of significance was tested with an error of  $p = 0.05\%$ .

## Results

Chart 1. shows the level of weekly physical activity of a mild or high intensity for early and preschool-aged children. It can be observed that neither child is active seven or more hours a week. Girls, almost 56% of them, have a maximum of one hour of physical activity a week. There are 33.3% of girls who belong to the category of two to three hours of activity, while 11.1% of them are active four to six hours a week at a mild to high intensity.

Regarding boys, half of them (50%) are physically active up to one hour a week. There are 10% of them who belong to the category of half an hour, 25% of them belong to the two to three hours category, and 15% to the four to six hour category.



**Chart 1: Presentation of the weekly physical activity of a mild to high intensity**

Table 1. shows the differences between the number of girls and boys at a certain level of physical activity. Most boys and girls engage in mild to high intensity physical activity for only one hour a week, while the percentage of boys who are physically active at a mild or high intensity is significantly ( $p = 0.01$ ) higher regarding their active time than the percentage of girls.

**Table 1: The result of differences between the number of girls and boys regarding levels of physical activity**

Chi – square	Levels of freedom	p – value
12.06	3	0.01

The research results indicate that there is no child who is physically active seven or more hours a week, that somewhat more than 55% of examinees are active one hour a week, 30% of them are active two to three hours a week, while only 13% of them are active four to six hours a week. The results also show that boys are statistically more significantly ( $p=0.00$ ) active than girls.

### Discussion

The analysis shows that there is no child in any of the groups who satisfies the recommendations of the World Health Organisation, namely 60 minutes of activity per day of a moderate or high intensity (World Health Organisation, 2014). The results of the research *Health Behaviour for School-Aged Children* (2010) indicate that in the Republic of Croatia, as early as in the first grade of high school, there are 92% of pupils having an insufficient level of physical activity, i.e. those who do not move for at least 60 minutes a day at a mild or high intensity. The average prevalence of insufficiently active children amounts to 81% on the global level, and it includes more girls (86%) and 76.3% of boys (Currie et al., 2008). The difference in the prevalence is visible among different age groups, too. It is the highest with the oldest ones (85%), and the lowest with the youngest ones (77%). What is surely worrisome during the inspection of obtained results is the obvious problem of insufficient physical activity of Central American and European children. The differences are also visible among certain countries and it is therefore necessary to conduct studies and assessments on the national level for every country to be able to monitor their children and youth and give them all necessary to motivate their engagement into physical activities. Almost all countries showed a difference between sexes. The prevalence of insufficient physical activity is higher with girls than with boys, and so in line with the obtained results regarding the sex, special attention should be directed to the motivation of girls. According to the results obtained by the HBSC, there is a noticeable increase in the prevalence of insufficient physical activity at becoming part of the high school system and leaving

the primary school educational system. Moreover, in the high school educational system, according to the YRBSS results, the differences in the prevalence of insufficient activities have been determined, and they are higher at the end of high school education than at its beginning, or at the time of enrolment in high school programmes (Weiss and Williams, 2004; according to Jurakić and Heimer, 2012).

This research indicates that the aforementioned problem is seriously present at an early and preschool age. Former researches indicate an exceptionally low level of physical activity as early as at preschool age (Tomac et al., 2015). Preschool institutions can and should support high quality children's physical activities, since children of an early and preschool age who attend these institutions spend most of their time in them (Tomac et al., 2015).

Besides an extremely low level of physical activity, statistically significant differences regarding sex have also been obtained. As in almost all former studies (Treuth et al., 2015), boys are physically more active than girls. Boys are more active by their nature and they are more prone to dynamic movements than girls. Regardless of the child's sex, it is important to encourage higher intensity activities because they could affect the quality and length of life at the adult age (Hills et al., 2007). Both girls and boys have the highest physical activity in their free time. Their physical activities differ in type and content, and so, for instance, girls participate less in sport activities, while boys respond less to house chores. This could certainly be one of the reasons for such obtained results.

Physically active children are healthier and by their active way of life they influence their healthier future (Boreham and Riddoch, 2001). It is necessary to adopt the healthy habit of regular physical activity, offer children the possibility to engage in them in the educational system which would motivate them and thus result in a healthier population and more positive results of studies about the prevalence of insufficient physical activity (Jurakić and Heimer, 2012).

A continuous assessment of physical activities, especially during childhood, is necessary on the national, as well as global level. Such assessments enable the organisation of measuring the physical activity level in both educational systems and children's free time. This can give a contribution to the improvement of the evaluation strategies' quality, but also to the advancement of physical activities (Jurakić and Heimer, 2012).

This research's flaws are certainly a small number of examinees and the fact that the children's physical activity level was subjectively evaluated by their parents. In the future, a larger number of examinees, or more regions, should be encompassed, while the physical activity level should be evaluated with exact instruments.

## Conclusion

This research has shown that even at the preschool age there is a serious problem of insufficient physical activity which calls for intervention programmes. It is clear that contemporary kinesiology in the educational system should be more directed toward health and that movement should not only be a trend, but a way of life, i.e. the way a certain kindergarten functions. How to set the *movement*, or moving, as a base for learning and teaching is not only one of the greatest challenges of kinesiology, but also a necessity if children's health is to be preserved and upgraded.

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