

MASARYK UNIVERSITY

Faculty of Education

Outdoor education as a powerful way of teaching and learning

Habilitation thesis

(A collection of previously published scholarly works with commentary)

Brno 2023

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I declare that this thesis has been composed solely by myself using only the cited literature, information and resources and that it has not been submitted in any previous application for a degree.

In Brno on 10th March 2023

I want to thank my colleagues from the Department of Geography, Faculty of Education, Masaryk University, who contributed making this thesis possible. They are namely Eduard Hofmann, a colleague who brought me to the topic of outdoor education and coauthors of the presented papers Darina Mísařová and Radek Durna. Big thank goes to the faculty administrative staff (Dana Nesnídalová and Daniela Marcollová).

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PART I: A COMMENTARY TO THE
COLLECTION OF PUBLISHED WORKS

1. INTRODUCTION: EXPLAINING THE STRUCTURE OF THE HABILITATION THESIS

The Habilitation thesis consists of two parts. Part I is a brief commentary on the collection of published works. Part II is a collection of published works. Figure 1 presents a basic structure of the Habilitation to understand the flow of the text and the author’s thinking about it.

Structure of PART I and its reflection in papers in PART II		
Chapter 1: Introduction		
Chapter 2: General chapter about the relevance of the Habilitation topic		
Chapter 3: Author’s contributions to the topic		
Chapter 3.1, 3.2: Contributions to theory, paper 1, 5, 6	Chapter 3.2, 3.3: Contributions to practice, paper 1, 2, 5, 6	Chapter 3.2, 3.4, 3.5 Contributions to research, paper 1, 3, 4, 5, 6
Chapter 4: Current work and future perspectives of the author’s research		
Video-based research	Progression among school grades	Integration across school subjects
Chapter 5: Conclusion		

Figure 1. Structure of part I of the Habilitation and its reflection in papers in part II
Source: Author

The Habilitation thesis includes a collection of six published works of the applicant – four journal papers, one book chapter and one book with selected chapters – see overview in Table 1. This *Commentary* explains the wider context of the publications’ topics and their interconnection.

All works have a common topic – curriculum-based outdoor education (OE) focused on geography education. OE facilitates the didactic transformation of the professional geographical curriculum and includes current topics in the classes. Many authors (especially abroad) consider OE a powerful teaching strategy because it is up to date, mobilises students and has many other positive aspects. As curriculum-based OE, that is, learning and teaching (in any scientific subject including geography), is a relatively unexplored phenomenon in Czechia, the topic offers many research and publication opportunities.

The *Commentary* is structured to show the applicant’s systematic long-term work and contributions in the specific topic that links geographical specialisation and the didactics of geography with pedagogical research. All publications are written in English to enable an international assessment of the work. Of course, the applicant has other papers on the topic of OE, but they were written in the Czech language. A list of these papers is included at the end of this work (attachment 1).

All publications are written in collaboration, as the topic of OE has been at the centre of research and pedagogical activities at the Department of Geography, Faculty of Education, Masaryk University. Moreover, the given works have been published as an output of research project 18-08315S *Fieldwork as a strong educational strategy* supported by the Czech Science Foundation in the period 1/2016–12/2018.

The topic of OE has so many unexplored dimensions (mainly in Czechia), both disciplinary and cross-curricular, that it was difficult to write papers on it as a single

author. It must be emphasised that the need for collaboration between authors has specific development. At the beginning of the applicant's interest in the topic, the applicant was not the leading author but the 'consumer' of previous activities in the Department of Geography. Therefore, the book chapter has two authors with 50% participation (publication 1). Later, with growing interest and several realised projects supported by the Development Fund of Masaryk University and specific research projects of the university, the applicant became the leader of research activities on the topic of OE, and international cooperation also began. As a result of growing interest in OE research in the Department of Geography, a research group for OE under the author's leadership emerged. The applicant is the leading author in three given journal papers (publications 2, 3 and 4). The other two publications (one journal paper and one book, specifically book chapters) are written by an international team of Czech, Danish and Slovene authors (publications 5 and 6). The applicant was one of the leading authors in both cases.

The abovementioned project 18-08315S was one of the applicant's most important projects, but it is not the only one. The following project TJ01000127 *Fieldwork Education System for Elementary Schools* was supported by the Technology Agency of the Czech Republic in the period 1/2018–4/2019. The output of this project is the methodology certified by the Ministry of Education, Youth and Sports of the Czech Republic (Svobodová et al., 2019). This methodology earned the Award of the Dean of the Faculty of Education of Masaryk University for its creative activity and is widely used by both trainee geography teachers and primary and lower secondary teachers. Unfortunately, this work is written in Czech and is not included in the presented works. Nowadays, the topic of OE is developed in other projects, including several PhD theses supervised/consulted by the applicant, and has the potential for future research. The timeline of the author's OE research participation is presented in Figure 2. Overall, in the period 2014–2022, the author was a participant (member or investigator) in 12 projects focused on OE.



Figure 2. Timeline of the author's outdoor education research participation
Source: Author

All presented journal papers in this Habilitation are published in respected journals, three of them in international journals indexed in the Web of Science database:

Journal of Adventure Education and Outdoor Learning (publication 1)

Journal of Geography (publication 3)

Compare: A Journal of Comparative and International Education (publication 6)

One paper was published in a Czech journal indexed in the Scopus database (*Studia Sportiva*; publication 4).

The topic presented in the publications also has developed content. Publication 1 describes a sample case study realised at the Department of Geography, Faculty of Education, Masaryk University, confirming concepts on the power of geography OE. Publication 2 analyses the anchoring of OE in Czech curricular documents and its implementation at selected elementary schools providing primary and lower secondary education. Therefore, my research group and I made an effort to propose the principles of the concept of OE and its implementation in the Czech curriculum for primary and lower secondary schools. Publication 3 deals with the benefits of OE as perceived by teachers, pupils and parents for learner development in knowledge, skills, attitudes and interpersonal relationships. The mentioned groups of actors perceive the benefits of OE differently, and therefore, we think that not only the continuous enlightenment of OE benefits but also pointing to its limit is necessary. One of the benefits of OE is strengthening pupils' physical activity. Publication 4 aims to determine the extent to which OE can increase the possibilities of movement for pupils during their schooling. Publications 5 and 6 present the possibilities of interdisciplinary integration of physical education and geography on the level of curricula and practice through OE in three different European countries.

Table 1

An overview of the selected published works

No.	Type of publication	Publication
1	journal paper (WoS, Q2)	Svobodová, H., Durna, R., Mísařová, D. & Hofmann, E. (2021). A proposal of a concept of outdoor education for primary and lower secondary schools – The case of the Czech Republic. <i>Journal of Adventure Education and Outdoor Learning</i> , 21(4), 336–356. https://doi.org/10.1080/14729679.2020.1830138
2	book chapter (Scopus)	Hofmann, E., & Svobodová, H. (2017). Case studies in geography education as a powerful way of teaching geography. In P. Karvánková, D. Popjaková, M. Vančura, & J. Mládek (Eds.), <i>Current topics in Czech and Central European geography education</i> (pp. 115–128). Springer. DOI: 10.1007/978-3-319-43614-2_7
3	journal paper (WoS, Q4)	Svobodová, H., Mísařová, D., Durna, R., & Hofmann, E. (2020). Geography Outdoor Education from the Perspective of Czech Teachers, Pupils and Parents. <i>Journal of Geography</i> , 119(1), 32–41. https://doi.org/10.1080/00221341.2019.1694055
4	journal paper (Scopus)	Durna, R. & Svobodová, H. (2020). Strengthening Pupils' Physical Activity through Outdoor Education. <i>Studia Sportiva</i> , 14(2), 26–38. https://doi.org/10.5817/StS2020-2-3
5	book chapters	Vlček, P., Resnik Planinc, T., Svobodová, H., Clausen, S. W., Conradsen, K., Hergan, I., . . . & Ogrin, M. (2016). <i>Integrating Physical Education and Geography</i> . Masarykova univerzita. https://munispace.muni.cz/library/catalog/book/871 Chapters 7.1, 7.2, 7.5, 7.6, 10.2, 10.3
6	journal paper (WoS, Q3)	Vlček, P., Svobodová, H., & Resnik Planinc, T. (2019). Integrating Physical Education and Geography in elementary education in the Czech Republic and the Republic of Slovenia. <i>Compare: A Journal of Comparative and International Education</i> , 49(6), 868–887. https://doi.org/10.1080/03057925.2018.1466267

Note. The list of other publications dealing with outdoor education is mentioned in attachment 1. These publications are not listed here, as they are written in the Czech language.

Details about the published works are listed in the chapter 'PART II: THE COLLECTION OF PUBLISHED WORKS'.

2. OUTDOOR EDUCATION – INTRODUCTORY REMARKS TO THE RELEVANCE OF THE TOPIC

Outdoor education (OE) is a form of education that for years has been considered a powerful teaching strategy matching the complex understanding of today's world (for example Lambert & Balderstone, 2010). Although many aspects of OE are already described in the literature at different levels of the educational process (primary school, secondary school, pre-service teachers and in-service teachers), the document 'A road map for 21st century geography education' (Bednarz et al., 2013) recommends more research about fieldwork and its impact on learning, skills and practices.

The relevance of the topic of OE in the last 15–20 years was growing as is obvious from a growing number of published papers on this topic indexed on the Web of Science (Figure 3) with a main research interest in Anglo-Saxon countries (and several other countries) (see Figure 4).

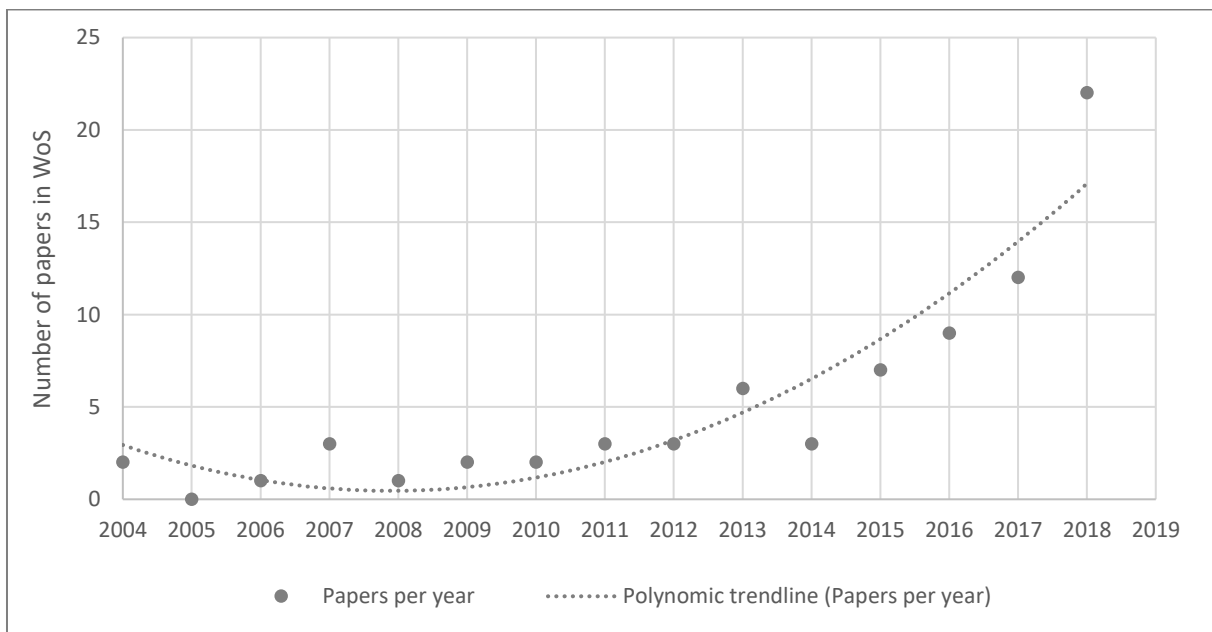


Figure 3. Number of papers engaging in research in outdoor education in school settings

Note. The graph is based on an analysis of 78 papers indexed in WoS during 2004–2/2019 dealing with curriculum-based outdoor education.

Source: Češková et al. (n.d.)

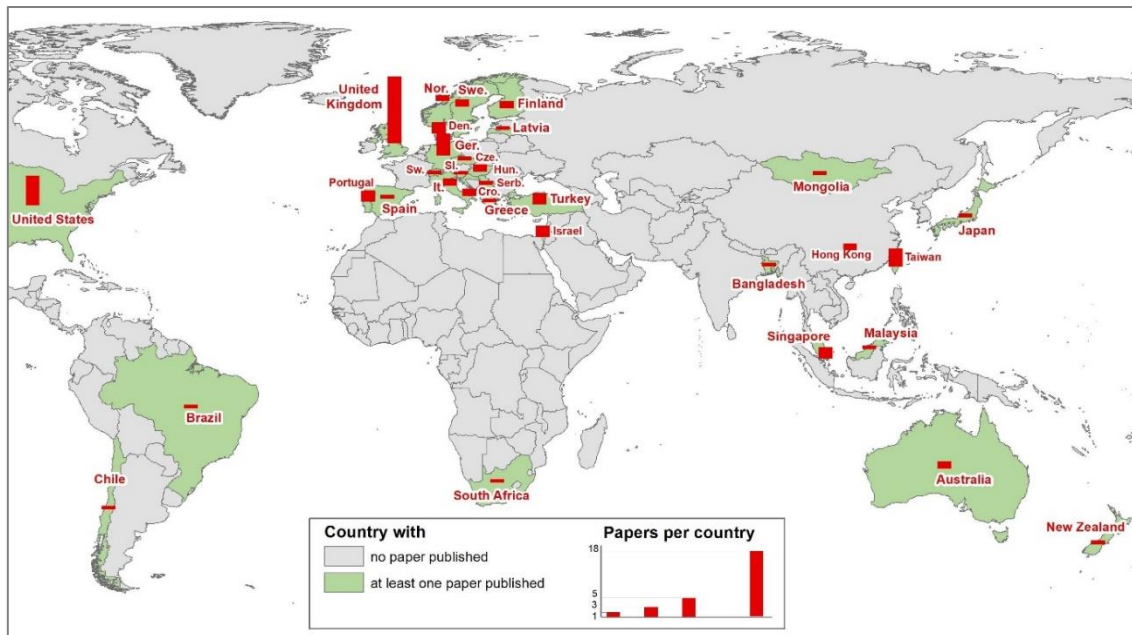


Figure 4. Leading countries in contemporary research in outdoor education

Note. The map is based on an analysis of 78 papers indexed in WoS during 2004–2/2019 dealing with curriculum-based outdoor education.

Source: Author based on the systematic mapping review

Meanwhile, the absence of Czech research in the field of OE is evident. There are only isolated attempts to realise research activities engaging in OE in geography education in the Czech Republic (Hofmann & Korvas, 2008). In this field, published papers/books are more often in the form of theoretical (Korvas & Cacek, 2009; Podroužek, 2002) or practical guides (Hofmann, 2003; Hofmann et al., 2009; Marada, 2006; Řezníčková, 2008; Smrtová et al., 2012).

The growing relevance of the topic of OE and the lack of knowledge about OE in the Czech Republic led us to a deeper analysis of OE in geography education in the country. With respect to the main areas of topics dealing with different kinds of OE performed in schools abroad, which are:

- the perspective of OE as a specific education strategy,
- research on the effects of OE,
- a subjective participant’s point of view on OE,
- an examination of instruction,
- teachers and their preparation,

me and my research group devoted our attention to the benefits of OE in the intended, implemented and achieved curriculum in Czech schools. Published research papers by authors worldwide have demonstrated the benefits of OE on many levels. These benefits stem from the specific nature of OE. We supported the knowledge about the benefits of OE with the papers presented in the thesis in different areas that will be presented in the next chapter.

To be fair, it is necessary to mention that OE has some negative aspects (Dettweiler et al., 2015; Tan et al., 2007) that can emerge when the OE is poorly implemented. There are also many barriers for teachers that discourage them from implementing OE into their tuition.

3. CONTRIBUTIONS TO SUPPORT OUTDOOR EDUCATION IMPLEMENTATION IN CZECH ELEMENTARY SCHOOLS

3.1 DIVERSITY OF TERMINOLOGY – OUR APPROACH

The common terms for all the presented papers are *fieldwork* or *outdoor education*. Because the definitions of both terms differ and our approach to the definitions developed with time, it is necessary to explain our approach to these terms.

The notion of *outdoor education* in the educational context means various forms of out-of-school activities. In professional literature, the term *outdoor education* is often combined with *outdoor education/learning* or *fieldwork* (see for example Biddulph et al., 2015; Kent et al., 1997; Lambert & Reiss, 2014; Ofsted, 2011; Oost et al., 2011 or Rickinson et al., 2004).

There are many definitions of *outdoor education/learning* or *fieldwork*, but none of them explain the difference between these terms, and journal authors use the terms randomly. We understand that in many cases, research workers do not feel the urge to describe a specific type of realised form of OE. Then, we can only identify from the context of how the authors understand the term. Higgins and Nicol (2002, p. 2) claim that *behind the diversity of approaches lie different theoretical understandings and practical applications of outdoor education*. Allison (2016) adds that the difference in OE definitions results from different understandings and practices within various research areas, countries and cultures.

To define the frame of our OE research, we have upgraded and used the definition of OE by Hofmann (2003) as follows:

Outdoor education is an ‘umbrella’ concept for multiple forms of education, with the common feature being undertaken outdoors, outside school buildings. Outdoor education can take on a variety of organizational forms, from didactic walks, excursions, and field exercises to field research. If outdoor education should have any benefits for pupils, they must be actively performing activities such as collecting and processing information from primary and secondary sources, using the research methods and aids of individual scientific disciplines.

We use this definition in papers 1, 3 and 4.

During the time we were interested in OE, we specified the terminology and started to use the term *curriculum-based outdoor education* (Becker et al., 2017; Marchant et al., 2019) in geography, that is, OE that is closely interconnected to school education and geography curriculum. In an ideal case, it should be performed by the teacher (not the external institution) as they know best what they teach in the classroom and can expand/practice through OE. The principles of how to implement OE into the school curriculum are mentioned in Chapter 3.2.

It is necessary to add that some authors (Oláhová & Nemčíková, 2009; Turčová et al., 2005) also include in OE teaching in an educational institution other than a school (e.g., a museum, a gallery, a planetarium, an industrial or agricultural plant). We do not consider this type of education as OE, as it is performed in a building.

If we use the term *fieldwork*, we understand it as a particular field activity included in the superior category of ‘outdoor education’. We use the term *fieldwork* in papers 5 and 6.

3.2 CURRICULUM-BASED OUTDOOR EDUCATION – OUR CONCEPT PRESENTED ON THE CASE OF GEOGRAPHY EDUCATION

Outdoor education programmes have their place in some national curricula (e.g., Australia, New Zealand, Denmark; Bentsen et al., 2009; Boyes, 2000; Gray & Martin, 2012). Also, in the Czech Republic, OE has an integral place in the national curriculum, which is represented by Framework Educational Programme for Elementary Education¹ (FEP EE, 2021) and Framework Educational Programme for Secondary General Education (Grammar Schools) (FEP SGE, 2007).² OE in FEP EE is already designed for primary education, especially with regard to the educational area ‘People and their World’. If we focus on lower secondary education, OE is well established within the individual educational areas “People and Nature” for biology and geography and in the educational area ‘People and Health’ for physical education.

Now, we focus only on geography. The educational area ‘People and Nature’ contains four educational fields, one of which is geography. Geography has seven thematic areas – *Field geographic education, practice and application*³ is one of them (see Figure 5). This figure demonstrates the ideal position of OE that should play with the thematic area ‘Geographic information, data sources, cartography and topography’ a crucial role in interconnecting all geographical thematic areas. In other words, these two thematic areas should be incorporated into the tuition of the four other thematic areas as we use geographical information, data sources, maps and OE in the other four thematic areas. *Field geographic education, practice and application* make teaching geography meaningful, as it provides opportunities to practice most of what pupils learn in the classroom from other geographic thematic areas in a real environment – outdoors. The landscape in which OE takes place is an infinitely large laboratory where students learn to collect primary data and search for answers to geographical questions. Properly conducted OE and follow-up activities in the classroom can provide students with one of the most important functions of geography: a view of the real environment – the phenomena and processes that take place in it.

¹ A more detailed description of the Czech curriculum with a link to outdoor education is in publication No. 1, pp. 337–339. To understand the structure of FEP to read this text, we present its basic structure: educational area – educational field – thematic area.

² We are interested only in the elementary school curriculum (i.e., primary and lower secondary) and higher secondary general school (i.e., grammar school) curriculum, as geography as a school subject is incorporated here. There are many other framework educational programmes, for example for secondary technical and vocational training, art education, language education, and others, where geography is not incorporated. In the text, we pay attention especially to lower secondary education.

³ Translation of ‘Field geographic education, practice and application’ (original is Terénní geografická výuka, praxe a aplikace) is assumed from the official English version of Framework Education Programme for Elementary Education (FEP EE, 2007), but we do not agree with it.

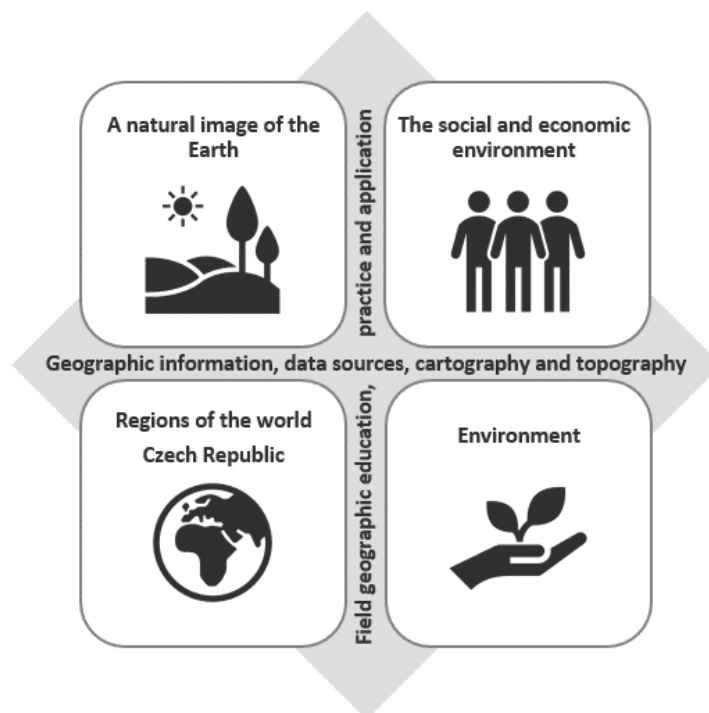


Figure 5. Visualisation of thematic areas of educational field geography
 Source: © Department of Geography, Faculty of Education, Masaryk University

However, the expected outcomes of thematic area *Field geographic education, practice and application* defined in the FEP EE (see Table 2) do not reflect the modern conception of OE that should be based on problem-orientated tasks (Kent et al., 1997) and students' inquiry.

Table 2
Anchoring of outdoor education in the FEP EE for geography education

FIELD GEOGRAPHIC EDUCATION, PRACTICE AND APPLICATION Expected outcomes the pupil shall: <ul style="list-style-type: none"> • master the basics of practical topography and orientation in the field; • apply practical methods in the field when observing, depicting and assessing the landscape; • apply the principles of safe movement and stay outdoors in practice, apply the principles of safe conduct and emergency behaviour in model situations.
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Source: Framework Educational Programme for Elementary Education (2021, p. 79).

As the position of OE in the Czech national curriculum is not ideal and does not reflect the approaches that are beneficial for students, we set the principles below to support OE implementation into the school curriculum and prevent the random ordering of OE among other forms of education (i.e., with only minimum links to curriculum). When the school or teacher wants to create a systematic conception of curriculum-based OE, they should follow these *principles* with a starting point of elaboration of a SWOT analysis of the school to determine the prerequisites for implementing OE. These principles are published and explained in detail in *Publication No. 1*.

- Links between outdoor education to knowledge acquired in previous years of education and to learning progress.

Principle 1: Links of outdoor education to knowledge acquired in the course of previous years of education and to learning progress.

The individual forms of outdoor education (see Table 2) should be included in the syllabus of the individual years of primary and lower secondary education according to the learning progress scheme (Bruner, 1960 or Mrázková, 2011 on an example of cartography skills), for continuous improvement of pupils' skills and competences. In the first years, the outdoor education activities should be simple, defined by the teacher. Later, these activities should require the use of knowledge acquired in the previous course of education and increased the independence of the pupil. In the final stage, the pupil should be able to work independently outdoors, and the teacher's role should be rather to check and advise. The pupil's role is thus transformed from the traditional consumer of information to an active learning individual. Both roles, those of the teacher and the student, must be balanced, hence either the leading role of the teacher prevails, or the activity is more student-work-oriented (Oost et al., 2011, p. 311).

(Taken from Publication No. 1, p. 349)

- Connection between outdoor education and classroom work.
- Combination of various forms of outdoor education from a temporal point of view.
- Interconnection of current topics with outdoor education in various types of landscapes.
- Interconnection of outdoor education implemented in individual school subjects (geography, biology, PE . . .) to a complex.
- The role of an outdoor education coordinator should be established at the school (similarly to the existing role of environmental education coordinator).

3.3 OUTDOOR EDUCATION AS A POWERFUL WAY OF TEACHING AND LEARNING – CONTRIBUTIONS FOR PRACTICE

One of the barriers to OE is the lack of supportive methodology resources for the preparation and implementation of OE or the lack of information resources on the place/region of implementation of OE (Anderson & Jacobson, 2018; Ham & Sewing, 1988; Svobodová, 2019). To overcome these barriers, we provided model methodical materials and worksheets for teachers.

All our practical activities are consistent with the principles mentioned above aiming to support the implementation of modern forms of OE in curricula. Our effort started with the publication of practical guides and methodological materials usable for problem-oriented OE teaching.

Publication No. 2 presents a model case study of fieldwork that focuses on the possibility of restoring a ski slope in Brno. This case study is applicable not only in Brno but also in any other areas (possibly with some modifications for local conditions). This paper aims to present the relevance and powerfulness of case studies for teacher training as the students and future geography teachers learn to:

1. Ask geographic questions from disciplines that relate to the actual task.
2. Search for answers in various sources of information.
3. Work with various research methods including field research.
4. Process the results and draw conclusions.

(Taken from Publication No. 2, p. 117)

Our approach is in concordance with those of other authors, who believe that OE should deepen the knowledge already acquired and convey to pupils a clearer understanding of the phenomena and events occurring around them (Lambert & Balderstone, 2010), advance their specific skills (Malone et al., 2002; Řezníčková, 2008) and shape their attitudes and respect for the environment.

Group No. 1: Evaluation of site suitability in terms of restoring the slopes

- Find out what the requirements are for ensuring the operation of the ski slope in summer and winter.
- Draw a plan of the slope and the necessary landscaping on the map.
- Select and justify the choice of location for the start and finish of the chairlift route and its management.
- Predict and justify the selection of sites for parking cars in the lower and upper part of the slope; mark the parking lots in the map including the recommended roads.
- *Output: Report for the city council assessing the possibilities for building the slopes, including maps and photographs.*

Commentary

The tasks are based on questions such as:

- *Are there conditions nearby for parking cars?*
- *What is the availability of the slope in Brno?*
- *What are the parameters for the construction of a safe slope?*
- *What documents (e. g. development strategy, spatial plan, specialized maps and data) do we need to prepare for the study of the slope area and the surroundings, etc..?*

Involvement of the knowledge and skills from the following discipline:

- *Cartography*

(Taken from Publication No. 2, p. 119)

Except for Publication No. 2, introducing a model case study realised with pre-service geography teachers at the Department of Geography, Faculty of Education, Masaryk University, we operate two webpages presenting resources for fieldwork, both developed in the frame of projects of the Masaryk University Development Fund.

The first project, called *Fieldwork in English* (3/2014–12/2014, with H. Svobodová as investigator), helped to create materials for students and teachers that can either be used directly for fieldwork in Brno and its surroundings (see Figure 6) or inspire them to prepare their activities in different localities. The project also introduced the content and language integrated learning method (CLIL) into geography teaching, as the materials are in Czech and English.

Úvod	Introduction
Panoramatický náčrt	Panoramic sketch
Suburbanizace	Suburbanization
Stránská skála	Stránská Rock
Spielberk Office Centrum	Spielberk Office Centre
Orientační běh	Orienteering
Wherigo	Wherigo
Sjezdovka Wilsonův les	Ski slope Wilson's forest
ATC Ošovec	ATC Ošovec

FIELDWORK IN ENGLISH (FINE)

Department of Geography, Faculty of Education, Masaryk University

Sjezdovka Wilsonův les

Ski slope Wilson's forest



Sedmdesátá léta 20. století. Doba, kdy se zrodila myšlenka na vybudování lyžařského svahu v Brně. Tento nápad na sebe nenechal dlouho čekat. Roku 1974 se slavnostně otevřel svah ve Wilsonově lese. Sjezdovka byla unikátem hned z několika důvodů. Byla umístěna do největšího lesoparku v Brně, který byl

It was 70s of the 21st century. The time when was made an idea of building up the ski slope in Brno. The idea did not have to wait long. In 1974 was festively opened the ski slope in the Wilson's forest. The ski slope was unique for a lot of aspects. It was situated in the biggest forest park in Brno, which was established in 1882 by

Figure 6. Fieldwork in English project website

Source: Fieldwork in English (FINE), <https://www.ped.muni.cz/fine/>

A more complex material for students and teachers with an interest in OE originated within the project *Námětovník pro terénní výuku* (1/2017–12/2017, with H. Svobodová as investigator). The activities for OE are organised into three parts – activities for school grounds, activities for the urban environment and activities for the rural environment (see Figure 7).

NÁMĚTOVNÍK PRO TERÉNNÍ VÝUKU SOCIOEKONOMICKÉ GEOGRAFIE

PEDAGOGICKÁ FAKULTA Masarykovy univerzity
HANA SVOBODOVÁ, RADEK DURNÁ, MAREK PERNICA, EDUARD HOFMANN

Školní pozemek	Město	Venkov
<p>Obsah</p> <ul style="list-style-type: none"> ▫ Titulní strana ▫ Úvodem <ul style="list-style-type: none"> ▫ Terénní výuka – prostor pro problémové vyučování ▫ Členění Námětovníku ▫ Příprava a realizace terénní výuky ▫ Příprava mapových podkladů pro terénní výuku (modelový případ) ▫ Školní pozemek ▫ Město ▫ Venkov ▫ Literatura 	<h3 style="color: #0070c0;">TERÉNNÍ VÝUKA – PROSTOR PRO PROBLÉMOVÉ VYUČOVÁNÍ</h3> <p>Nejvyšším a zároveň nejtěžším posláním všech stupňů a typů škol je naučit žáky či studenty kriticky myslet. V současném kurikulu v České republice i v zahraničí je tato skutečnost zakotvena v podobě klíčových kompetencí, které mají žákům poskytnout spolehlivý základ všeobecného vzdělání orientovaného zejména na situace blízké životu a na praktické jednání (RVP ZV, 2016, s. 8).</p> <p>Protiváhou k těmto vzdělávacím cílům stojí často statická výuka, která nenutí žáky přemýšlet. Učí se množství faktografických poznatků bez toho, aby byl kladen důraz na to – proč se těmto faktům mají učit a jak s nimi mohou naložit v praktickém životě. Geografické vzdělávání není v tomto směru žádnou výjimkou. Zeměpis má však celou řadu předpokladů, jak se ze “statického” pojetí výuky vymanit a ukázat, že geografické poznatky, a především geografické myšlení lze uplatnit i v každodenním životě. A právě “užitečnost” poznatků, které se prostřednictvím školy z jednotlivých předmětů studenti dozívají, může vést k prohloubení zájmu o tento předmět. Vlajkovou lodí je v tomto směru terénní výuka.</p>	

Figure 7. Námětovník pro terénní výuku project website

Source: Svobodová et al. (2018)

Last but not least, the methodological material supporting the implementation of OE into school tuition is Publication A *The Concept of Outdoor Education for Elementary School* (Svobodová et al., 2019), listed in attachment 1.

All the materials are focused on the fact that short-term and midterm forms of OE should be prepared and guided by the teacher. Through our publications, we offer practical and methodological guides to include OE in the elementary school curriculum, including detailed examples of educational topics applicable in urban and rural environments. The concept, moreover, provides a guidance to ensure pupils' safety, legislative regulations related to OE specific to the Czech environment and examples of the use of specific teaching aids.

3.4 OUTDOOR EDUCATION AS A POWERFUL WAY OF TEACHING AND LEARNING – CONTRIBUTIONS FOR RESEARCH

Our research on OE stems from the fact that OE is considered a powerful way of teaching and learning, but there is insufficient information about OE performed in Czech schools. In concordance with international trends in OE research, we focused on four partial aims realised in four steps:

Partial aim 1: Analyse the anchoring of outdoor education (with a focus on teaching the subject of geography) in selected school educational programmes (SEPs) in elementary school's lower and upper stages. → *published in Publication G in attachment 1 in the Czech language.*

Partial aim 2: Find out the extent to which outdoor education is implemented at elementary schools. → *published in Publication No. 1.*

Partial aim 3: Find out the attitudes of teachers, pupils and their parents towards implementing outdoor education at elementary schools. → *published in Publication No. 3.*

Partial aim 4: Measure the benefits of outdoor education to develop pupils' physical activity in the model elementary school. → *published in publication No. 4.*

3.4.1 RESEARCH METHODOLOGY

My research group and I analysed 78 papers indexed on WoS in 2004–2/2019 dealing with curriculum-based OE to find out the type of research and methods that the authors used. Most of the included papers employed qualitative research (n = 32; 40%); studies that used quantitative and mixed-method research were equal (n = 23; 30% for both). Six main research methods (according to Cohen et al., 2011) were identified: most often were interviews (including focus groups, n = 39; 50%) or questionnaires (n = 45; 58%). Further, observation (n = 25; 32%), document analysis (i.e., diary, concept map, curriculum, field notes, online chat etc., n = 20; 26%), didactic test (n = 15; 19%) and audiovisual media (including audio and video recordings, n = 13; 17%) were applied. As evident, 53 analysed papers (68%) used more than one research method.

Similarly, as the authors of the analysed studies, we used mixed-method research. Four main methods were used to gain original data about OE in the Czech Republic – content analysis, structured interviews, questionnaire survey and physical activity measurement (see red box in Figure 8). Each step of the research reflects one of the abovementioned

partial aims. A detailed description of each method is described below and is taken from Svobodová (2019) and *Publications No. 1, 3 and 4*.

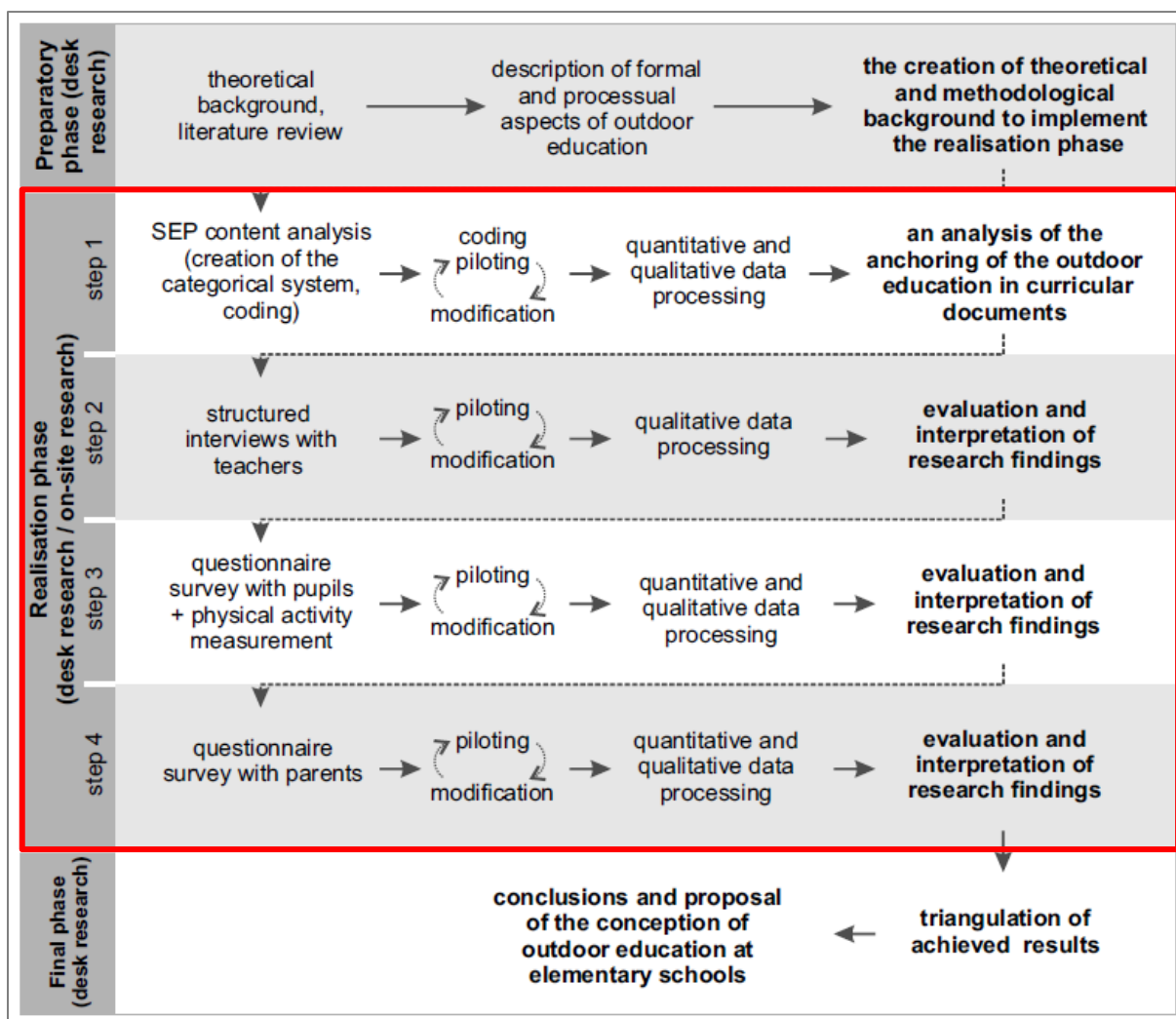


Figure 8. Research design used for project 16-00695S Fieldwork as a powerful learning strategy
Source: Svobodová (2019, p. 89)

3.4.2 CONTENT ANALYSIS: ANCHORING OF OUTDOOR EDUCATION IN SCHOOL EDUCATIONAL PROGRAMMES – THE STATE OF INTENDED CURRICULA

The first phase of the research was defining the theoretical background of OE. One of the crucial aspects of whether and how OE is realised in practice is its anchoring in curricular documents. Therefore, we conducted a content analysis of the national curricular documents (Framework Educational Programme for Elementary Education and Framework Educational Programme for Secondary General Education – Grammar Schools) and mainly school education programmes (SEPs) in relation to OE.

As the anchoring of OE in the national curriculum is clearly given, we focused on the content analysis of SEPs as the conception of OE may vary here. **Content analysis** of SEPs was implemented for 50 intentionally selected school curricula of complete elementary schools (grades 1 to 9) and the lower grades of eight-year grammar schools (grades 1 to 4 as these are parallel to grades 6 to 9 at an elementary school) in the South-Moravian and South-Bohemian Regions.

The content analysis of the SEPs included 32 criteria of which 13 were identification criteria: (1) name of the school, (2) region of the school, (3) district of the school, (4) address of the school, (5) school website, (6) head teacher, (7) contact teacher, (8) type of the school, (9) number of classes in the lower stage, (10) number of classes in the upper stage, (11) total number of pupils, (12) availability of the curriculum on the school website, (13) website link to the SEP.

[. . .]

The next four criteria examined whether and to what extent outdoor education was mentioned in the SEP in the general perspective and whether and how it was anchored in the curriculum. In syllabi (*), the questions were focused on the implementation of outdoor education as regards the form, time, space, integration of the subjects and implementation of outdoor education in the cross-curricular subjects and projects of the school. The questions in the questionnaire were partially closed (YES/NO answers), semi-closed (choice of an option with a supplementing comment) and open where it was necessary to write the person's own comment.

The assessed parameters were selected according to the contextual, chronological, localisation and organisational perspectives. The level of the analysis, i.e. the individual concepts (categories), was specified and between them, the words, phrases and themes were included. This was followed by a proposal of the coding, i.e. specification of the units in the partial categories with clarification of the scope of the individual concepts. The existence and frequency of the words or phrases were recorded. For example, if the subject in the SEP was described as "the education proceeds with the application of various forms and methods depending on the nature of the subject matter – frontal teaching, group work, projects, papers, geographical field trips" and subsequently an outcome for the given subject defined as "pupils are capable of basic orientation in the terrain using a compass and a map", the following codes were assigned: inclusion in the SEP – yes, as regards the subject – subject-oriented outdoor education, as regards the time – short-term outdoor education, as regards the space – an environment of a municipality or school plot (which stems from the short-term nature of the activity and the knowledge of this context by the coding person), as regards the organization (form) – an outdoor exercise/a walk (here it cannot be clearly defined; the orientation is more the content of a walk or an outdoor exercise). In this way, the entire SEP of the given school was coded and finally evaluated to find out if the outdoor education in the school SEP was presented as a comprehensive concept both in the YES/NO evaluation and in the brief comment.

(Taken from Svobodová, 2019, pp. 92–93).

(* Note. The remaining 15 questions)

We know that the Framework Educational Programmes provide support for school/curriculum-based outdoor education realised in Czech schools. However, it depends only on how the teachers incorporate the expected outcomes set in the FEP into the SEP. As the Czech curriculum is specific (compared with other countries), we pay attention to a brief summary of the results of their content analysis.

OE is mentioned in 49 of 50 analysed SEPs but to a different extent. OE was most often identified in the educational sphere 'People and Nature' – in geography 46 times and biology 41 times. This indicates that OE is primarily realised in natural sciences, and other educational spheres are represented less often.

As mentioned, the diversity of terms to name different forms of OE is endless. This was also evident in the analysed SEPs, and thus we used standardised categories to name identified forms of OE. The most frequently used term was *excursion*, which usually included visits to museums, libraries, exhibitions, planetariums and other cultural and educational institutions. The second most frequently mentioned form of OE was *a walk*. The third was *outdoor/field/fieldwork exercise*. All identified and standardised forms of OE are evident in Figure 9.

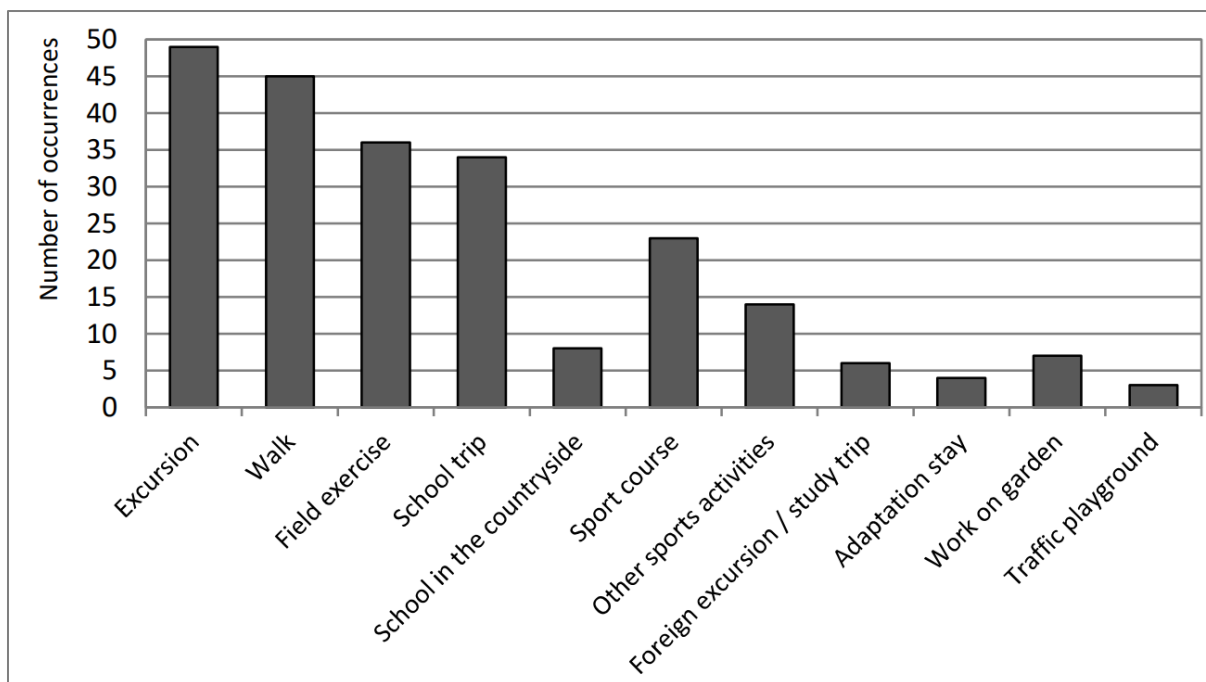


Figure 9. Implemented forms of outdoor education identified in 50 SEPs

Source: Publication No. 1, Svobodová et al. (2020, p. 344); the graph is based on content analysis of 50 SEPs

From a temporal point of view, mostly short-term outdoor activities (i.e., 1–2 lessons) were identified. These are mostly short excursions such as the abovementioned visits to libraries, exhibitions and work on school grounds. Long-term courses (i.e., lasting two or more days) including sport courses, school trips or stays in environmental centres are quite often conducted.

The place where OE takes place correlates with the temporal aspect (Figure 10). If short-term activities prevail (excursion, walks), the place must be near the school. That is why the urban environment dominates with regard to location. The rural environment is visited to organise long-term school trips or sports courses.

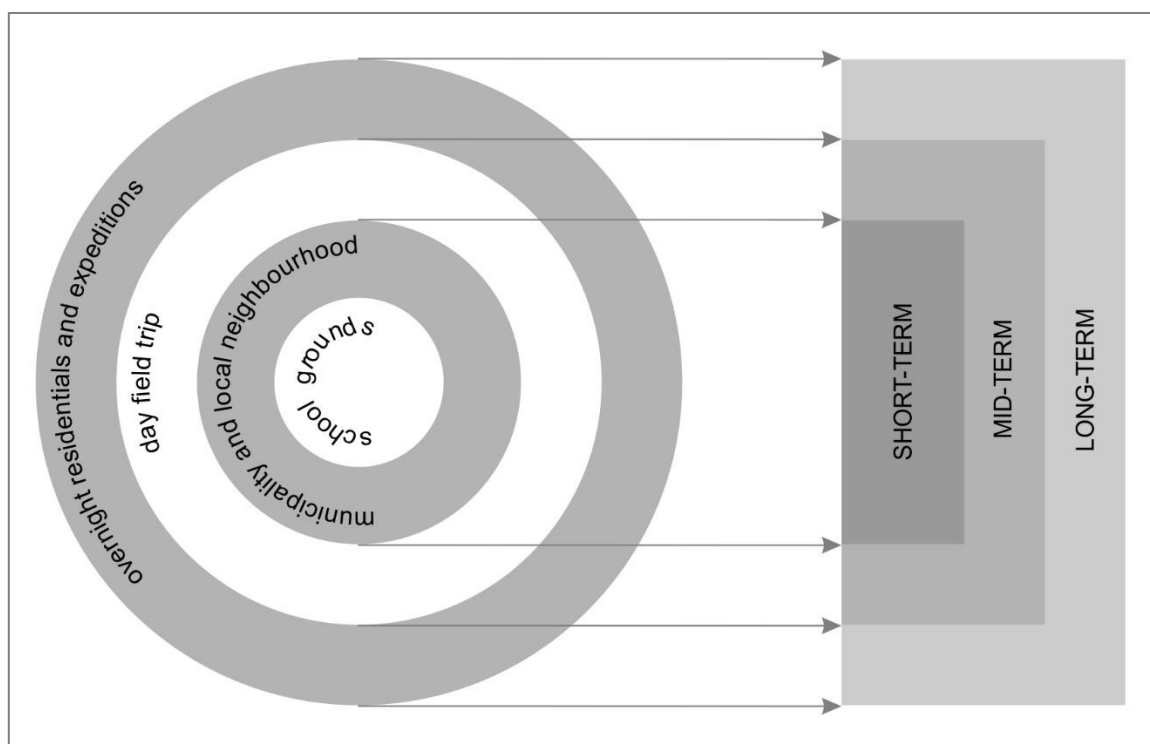


Figure 10. Zones and terms of outdoor education

Source: Beames et al. (2012, p. 6); own adjustment and supplement in the Czech language in Svobodová et al. (2019)

This analysis should have revealed whether OE is presented in the SEP as a unified (teaching) concept, that is, whether particular forms of OE are interconnected and developed systematically. The analysis shows that the vast majority (40) of analysed SEPs do not present OE as a systematic concept but as separate unrelated activities. However, this analysis works with the state of the intended curricula, which usually do not provide a comprehensive overview of all implemented forms of OE. Usually, only repetitive forms (long-term forms of OE) are indicated. If short- or midterm forms of OE are mentioned, usually the hourly allowances of the individual forms are not identified. Therefore, the next step of the research was made to specify all the details of the realised OE through interviews with teachers.

On a practical level, Svobodová et al. (2019) was published to help teachers set the rules to support a comprehensive system of OE in intended curricula. Moreover, model activities for OE are offered there.

3.4.3 STRUCTURED INTERVIEWS: OUTDOOR EDUCATION BY THE VIEW OF TEACHERS – THE STATE OF IMPLEMENTED CURRICULA

The first step of the research revealed the extent of the intended anchoring OE in the SEPs. As we are aware that the formal content of the SEPs may not always exactly reflect the reality in the particular school, the second step of the research was validating the results obtained in the first step (content analysis of the SEP). We chose the method of *structured interviews* with the teachers in 10 model elementary schools (19 teachers – 9

from the primary level,⁴ 10 from the lower secondary level). These schools stated various forms of outdoor education in their SEP represented to a different extent, as is described in *Publication No. 1*.

The second stage of the research (structured interviews with teachers... allowed for a more detailed in-depth study of the overall findings of the first stage (content analysis). The structured interviews with a number of teachers provided a deeper insight into the issue of anchoring outdoor education in the SEPs and above all in the educational reality at the studied schools. The schools and teachers were selected based on a content analysis of SEPs that showed that the schools implemented outdoor education in some form, as we were primarily interested in the opinions of teachers who had repeated experience of planning and implementing outdoor education and had actively participated in outdoor education. On average, the interviews lasted for 60 minutes per school.

As mentioned by Hendl (2012, p. 173): “the basic purpose of this type of interview (‘structured interview’) is to minimise the effect of the inquirer on the quality of the interview itself, while at the same time, there is a reduced likelihood that the data obtained in each interview will vary significantly.” Every respondent was, therefore, asked the same questions in the same order (Hay, 2010). Most questions in the first part of the interview were closed questions with only YES/NO answer options. After this stage, open questions were posed asking for explanations of the YES/NO answers and provision of more details on the theme.

(Taken from Publication No. 1, p. 340)

The table in the box below, excerpted from Publication No. 1, summarises the topic of our research interest – both concerning SEP content analysis and the transformation of the themes into the selected questions for structured interviews.

Table 1. Transformation of themes of interest following from the SEP analysis into the structured interview questionnaire. Source: Authors.

Area of interest following from the SEP content analysis	Questions posed in the interview with the teachers
Coordination of outdoor education	Are you or another teacher or member of school management informed about all implemented forms of outdoor education at your school? Does anybody at your school coordinate all forms of outdoor education into a unified concept ⁶ where the individual activities are linked together?
Compactness of the concept of outdoor education	Do you use your own unified concept of outdoor education in your subject with individual activities linked to each other?
Selection of themes for outdoor education	Do you apply any method of theme selection for outdoor education?
Implemented forms of outdoor education	Do you use different forms of outdoor education in your subject?
Tentative lesson allocation	Are all forms of outdoor education included in the annual thematic plan ⁷ for your subject with the lesson allocation?
Cross-curricular relations	Do you implement any forms of outdoor education in cooperation with teachers of other subjects?
Link to outdoor education	Do you select themes in direct connection with classroom work? Do you select real-life themes for outdoor education? Do you have outdoor education anchored in the “informal curriculum”? For example, in hobby groups? Do you provide outdoor education mediated by educational programmes of institutions other than schools? Do you use forms of outdoor education in other educational events?
Teacher preparation for outdoor teaching	Do you make detailed written preparation for outdoor education?
Barriers to outdoor education	Do you personally feel any limitations in preparation for outdoor education?

Due to the limited size of this paper, only selected results of the structured interview are included.

(Taken from Publication No. 1, p. 341)

⁴ One teacher was from the lower grade of grammar school. The grammar school does not have the primary level. Therefore, there are 19 teachers, not 20.

The structured interviews with 19 Czech elementary school teachers in model schools allowed us a deeper insight into the real anchorage of OE into the implemented curriculum and especially into educational reality. Our results also confirmed the results of previous research in different countries in the world dealing with the prerequisites, barriers and benefits of OE (Boardman, 1974; Smith, 1999; Han & Foskett, 2007; Yang et al., 2014). We found that the prerequisites for OE realisation are excellent – in other words, nothing and no one hinder teachers from realising OE. The interviewed teachers appreciated the pupils' skills development through OE, but they included OE in the tuition quite rarely. The low share of OE in Czech elementary schools is caused by more factors. Among the most frequently mentioned barriers are

- lack of time for the realisation of the OE during the school year,
- lack of time to prepare OE,
- lack of finances,
- lack of supporting methodological material for the preparation of OE,
- possible dangers of OE.

The proposed principles and comprehensive system of OE that we designed in our publications should help teachers overcome some of these barriers. If they set OE systematically in the SEP, it could help in obtaining more time for OE realisation. Methodological but also practical publications (mainly Svobodová et al., 2019) that were written by our research group under the author's leadership could help overcome the lack of methodological material. As these publications aim for short- and midterm OE activities, the lack of finances could not be the problem as well because in this case, OE is realised by the teacher on or near the school grounds.

3.4.4 QUESTIONNAIRE SURVEYS: OUTDOOR EDUCATION FROM THE VIEW OF PUPILS AND PARENTS

The third step of the research was the *questionnaire surveys* concerning pupils' and their parents' attitudes towards OE. These attitudes were then compared with the previous results of the interviews with teachers. *Publication No. 3* presents results based on three interconnected surveys whereas only a part of surveyed pupils' opinions are evaluated in this text. Our question for this part of the research was: 'What are the learning benefits of OE from the view of teachers, pupils and parents?'

The survey with pupils and their parents was conducted on the model school on the basis of the results from the previous two steps – the content analysis of the SEP, which implicated that the school could have a conceptually conceived OE, and the interviews with the primary and lower secondary grade teachers who confirmed our presumption of a comprehensively grasped OE. The crucial fact in choosing this model school was that the school was willing to cooperate in measuring the pupils' physical activity (see below).

[...] the study examined the opinions of pupils (aged 10–15, grades 5, 6, 8, and 9) regarding their view of outdoor education and their attitudes towards this form of teaching. The survey was conducted among the pupils (n = 62) of one school selected based on the results of the previous interviews with the teachers.

[...]

The pupils' attitude to outdoor education was identified in four subsequent questions. The answers to these questions were registered using a 4-point scale. [...] The last question was

aimed at finding out what the pupils liked or disliked the most in outdoor education and it was open-ended, for free writing.

(Taken from Publication No. 3, pp. 35–36)

The family of every pupil at the model school was sent the questionnaire to ascertain their views on the effect of OE on their children and what they see as benefits of this form of teaching for their children.

[...] we surveyed parents using a questionnaire on a five-point scale [...] (scale from 1 as the least perceived benefit to 5 as the strongest perceived benefit). The latter question was identical to the question given to teachers in the first study regarding the benefits of outdoor education. We also asked parents whether this form of teaching imposed any burden on them. A final question asked parents how often they take their children into nature (a closed-end question with multiple-choice answers: very often – more than once a week, often – once a week, occasionally – once a month, on exceptional occasions, or never).

(Taken from Publication No. 3, p. 36)

In previous publications, finding out the opinions of pupils and their parents on OE is not entirely typical. In our case, obtaining this data provided a basis for comparing the views of these two groups of actors with the view of teachers, thus confirming our assumption that each of these groups sees OE with a different meaning – see *Publication No. 3* for more details.

Pupils report that OE is more interesting than education in class. Some of them like that they learn something new outside (e.g., the use of GPS), and some just enjoy that they spend time outside; they consider OE as a day with no educational content. Therefore, most of them would like more OE during the school year. This probably reflects the situation where pupils are not used to practising OE regularly and the content in the final phase of OE or in the context of the previous or following lessons taught in the classroom.

The parents are most aware of the pupils' attitude development through OE. Meanwhile, parents often consider OE a type of recreation rather than learning they do not have a clear idea of what OE is about.

Changing the pupils' and the parents' views of OE requires a clear set of aims, instructions and conceptions of OE. Hence, the pupils and their parents know that OE is an inseparable part of education that develops interdisciplinary subject knowledge and skills in a real environment, attitudes towards the environment and the place and life skills such as cooperation and communication.

3.4.5 PHYSICAL ACTIVITY MEASUREMENT: BENEFITS OF OUTDOOR EDUCATION TO THE PHYSICAL ACTIVITY OF PUPILS

The last step of the research was to measure the physical activity of the pupils of the model school to find out the contribution of OE to the development of locomotor activity. The background of this part of the research is based on the fact that a hypo-kinetic lifestyle connected with increasing childhood obesity prevails among children today in many countries (Lee et al., 2016; Lobstein & Jackson-Leach, 2007). We believe that teachers at all levels of education could do more to promote the healthy development of pupils, and OE can contribute to this significantly through unstructured physical activity.

Measurements of physical activity were taken in May 2017 for pupils of the 5th grade (age 9–11, i.e., K–5) and 8th grade (age 13–14, i.e., K–8) of the elementary school, where all day long outdoor education is used regularly in each of those grades (5th and 8th). So, this was the main reason why we conducted research on pupils in described age groups The sample for pupil measurement was limited by the number of ActiGraph monitoring devices to 10 pupils per grade that mean 20 pupils in total (ten for 5th grade and ten for the 8th grade).

[...]

The physical load of the pupils was monitored by the ActiGraph wGT3X-BT accelerometers. Twenty participants were instructed to wear the monitoring device on the right hip during the education units. Activity data were recorded at 10-second intervals. Data processing and evaluation were done with hourly averages of the measured data. Every measured education unit lasted 4 hours.

We focused on the values of the energy consumed in kcal and the metabolic output in MET (metabolic equivalent of task). ... To interpret the measured data, we used three kinds of analysis provided by the ActiLife (actigraphy data analysis software platform). Firstly, the Energy Expenditure (analysis of the calories burned) of each proband during three different types of learning was carried out. Secondly, we considered the MET rates values reached by the probands. Finally, the Sedentary Bouts (analysis of low activity describing the proband's sedentary behavior) were calculated in the ActiLife software.

(Taken from Publication No. 4, pp. 27–29)

Evidence of the effectiveness of OE metrics and measurements of effectiveness are important. Our results indicate that OE can significantly contribute to increasing pupils' physical activity. Simple walking during OE is a booster of daily energy expenditure, which is verified by the selected data from our measurement presented in Figure 11. More results are presented in *Publication No. 4* or in Trávníček et al. (2018) with a different sample of participants.

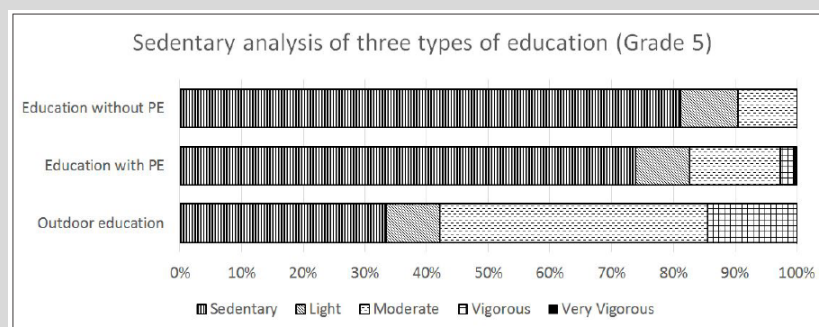


Figure 1: Sedentary analysis results (5th grade pupils).

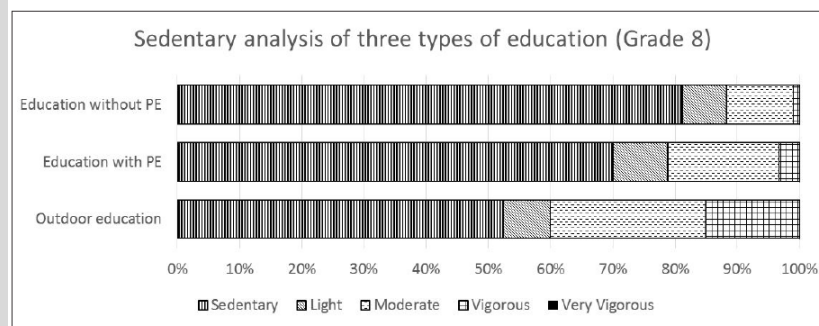


Figure 2: Sedentary analysis results (8th grade pupils).

Figure 11. The portion of time spent on different kinds of activity for 10 pupils in grade 5 and 10 pupils in grade 8 during four lessons of various types of education (Taken from Publication No. 4, p. 32)

Since a hypokinetic lifestyle prevails among school-age children, it is necessary to motivate children towards unstructured movement and a healthy lifestyle. Teachers can promote this by implementing more OE lessons that can be incorporated into almost all subjects or interdisciplinary (see next chapter). Moreover, pupils learn in a real environment, which corresponds to current trends in education and is one of the benefits of OE. Although the measurement of pupils' physical activity during OE can be considered as a pilot because of the limited sample and measurement time, it brought interesting results and opened up the possibility of interdisciplinary OE research.

3.5 OUTDOOR EDUCATION AS A TOPIC FOR INTERDISCIPLINARY COOPERATION

OE includes a wide range of adventure and sports activities closely interconnected with outdoor science (geography, geology, biology, etc.) and the environment. Therefore, interdisciplinarity is an important issue to study, as there is a lack of knowledge and research (Vlček et al., 2016). Following the physical activity measurement (see the previous subchapter), our research focused on interdisciplinary cooperation between PE and geography.

We analysed (among others) how interdisciplinary cooperation between PE and geography can be carried out, using examples from the three countries involved – Czechia, Slovenia and Denmark (*Publication No. 5*). A more detailed focus was devoted to the comparison of two ex-communist countries – Czechia and Slovenia (*Publication No. 6*).

The core of the study is an analysis of the curricular documents 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 – understanding, juxtaposition and comparison.

(Taken from Publication No. 5, p. 24)

First, we determined the study units – the PE and geography curricula in the model countries. Then we invited two experts from each country to participate in the research based on their academic contributions to the field – one expert for the PE school curriculum and one for the geography school curriculum. Their task was to describe the general situation of PE and geography in their country, with a focus on elementary education (ISCED 1 and 2). The goal of these procedures was to thoroughly describe the material and understand the connections between geography and PE curricula – both intended and implemented. The results were juxtaposed to compare countries' facts and findings of causalities.

The findings indicate that while interdisciplinarity is an important policy goal of the educational systems in all studied countries, integration is not being implemented in practice. Therefore, we suggested some examples of good practices for integrating geography and PE.

4. CURRENT WORK AND FUTURE PERSPECTIVES IN OUTDOOR EDUCATION RESEARCH

4.1 CHANGE IN AUTHOR'S PERCEPTION OF OUTDOOR EDUCATION AND ITS IMPLICATIONS FOR THE FUTURE RESEARCH AND PRACTICE

The author's perception of OE has shifted during her practice and research activities from the *place-based approach*, which is human-centred, and its importance includes forming relations with the place through regular visits to the same outdoor environment (Lloyd & Gray, 2014) to a *more-than-human approach* in a posthumanist sense, stating that outdoor places are fields of relations, and more-than-human aspects of place should be harnessed into the curriculum planning and enactment of outdoor learning (Lynch, 2020). The more-than-human approach shifts away from human-centredness and does not reduce nature to something less important than humans (Whatmore, 2002). Phenomena are multiple, not binary (human/nature, mind/body), but they arise from complex relations (Taylor, 2016; Ulmer, 2017), which enables a complex construction of understanding real life. *Approaches to understanding and making sense of material and social phenomena are changing continuously through critical reflection and practice* (Coates et al., 2016, p. 69). Also, the author's practice and reflection changed her perception of OE, as illustrated in Figure 12, which is later reflected in the present and future research perspectives.

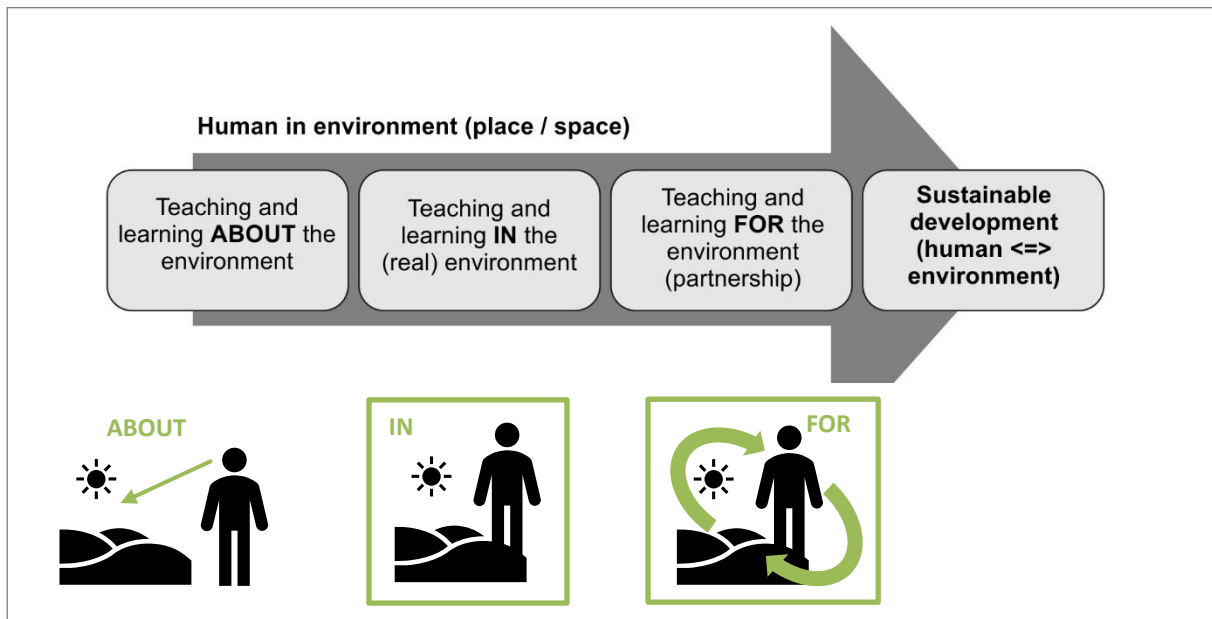


Figure 12. Development of author's perception of OE

4.1.1 FUTURE PERSPECTIVE NO. 1: VIDEO-BASED RESEARCH OF INTERACTIONS DURING OUTDOOR EDUCATION

The dominant part of OE research in international journals follows the specifics of OE and its effectivity. Thus, we know that it is a strong and useful educational strategy, and our research contributed to this discussion (for example, Svobodová, 2019), but we have little information about real instruction based on OE. We do need more research on how

OE is enacted and how teaching and learning processes in real lessons look like in the sense of interactions, communication, acting and so on.

It is also interesting that even though there is an evident effort to get OE into education, there are only a few studies aimed at teachers and trainee teachers and their preparation. The studies analysing usefulness in teachers' preparation, its effectivity or whether the content of the study meets teachers' needs are entirely omitted. However, if we want to promote OE as a powerful educational strategy, we also have to describe and afterwards help teachers link OE and all levels of curricula. Studies on the curricula are scarce (for example, Tal & Morag, 2013). We hope that we have contributed to this area in our papers, and we will continue these efforts using a combination of the mentioned change of view accompanied by technological innovation. We found that the most often used methods of OE research are questionnaires and interviews – methods that give us information about participants' feelings, impressions, knowledge or subjective views and so on. However, observations or video studies that might provide information about the course are rare. Therefore, we decided to use mobile technologies with sensory-based methods as alternative methods of exploring human relationships with the more-than-human, which justifies our video-based research and includes mobile technologies in OE. Pink (2009, p. 97) adds that *visual methods and digital technologies are seen to provide access to privileged insights into human relationships to their material environments*.

In the research area, we react by conducting video-based research on curriculum-based OE focused on teacher–student–environment⁵ interactions (see Figure 13). We use a 360-degree camera, a relatively new technology that might become an effective tool for the self-development of students and teachers and further educational improvement. The study of teacher–student–environment interactions is supported by the idea of Borić and Škugor (2014), who claim that outdoor learning and teaching present a possibility for ensuring the kind of knowledge *where words do not suffice*.

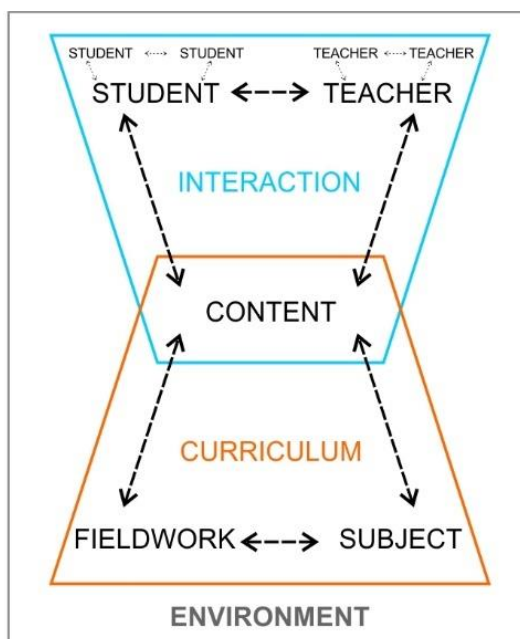


Figure 13. The scheme of the processual part of outdoor education
Source: Muzikant & Svobodová (2021)

⁵ Exactly university teachers and trainee geography teachers as students.

We hope this research will deepen our understanding of the various processes and interactions among teachers, students and the environment during OE. The first contributions to this topic were presentations by Muzikant and Svobodová (2021) and Svobodová (in press).

4.1.2 FUTURE PERSPECTIVE NO. 2: CHANGING BARRIERS OF OUTDOOR EDUCATION INTO CHALLENGES

Still, we hear from the teachers that there are many barriers to realise OE. We perceive these barriers as challenges to help teachers understand the benefits of OE. We want to continue providing methodological help towards practice. Our intention is to (a) provide teachers with more model examples for OE on the newly created website and (b) offer additional professional development/education in OE for teachers accredited by the Ministry of Education, Youth and Sports. Both intentions are financed through the National Recovery Plan project.

Moreover, we would like to monitor the level of skills and competencies pupils reach at the end of primary school (i.e., in grade 5) and show lower secondary school teachers that pupils at the beginning of lower secondary school are usually capable of basic OE skills, such as observing, orientating with a map, distinguishing natural materials or moving safely. Thus, lower secondary teachers should proceed with more complex activities, such as inquiry or case studies. The teachers should also know that several OE activities have the potential for practising cross-curricular subjects (e.g., environmental education in the assessment of human activities in the landscape or multimedia education in the creation of a map, data or photographic outputs). We aim to achieve this through the international Erasmus+ project 'Teaching, Learning & Adventurous Play Outdoors in Primary Schools'.

4.1.3 FUTURE PERSPECTIVE NO. 3: INTEGRATION OF OUTDOOR EDUCATION ACROSS SCHOOL SUBJECTS

OE has a huge potential to overcome discipline/subject boundaries, as they are presently anchored in the Czech curriculum. The outdoor environment serves as an unlimited arena for real-life education (Jordet, 2007). Interdisciplinarity and complexity were described by Priest's model of OE in the 1980s (Priest, 1986). The model shows OE as 'a method of teaching and learning that reinforces a direct, multisensory experience unfolding in an outdoor setting and uses an integrated approach to learning that encompasses the natural environment, the community and the individual implanted in them. Through outdoor stays, OE seeks to increase the physical, affective, cognitive, social and spiritual level of an individual'. This approach is still not common at any level of the Czech school system and is more likely to be applied on the primary school level, as the teachers can flexibly organise their lessons to meet their expectations. The upper secondary – and secondary-level teachers in the Czech Republic face many obstacles (Svobodová, 2019) to implementing regularly realised integrated curriculum-based OE with respect to maintaining curricular objectives and outcomes.

Therefore, it is necessary to continue research on integrated OE both on the national and international level (as indicated in Publication Nos. 5 and 6) and promote research results and examples of best practices towards school practice. The highest aim is a joint project submission of several departments of the Faculty of Education. This project

should start integrating cooperation among the departments of the Faculty of Education at Masaryk University and later create a new department associating OE experts with different specialisations as is already normal in Western countries. This department should educate OE experts potentially employed in outdoor and environmental centres and coordinators, as defined in Svobodová (2019, p. 69): *The outdoor education coordinator should be a well-trained expert in the integration of outdoor education at elementary schools. The coordinator's work consists of organisation, coordination, and content guarantee of individual forms of outdoor education at the school where he or she is working.*

4.1.4 OTHER BLIND SPOTS IN OUTDOOR EDUCATION RESEARCH

Of course, there are many other blind spots in OE research that should be addressed in future by researchers over the world dealing with OE, such as:

- outsourcing of OE and the impacts of outsourced compared with the teacher-led OE (recently, the first step to describe the situation in the Czech Republic was made by Činčera et al., 2021);
- competencies developed through OE (we have found only one journal paper dealing with this topic in our sample of 78 journal papers – Kudo et al., 2018);
- the well-being and the influence of conditions affecting teaching, learning and acting during OE;
- deeper analysis of using mobile devices and other technologies during OE (there are already some studies; however, because of the coronavirus epidemic, we can suppose that this branch of research will increasingly grow in the next years).

It is not possible to address all these topics. Still, I hope my research group and I have contributed significantly to OE discussions both personally during OE conferences and virtually through our texts.

5. CONCLUSION

Using the real world is the way learning has happened for 99.9% of human existence, only in the last hundred years have we put it in a little box called a classroom.

– Will Nixon, 'Letting Nature Shape Childhood'

OE is a form of education that has been considered a powerful teaching strategy for years. Even though the benefits of OE are well-known, learning outdoors in the real environment is usually displaced by learning indoors, detached from reality. Teachers often only describe and explain natural processes happening outdoors that are easy to show, observe and mainly experience outdoors. They replace the natural with the virtual, which is more fascinating for today's children than staying outdoors. This trend is, unfortunately, supported by parents who transport children, who used to play and learn outdoors, from one afterschool activity to another, and therefore, children have few opportunities to be outdoors. Moreover, parents and teachers often perceive playing and learning outdoors as dangerous. Therefore Gray (2018, p. 146) claims that the *lack of connection with nature* (during school time and also in children's free time) *has become a valid concern for parents, educators, health professionals and environmentalists alike.*

As outdoor teaching and learning in Czech schools have not been sufficiently described, the author's research team aimed to analyse the anchoring of OE in the intended and implemented curriculum in selected Czech elementary schools through curricula content analysis and interviews with the teachers in both positive and negative terms. We also wanted to find out parents' and pupils' opinions on OE. The author's research team works in cooperation with the PE experts; we also aimed to reveal the importance of OE from the perspective of physical activity.

The Habilitation presents six texts on the topic of OE, and the text in the first part underpins the author's contributions to OE in the area of research, transfer to practice and generalisation to the theory that is published in the texts. In conclusion, the current work and future perspectives on the topic are briefly presented.

Of course, previous research has some limitations, which is mainly a limited sample of participants in our surveys and measurements. Therefore, the quantitative data are not too robust. Meanwhile, our results are in concordance with similar research abroad.

The motivation for future work stems from our belief that OE is beneficial for all participants. OE provides a view of the real environment – the phenomena and processes that occur in it. It is necessary to show the teachers its benefits and provide them useful education and materials. This is especially valid for natural science subjects, including geography. The aim is to provide pupils with meaningful education, active involvement in the tuition, interaction with the space where we live and, of course, the joy of learning and physical activity. As Scott, Fuller and Gaskin (2006, p. 170) state, OE represents *learning opportunities that cannot be replaced effectively.* Also, parents must have enough supporting arguments to let children go outside again. This is the goal not only for me and my research team but also for all outdoor experts and educators all over the world.

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PART II: THE COLLECTION OF
PUBLISHED WORKS

DETAILED INFORMATION ABOUT THE COLLECTED WORKS

[1] Svobodová, H., Durna, R., Mísařová, D. & Hofmann, E. (2020). A proposal of a concept of outdoor education for primary and lower secondary schools – the case of the Czech Republic. *Journal of Adventure Education and Outdoor Learning*, 21(4), 336–356. <https://doi.org/10.1080/14729679.2020.1830138>

This study was designed to analyse the way in which OE is implemented at selected elementary schools providing primary and lower secondary education. To understand the status of OE in the Czechia, a formal framework for implementing OE in national and school curricula is described in the introduction. The first phase of our research consists of a content analysis of the School Education Programmes (SEPs). All the analysed SEPs included OE in some form but with differences among the schools in terms of quantity and quality of learning. Therefore, the next phase of our research supplemented the data acquired in the first phase, using structured interviews with 18 teachers at 9 model schools. The interviews confirmed that the schools have no concept of OE. Therefore, we made an effort to propose the principles of a concept of OE and its implementation in the Czech curriculum.

Applicant's contribution: the structure of the text and conceptualisation, theoretical background, methodology preparation, data collection and analysis, the concept of outdoor proposal, discussion, writing – original draft preparation, review and editing.

Coauthors' contribution:

R. Durna – data collection and analysis, discussion, review and editing.

D. Mísařová – data collection and analysis, corresponding author.

E. Hofmann – methodology preparation, data collection, the concept of outdoor proposal.

Supervision (%)	Manuscript (%)	Research direction (%)
100	70	70

[2] Hofmann, E., & Svobodová, H. (2017). Case studies in geography education as a powerful way of teaching geography. In P. Karvánková, D. Popjaková, M. Vančura, & J. Mládek (Eds.), *Current topics in Czech and Central European geography education* (pp. 115–128). Springer. DOI:[10.1007/978-3-319-43614-2_7](https://doi.org/10.1007/978-3-319-43614-2_7)

This work presents why case studies are used for teacher training at the Department of Geography of the Faculty of Education, Masaryk University. Introducing case studies into the curriculum of elementary and secondary school brings certain risks, some of which can be prevented by educating and training students. The paper presents a case study that focuses on the possibility of restoring a ski slope in Brno. This case study is applicable not only in Brno but also in any other areas (possibly with some modifications for local conditions). In addition to the specific environmental situations, students primarily learn to ask geographic questions and seek adequate responses, using existing knowledge and skills gained in the study of geography. Students have the opportunity to directly apply the knowledge they acquired during their studies to the specific case in the field, without which the teaching of geography is like that of chemistry without laboratory experiments.

Applicant's contribution: theoretical background, description of the implementation of the case study into education, model case study – the idea, realisation and evaluation, writing – original draft preparation, review and editing.

Coauthor's contribution:

E. Hofmann – theoretical background, description of the implementation of the case study into education, model case study – idea, realisation and evaluation, writing – original draft preparation, review and editing, corresponding author.

Supervision (%)	Manuscript (%)	Research direction (%)
50	50	50

[3] Svobodová, H., Mísařová, D., Durna, R., & Hofmann, E. (2020). Geography Outdoor Education from the Perspective of Czech Teachers, Pupils and Parents. *Journal of Geography*, 119(1), 32-41. <https://doi.org/10.1080/00221341.2019.1694055>

This paper deals with the benefits of OE as perceived by teachers, pupils and parents for learner development of knowledge, skills, attitudes and interpersonal relationships. To obtain data, semistructured interviews with 18 elementary school teachers were conducted. Then, based on the interview results, one model school was chosen to conduct a questionnaire survey with the pupils and their parents. The research shows that teachers see the benefits of OE in both the cognitive area and the affective aspect of education and know that learners gain certain skills and knowledge during OE. Conversely, parents see the greatest benefit in the area of attitudes and interpersonal relationships. Finally, learners perceive OE as entertainment and time spent outside the classroom rather than a learning process.

Applicant's contribution: the structure of the text and conceptualisation, theoretical background, methodology preparation, data collection and analysis, discussion, writing – original draft preparation, review and editing.

Coauthors' contribution:

D. Mísařová – data collection and analysis, statistical analysis, corresponding author.

R. Durna – theoretical background, data collection and analysis, discussion, review and editing.

E. Hofmann – data collection.

Supervision (%)	Manuscript (%)	Research direction (%)
100	70	100

[4] Durna, R. & Svobodová, H. (2020). Strengthening Pupils' Physical Activity through Outdoor Education. *Studia Sportiva*, 14(2), 26–38. <https://doi.org/10.5817/StS2020-2-3>

The time pupils spend at school provides a minimal benefit to pupils' movement activity. At a time when many school-age children lack physical activity, it is necessary to think about how to integrate more movement into the period that the child spends at school. The paper is based on the assumption that OE can contribute to the development of pupils' movement activity, and the paper aims to determine the extent. For model pupils, calorie count and metabolic discharge, including sedentary analysis, were recorded through an ActiGraph accelerometer during four-hour lessons of different types of education days. The result is that OE can serve as an appropriate complement to learning that contributes to the development of pupils' knowledge and skills while working in a real environment but also acts as a means of increasing the possibilities for pupils' movement during their schooling.

Applicant's contribution: the structure of the text and conceptualisation, theoretical background, methodology preparation, data analysis, discussion, writing – original draft preparation, review and editing.

R. Durna is the first author because the paper was published in the student's section of the journal.

Coauthor's contribution:

R. Durna – data collection and analysis, review and editing, corresponding author.

Supervision (%)	Manuscript (%)	Research direction (%)
100	80	90

[5] Vlček, P., Resnik Planinc, T., Svobodová, H., Clausen, S. W., Conradsen, K., Hergan, I, . . . & Ogrin, M. (2016). *Integrating Physical Education and Geography*. Masarykova univerzita.

Chapters 7.1, 7.2, 7.5, 7.6, 10.2, 10.3

Integrating Physical Education and Geography is an outcome of the activity of International Network C.A.L.M.A.Z., which deals with interdisciplinary cooperation in PE and geography. The authors are representatives of university departments in the Czech Republic, Slovenia and Denmark. The publication aims to present how the participating countries approach, in their curricula, cooperation in PE and geography. The cooperation is viewed from two perspectives – a comparison of curricular documents helps ascertain how this cooperation is embedded at the theoretical level. The questionnaire survey with teachers represents a probe into the realisation form of the curriculum. In the conclusion, possible approaches to integration are discussed, and practical examples are presented.

Applicant’s contribution: chapters 7.1 Czech Republic – Introduction, 7.2 Czech Republic – The educational system of the Czech Republic, 7.5 Czech Republic – Description of Geography curricula, 7.6 Czech Republic – Possible ways to combine PE and geography in the Czech curricula, 10.2 Results of comparison – Comparison of the analysed curricula, 10.3 Results of comparison – The questionnaire survey analysis – PE and geography integration, writing – original draft preparation and editing.

Co-authors’ (editors’) contribution:

P. Vlček – structure of the text and conceptualisation, theoretical background, methodology preparation, all parts concerning PE education, writing – original draft preparation and editing (chapters 1–6, 7.3–7.6, 10, 10.1–10.3, 11–12).

T. Resnik Planinc – parts concerning geography education in the Republic of Slovenia and its integration with PE (chapters 1–2, 9.2, 10.1).

S. Witzel Clausen – parts concerning geography education in Denmark (chapters 4, 8, 8.1–8.3, 8.5–8.6).

Other authors – parts concerning geography or PE education in their country.

Supervision of the selected chapters (%)	Manuscript of the selected chapters (%)	Research direction of the book (%)
90	90	40

[6] Vlček, P., Svobodová, H., & Resnik Planinc, T. (2019). Integrating Physical Education and Geography in elementary education in the Czech Republic and the Republic of Slovenia. *Compare: A Journal of Comparative and International Education*, 49(6), 868–887. <https://doi.org/10.1080/03057925.2018.1466267>

This paper addresses the lack of international knowledge and research in interdisciplinary curriculum development and teaching in physical education and geography. The authors analysed and compared elementary school curricular documents from two ex-communist countries, the Czech Republic and the Republic of Slovenia (an ex-socialist Yugoslav republic) to reveal how the integration of physical education and geography can be embedded at the policy level. A questionnaire survey among teachers examined how the integration is implemented in practice. The authors present some practical examples to show how physical education and geography integration can be achieved. The findings of the study indicate that while interdisciplinarity is an important policy goal of the educational systems of these two countries, integration is not being implemented in practice.

Applicant’s contribution: all parts concerning geography education in the Czech Republic and its integration with PE, writing – original draft preparation, review and editing.

Coauthors’ contribution:

P. Vlček – the structure of the text and conceptualisation, theoretical background, methodology preparation, all parts concerning PE education, writing – original draft preparation, review and editing.

T. Resnik Planinc – all parts concerning geography education in Republic of Slovenia and its integration with PE.

Supervision (%)	Manuscript (%)	Research direction (%)
50	50	40

Publication 1

Svobodová, H., Durna, R., Mísařová, D. & Hofmann, E. (2020). A proposal of a concept of outdoor education for primary and lower secondary schools – the case of the Czech Republic. *Journal of Adventure Education and Outdoor Learning*, 21(4), 336–356. <https://doi.org/10.1080/14729679.2020.1830138>

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Publication 2

Hofmann, E., & Svobodová, H. (2017). Case studies in geography education as a powerful way of teaching geography. In P. Karvánková, D. Popjaková, M. Vančura, & J. Mládek (Eds.), *Current topics in Czech and Central European geography education* (pp. 115–128). Springer. DOI:[10.1007/978-3-319-43614-2_7](https://doi.org/10.1007/978-3-319-43614-2_7)

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Publication 3

Svobodová, H., Mísařová, D., Durna, R., & Hofmann, E. (2020). Geography Outdoor Education from the Perspective of Czech Teachers, Pupils and Parents. *Journal of Geography*, 119(1), 32–41. <https://doi.org/10.1080/00221341.2019.1694055>

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Publication 4

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Strengthening Pupils' Physical Activity through Outdoor Education

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Abstract:

The time pupils spend at school provides a very small benefit to pupils' movement activity. At a time when many school-age children lack physical activity, it is necessary to think about how to integrate more movement into the period that the child spends at school. The paper is based on the assumption that outdoor education can contribute to the development of movement activity of pupils, and the paper aims to determine to what extent. For model pupils, the calorie count and metabolic discharge, including sedentary analysis, were recorded through an ActiGraph accelerometer during 4-hour lessons of different types of education days. The result is that outdoor education can serve as an appropriate complement to learning that contributes to the development of pupils' knowledge and skills while working in a real environment but also acts as a mean of increasing the possibilities for movement for pupils during their schooling.

Keywords: *outdoor education; elementary school; physical activity assessment; health promotion; accelerometry*

INTRODUCTION

Movement (physical activity) is an integral part of human life and, at the same time, one of the important needs of each child (pupil/student). Neumann (2000, p. 24) states that "we live at a time when the physical fitness of the population is on the downgrade and movement activity is often replaced by passive ways of entertainment" (e.g., playing on the PC, watching TV, etc.). An international study Health Behaviour in School-Aged Children compared the movement activities of schoolchildren ages 11, 13, and 15 of 48 countries in Europe and North America including Central Europe (Czechia, Slovakia, Poland, Hungary, and Ukraine) also shows that more and more European students are lacking in physical activity (Madarasová Gecková et al., 2016). Similarly, there is evidence of the increased prevalence of childhood obesity in the UK (Lobstein, James, & Cole, 2003) or the USA (Lobstein & Jackson-Leach, 2007; Lee, Stodden, & Gao, 2016). Since a hypo-kinetic lifestyle prevails among children today (as well as among adult population), teachers could do more to promote the healthy development of pupils supported by movement activity (Mužík & Krejčí, 1997). The movement inadequacy, or hypokinesia, occurs in children and adults and its manifestations are not only physical but also psychological (Krejčí, 2011). As the current lifestyle of many children and adults is not good, a positive attitude towards movement and a healthy lifestyle should be built up already in school-aged children.

Mužík and Krejčí (1997) recommend 30 minutes of a lower intensity movement activity (light to moderate) a day, to which 30 minutes of medium intensity movement (moderate to vigorous) should be added at least three times a week. As compared to Mužík and Krejčí, the demands of Sigmund and Sigmundová (2011) for the daily movement activity of early school-age children are significantly higher. In their opinion, the medium intensity daily movement activity of children should be three times longer, i.e., 90 minutes. Strong et al. (2005) recommend at least 60 minutes per day of moderate to vigorous intensity of physical activity.

There are several strategies on how to raise the intensity of physical activity. Steele et al. (2010) speak about promoting physical activity during weekdays after school and weekends. We focus on increasing physical activity during school-time, because this time can take up more than 1/3 of the pupil's total daily time without the required time for sleeping. Wareham, van Sluijs and Ekelund (2005) claim that when examining the most effective school-based interventions, it appears that such interventions are indeed limited to structured activity through predominantly physical education classes. However, movement can be largely incorporated into the teaching of most subjects at elementary school. If we disregard the actual physical education, which is a compulsory subject, then the movement can be incorporated mainly by means of outdoor education, which is an integral part of the natural sciences (geography, biology). It can also be applied to most social science subjects. Outdoor education is inherently associated with movement activities. Still, the movement itself is not a necessary priority for such form of education and that pupils sometimes may not even realize its importance. In the outdoors, pupils move on foot to various places during the collection of primary data for later processing. We see one of the most significant values of outdoor education in the fact that it combines elements of physical education with the transfer of subject-oriented schoolwork in natural science subjects and the humanities to the pupils.

The compatibility of physical education and outdoor education has already been described in Bunting (1989), who compared physical education and outdoor education objectives. Both physical and outdoor education directly or indirectly develop skills, social domains, physical fitness, and the process of learning. Moreover, outdoor education emphasizes environmental interdependency (Martin & McCullagh, 2011). In some countries, the outdoor education is considered to be so important that it has its own curriculum (Australia – Gray & Martin, 2012; New Zealand – Boyes, 2000; Denmark – Bentsen, Mygind, & Randrup, 2009).

In Czechia, the benefits of outdoor education have been described in general based on the view of teachers (Svobodová, Mísařová, & Hofmann, 2016), while in foreign literature the numerous benefits of outdoor education have been deeply analysed in various studies (Meredith, Fortner, & Mullins, 1997; Neill & Richards, 1998; Knapp, 2000; Rickinson et al., 2004; Fuller, Edmondson, France, Higgitt, & Ratinen, 2006; Shin, 2007; Mygind, 2007, 2009; Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010; Cooper et al., 2010; Karppinen, 2012). The specific benefit of outdoor education on the development of natural movement activity has been investigated only partially in the context of Czech schooling (Korvas, 2005; Hofmann & Korvas, 2008). These researches, however, consisted of a measurement of the number of steps in different activities which are typical for integrated outdoor education. Later, the step count and MET rate has been gauged by Trávníček, Svobodová, and Durna (2018) on school aged children during different types of learning lessons.

However, outdoor education is also connected with the need to overcome a wide range of organizational, safety, as well as methodological obstacles (Waite 2009; Yang, Wang, Xu, & Deng, 2014). Therefore, it is not surprising that it remains the domain of only the most daring educators in the Czechia (Svobodová, Zadabal, & Kovaříková, 2012). It is necessary to add that the study courses for outdoor educators, as are usual in more developed countries (Thorburn & Allison, 2010; Lugg & Martin, 2001), are missing in Czechia.

The facts described above bring us to the aims of this paper. The influence of outdoor education on the Czech pupils' knowledge and skills were described in another authors' paper (Svobodová, Mísařová, Durna, & Hofmann, 2019). The influence of outdoor education on the pupils' movement activity needs to be more investigated (among Czech pupils) as compared to learning in a classroom. The absence of repeated sophisticated measurement of pupils' movement activity and its comparison in different educational units implies the aim of this paper. The aim

of our study is to find out how can outdoor education contribute to the physical activeness of the pupils during school-time. Our research question is following: Is the pupil's physical activity during the day of outdoor education comparable or lower/higher to their physical activity during sedentary classroom education with/without the PE lesson?

To reach this aim, we compared the data gained from the physical activity measurement during the following forms of education: 1) all day classroom education, 2) classroom education with the incorporation of a physical education lesson, 3) outdoor education.

ANCHORING MOVEMENT AND OUTDOOR EDUCATION IN THE CZECH CURRICULUM

The educational objectives and content of the Czech curricula are defined in the Framework Education Programs (FEPs), which represent the national level of educational content. These centrally drafted curricular programs are binding for all elementary and secondary schools. The FEPs provide a foundation for the School Education Programs (SEPs) that are set at the school level to help teachers refine and customize the objectives and content of the subjects they teach (Vlček et al., 2016).

The FEPs specify (1) the level of key competencies that pupils should acquire by the end of specific education grade, (2) define an obligatory content of education (expected outcomes and curriculum), and (3) integrates cross-curricular topics as an obligatory part of education.

The educational content is divided into nine educational areas. Movement activities can be explicitly found only in the part of FEP called Man and Health educational area (incorporated in all nine grades of Czech elementary schools and it includes both Physical Education and Health Education – the given minimum of two hours per week in all grades).

In other educational areas, movement can be incorporated, for example, in the following ways, whereupon Jacobs (1989) speaks about complementary units in this context:

- (1) A minute for health – pupils should break up long periods of sitting down with a minute of physical activity, during which they perform some movement exercises.
- (2) Class lessons – teachers can prepare simple physical/sports activities in the course of regular lessons in the classroom (traditional dances in geography or music lesson).
- (3) Outdoor education. As outdoor education is the key term for our paper, we add our own definition according to Hofmann (2003) and later adjusted by Svobodová, Mísařová and Hofmann (2016).

“Outdoor education is an ‘umbrella’ concept for multiple forms of education, with the common feature of being undertaken outdoors, outside of school buildings. Outdoor education can take on a variety of organizational forms, from didactic walks, excursions, and field exercises to field research. If an outdoor education should have any benefits for students, they must be actively performing activities such as collecting and processing information from primary and secondary sources, using the research methods and aids of individual scientific disciplines”.

The definition of OEA (2010, n. p.) adds that “outdoor education provides unique opportunities to develop a positive relationship with the environment (or experiential knowledge as is said in VCAA, 2005, p. 7), others and ourselves through interaction with the natural world.”

One of the priorities of the Framework Educational Program is the consistent use of inter-subject links and the integration of the educational content of various subjects. Outdoor education, which can be an integral part of many subjects (especially the natural sciences), is an appropriate form of teaching to meet these inter-subject links, leading to the cooperation of teachers in various educational areas. From the above-mentioned possibilities for incorporating movement into learning, outdoor education can be considered in terms of its benefits on the development of movement activity and the development of key competencies as the most complex form of education.

In relation to outdoor education, it is only up to the teachers themselves how they will transfer all of the activities into the School Educational Program and subsequently to educational units. There are sufficient prerequisites for the application of outdoor education in the Czech curriculum, but its realization in practice often fails (Svobodová, Mísařová, & Hofmann, 2016). It is mainly because the benefits of outdoor education not only for physical activity are not yet widely appreciated among Czech teachers as no institution provides them appropriate education in the field of outdoor education.

From the point of view of didactics, outdoor education in the Czech education system is often included on the basis of the “traditional” concept of teaching. The methods of its implementation at many Czech schools nowadays are considered as ways that have already been overcome abroad. This means that outdoor education is rather associated with excursions, school trips, and other activities where pupils are merely observers and passive recipients of information – not active researchers, as exemplified in Oost, De Vries and van der Schee (2011). The different forms of outdoor education units contribute differently to the development of natural movement activity.

METHODS

Participants

Measurements of physical activity were taken in May 2017 for pupils of the 5th grade (age 9–11, i.e., K–5) and 8th grade (age 13–14, i.e., K–8) of the elementary school, where all day long outdoor education is used regularly in each of those grades (5th and 8th). So, this was the main reason why we conducted research on pupils in described age groups. We also wanted to avoid the research distortion where possible. Therefore, all lessons were conducted under the guidance of the teacher, to whom the pupils were accustomed. The present researcher only assured the correct setting and deployment of physical activity sensors. The sample for pupil measurement was limited by the number of ActiGraph monitoring devices to 10 pupils per grade that mean 20 pupils in total (ten for 5th grade and ten for the 8th grade). These ten devices were distributed among pupils using a stratified selection. In the 5th grade group, boys and girls were equally represented (five male and five female pupils). In the 8th grade group, there was only one male pupil, and the rest of the group represent nine female pupils. The reason for this sex disproportion was caused by the deficiency of boys in 8th grade (and the actual health condition of the other male pupil prevent him from participation in the research). So the sex ratio (F : M) of the sample (n = 20) was 2.3 : 1. More detailed information about each participant (BMI, BMI percentile, age) is shown in Table 1. Due to sample size we consider this research as the pilot study. Nevertheless, we believe that the data and methods presented here can be used by other fellow researchers, who are interested in research of children's physical activity during their schooling.

Table 1. BMI percentile and weight status of 5th and 8th grade probands according to the 6th NAS methodology.

P5	5 th grade					8 th grade					
	AGE	SEX	BMI	BMI P	WS	P8	AGE	SEX	BMI	BMI P	WS
1	9	M	14,7	10–25	slim	1	13	F	18,0	25–50	prop.
2	10	M	15,8	25	prop.	2	13	F	18,8	25–50	prop.
3	9	M	16,4	50	prop.	3	13	F	17,3	25–50	prop.
4	9	M	15,2	25	prop.	4	13	F	16,5	10–25	slim
5	9	M	21,3	97	overweight	5	13	F	20,8	75	at risk
6	10	F	16,9	25–50	prop.	6	14	F	19,5	50	prop.
7	9	F	21,4	97–99	obese	7	14	M	24,1	90–97	overweight
8	10	F	16,6	25–50	prop.	8	14	F	19,5	50	prop.
9	9	F	18,1	75	prop. / at risk	9	13	F	22,6	90	at risk
10	11	F	19,5	75–90	at risk	10	13	F	18,4	25–50	prop.

Legend: P5, P8 – proband of 5th and 8th grade; BMI P – BMI percentile (specific to the age of probands); WS – weight status (according to the 6th NAS); prop. – proportional. Probands are labelled by the number of worn ActiGraph device (first column of the table). Column BMI percentile (BMI P) contain information if BMI value of proband lies directly on the edge of interval (single number) or if the value lies in the interval of value range.

Instrumentation

The physical load of the pupils was monitored by the ActiGraph wGT3X-BT accelerometers. Twenty participants were instructed to wear the monitoring device on the right hip during the education units. Activity data were recorded at 10-second intervals. Data processing and evaluation were done with hourly averages of the measured data. Every measured education unit lasted 4 hours.

We focused on the values of the energy consumed in kcal and the metabolic output in MET (metabolic equivalent of task). One MET is defined as the resting metabolic rate, represented by the amount of oxygen consumed at rest (sitting quietly), approximately 3.5 ml O₂/kg/min (or 1.2 kcal/min for a 70-kg person; Jetté, Sidney, & Blümchen, 1990). For example, the energy cost of playing rugby is 8.3 METS, which means the use 8.3 times more energy than sitting quietly and rest (M.E.T.S., 2016).

For each pupil, the value of kcals was recorded for the same time interval that is for four hours over three days, with a different form of learning represented on each day. For regular lessons lasting 45 minutes, the break time (3×10 and 1×20 minutes) is also included.

The ActiGraph accelerometer is also able to process the sedentary analysis. We focused on the total length of sedentary bouts, i.e., the total sedentary time in minutes detected during four hours of different types of learning. So, we can also compare the time spent (by the probands) on sitting for each educational unit.

Procedure

Given that we are aware of certain research limitations, which include the different levels of movement activity during different learning units and different types of outdoor education, we have carried out first measurements with 5th grade pupils and later a control measurements with pupils of the 8th grade at the same school. The conditions were similar for both grades – pupils completed four hours of classroom lessons without PE, four hours of indoor lessons including two lessons of PE (i.e., 2 times as much as the grade 5), and four hours of outdoor education.

The representation of girls (9) and boys (1) in the evaluated sample was uneven, as there were only 2 boys in the class.

Data Analysis

Before the physical activity measurement, the height and weight of probands were recorded, and the body mass index (BMI) was calculated for each of them. We are aware that simple value of BMI is not very useful for assessment of weight status of children and youth, so we adapted the method of BMI percentile which is more suitable for children and adolescents due to fluctuations in height, weight, and body composition that occur in the growth stages. BMI percentile tends to be a more sensitive tool to the change in the weight status of growing children and adolescents (Hoelscher, Kirk, Ritchie, & Cunningham-Sabo, 2013; Price, Cohen, Pribis, & Cerami, 2017).

For Czech children, weight status is determined using BMI age and sex norm-referenced values derived from the national wide survey. In Table 1 there is the BMI percentile and the weight status of all probands. Using the 6th National wide Anthropological Survey (Kobzová, Vignerová, Bláha, Krejčovský, & Riedlová, 2006 – 6th NAS) growth charts, *obesity* is defined as a BMI \geq 97th percentile and *overweight* is BMI \geq 90th and $<$ 97th percentile and the zone *at risk of overweight* is defined as a BMI $>$ 75th and $<$ 90th percentile. The *proportional* zone (regular weight in specific age) lies between the \geq 25th and \leq 75th percentile, and *slim* is defined as a $<$ 25th percentile. Values below the 3rd percentile indicate the very severe *underweight*. Authors are aware that BMI percentile limit values may differ among the other authors, so we use these values only in the Czech anthropo-socio-cultural context. We use the above-described method to inform about the weight status (WS) of probands (see Table 1).

To interpret the measured data, we used three kinds of analysis provided by the ActiLife (actigraphy data analysis software platform). Firstly, the Energy Expenditure (analysis of the calories burned) of each proband during three different types of learning was carried out. Secondly, we considered the MET rates values reached by the probands. Finally, the Sedentary Bouts (analysis of low activity describing the proband's sedentary behavior) were calculated in the ActiLife software.

To interpret the data coming from the analysis described above, we adopted the methods of descriptive statistic (average value) and data significance level. We combined all the data described above in an attempt to discuss one of the potential benefits of outdoor education – the increased physical activity during this type of education.

RESULTS

Energy Expenditure

The results of ActiGraph measuring of the calories burned by the 5th grade pupils (Table 2) show that the average energy expenditure among the probands was 23.8 kcal per a regular learning day without PE (exactly four hours of learning). On a learning day wherein PE is incorporated, the average energy expenditure was 57.2 kcal. For outdoor education day, the average energy expenditure was 189.3 kcal, i.e., three times more than on a learning day with PE and eight times more than on the learning day without PE. This result suggest that outdoor education may contribute significantly to the daily energy expenditure.

The results of 8th grade pupils' movement activity (Table 2) show a higher energy expenditure than in the group of the 5th grade pupils in all cases. Differences between classes can be explained, in particular, due to different pupil activities during the individual types of learning as well as the different individual biometric characteristics of pupils in grades 5 and 8.

On a regular learning day without PE, the average energy consumed value was 53.4 kcal. For a learning day where PE was incorporated, the average energy consumed value was 110.6 kcal. During outdoor education of the same time range as learning at school, the average energy consumed value was 277.7 kcal, i.e., 2.5 times more than during the learning day with PE and five times more than during the school day without PE.

Table 2. Energy expenditure (kcal) of the 5th & 8th grade pupils during 4 hours of different types of education

5th grade pupils				
Pupil (sex)	Weight status (see table 1)	Classroom educa- tion without PE	Classroom educa- tion with PE	Outdoor education
pupil 1 (M)	slim	27,117	41,711	157,456
pupil 2 (M)	proportional	22,965	84,447	266,275
pupil 3 (M)	proportional	21,045	32,856	136,660
pupil 4 (M)*	proportional	11,286	23,270	41,431
pupil 5 (M)	overweight	33,074	70,778	235,441
pupil 6 (F)	proportional	18,550	40,640	151,332
pupil 7 (F)	obese	11,100	74,025	199,620
pupil 8 (F)	proportional	41,116	82,842	199,511
pupil 9 (F)	prop./ at risk	20,676	38,221	134,540
pupil 10 (F)	at risk	31,127	83,475	371,074
Average – male	-	23,097	50,612	167,453
Average – female	-	24,514	63,841	211,215
Average	-	23,806	57,227	189,334

8th grade pupils				
Pupil (sex)	Weight status (see table 1)	Classroom educa- tion without PE	Classroom educa- tion with PE	Outdoor education
pupil 1 (F)	proportional	47,940	130,320	403,870
pupil 2 (F)	proportional	70,971	71,878	241,360
pupil 3 (F)	proportional	30,303	49,188	205,811
pupil 4 (F)	slim	38,882	95,946	191,747
pupil 5 (F)	at risk	54,337	176,880	302,487
pupil 6 (F)	proportional	44,347	61,424	291,894
pupil 7 (M)	overweight	77,686	205,830	362,866
pupil 8 (F)	proportional	53,025	95,306	233,740
pupil 9 (F)	at risk	57,785	89,396	319,096
pupil 10 (F)	proportional	58,389	129,710	223,820
Average – male	-	77,686	205,830	362,866
Average – female	-	50,664	100,005	268,203
Average	-	53,367	110,588	277,669

Source: own ActiGraph measurements, own calculations

* The lower measured values for pupil 4 can be explained by the partially incorrect measurement of the ActiGraph – see the limitations of the research for further detail.

Metabolic Equivalent of Task

The value of the Metabolic equivalent of task (MET) per individual per time provides information about how intensive is the executed physical activity of proband compared to sitting still (MET =

1). We compared the average MET rate achieved during the three types of learning (Table 3) and all values strongly differ from 1 (basal metabolic rate). This is interesting, especially in case of learning in the classroom, but it can be probably explained by the fact that pupils do not sit still during the lessons all the time (they move on the chair, sometimes walk around the room, they move during the breaks, etc.). MET rates achieved during learning in the classroom including the PE lesson was in the case of 5th grade 1.3 times higher (on average) compared to classroom learning without PE and similarly 1.2 times higher in the case of 8th grade (similarly the Energy Expenditure was higher in all cases). If we compare the MET rate achieved by probands during the outdoor education to MET rate achieved in the classroom, the outdoor shows the 2.6 times higher values (on average) in case of 5th grade and 1.9 times higher values in case of 8th grade pupils. The ratio of the difference of MET rate and energy expenditure among the 5th and 8th grades is the same (close to the value 1.4×).

Table 3. MET rates of the 5th & 8th grade pupils during 4 hours of different types of education

5th grade pupils				
Pupil (sex)	Weight status (see table 1)	Classroom educa- tion without PE	Classroom educa- tion with PE	Outdoor education
pupil 1 (M)	slim	1,55	1,89	4,06
pupil 2 (M)	proportional	1,38	1,98	3,97
pupil 3 (M)	proportional	1,42	1,70	3,64
pupil 4 (M)*	proportional	1,28	1,52	3,52
pupil 5 (M)	overweight	1,41	1,72	3,30
pupil 6 (F)	proportional	1,29	1,52	3,30
pupil 7 (F)	obese	1,15	1,75	3,52
pupil 8 (F)	proportional	1,57	1,91	3,37
pupil 9 (F)	prop./ at risk	1,37	1,75	3,75
pupil 10 (F)	at risk	1,32	1,66	3,74
Average – male	-	1,41	1,76	3,70
Average – female	-	1,34	1,72	3,54
Average	-	1,37	1,74	3,62
8th grade pupils				
Pupil (sex)	Weight status (see table 1)	Classroom educa- tion without PE	Classroom educa- tion with PE	Outdoor education
pupil 1 (F)	proportional	1,28	1,74	3,07
pupil 2 (F)	proportional	1,59	1,59	2,63
pupil 3 (F)	proportional	1,28	1,43	2,53
pupil 4 (F)	slim	1,34	1,81	2,52
pupil 5 (F)	at risk	1,32	1,97	2,57
pupil 6 (F)	proportional	1,27	1,38	2,54
pupil 7 (M)	overweight	1,42	1,93	2,40
pupil 8 (F)	proportional	1,44	1,72	2,57
pupil 9 (F)	at risk	1,33	1,75	2,59
pupil 10 (F)	proportional	1,48	1,69	2,75
Average – male	-	1,42	1,93	2,40
Average – female	-	1,37	1,67	2,64
Average	-	1,40	1,80	2,52

Source: own ActiGraph measurements, own calculations

Sedentary Analysis

The learning day without the PE lesson(s) or outdoor education was mainly (more than 80 % of the time spent by pupils) in a sedentary way – see Figures 1 and 2. Pupils spent about 20 % of the time in light or moderate movement, which roughly corresponds to the period of time of a break when pupils can move freely (a total of 40 minutes of the 240 minutes measured). During a learning day with the inclusion of PE, there was a higher proportion of time when pupils engage in moderate movement – approx. 15–20 %. The representation of light movement was similar to a day without PE, i.e., approx. 10 %. As opposed to a learning day without PE, the vigorous movement type prevails here at a higher rate (approx. 3–5 %).

The different representation of movement activity was also apparent in different outdoor education days. Although the sedentary type prevailed in 8th grade group (because there was a task insisting a lot of writing), it was not the same case in the 5th grade group where the moderate movement type prevailed. Nevertheless, the vigorous movement type was represented by about 15 % in both assessed groups.

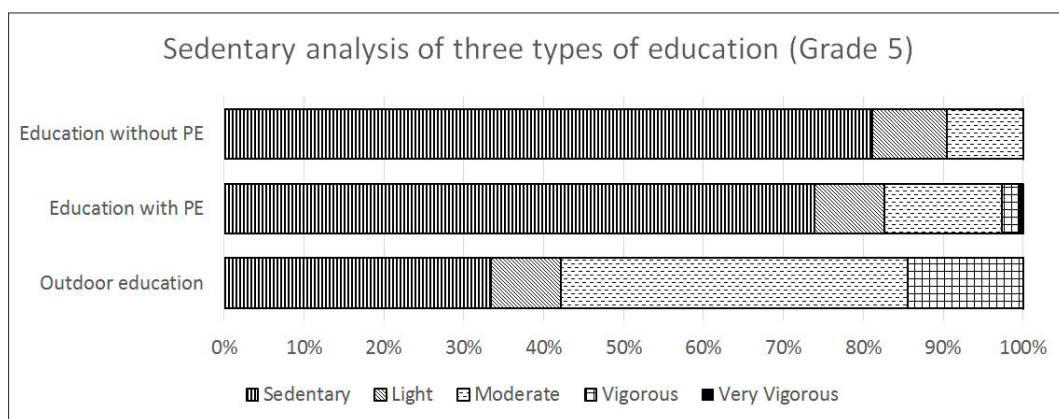


Figure 1: Sedentary analysis results (5th grade pupils).

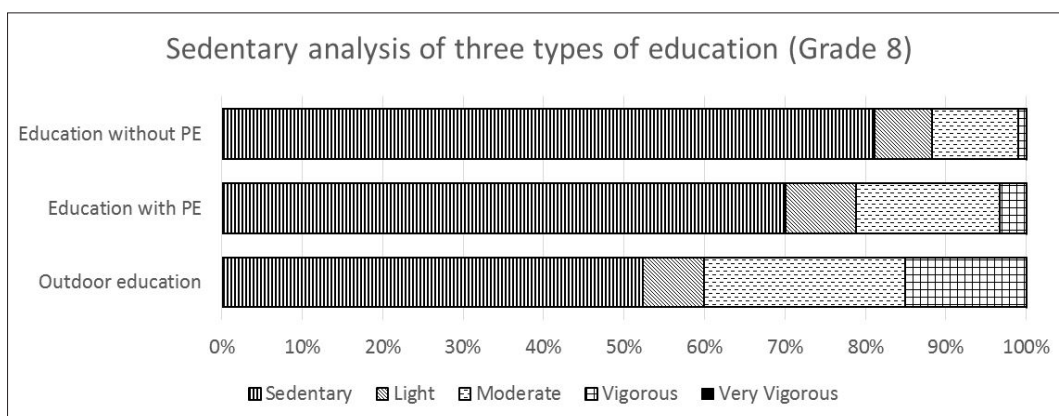


Figure 2: Sedentary analysis results (8th grade pupils).

Overall, the benefit of outdoor education, both in terms of the contribution to the daily calorie consumption and in terms of sedentary analysis, can be more positively evaluated than “common” education. If we compared 1 hour of outdoor education and 1 hour of PE, then the

8th grade pupils consumed an average of 48.2 kcal during one hour of PE and 107.3 kcal during one hour of outdoor education, while 5th grade pupils consumed 30.8 kcal during one hour of PE and 39.1 kcal during one hour of outdoor education. From these data, it can be concluded that in specific cases even an hour of outdoor education may have a slightly larger benefit on pupils' movement activity than an hour of PE. This can be caused by specific conditions during particular lessons. In both cases of outdoor education, pupils had to be active (physically) during the whole session of the measured period because they have to walk, observe, measure etc., all the time. Although during the PE lesson in the 8th grade pupils played volleyball (and ran at the beginning of lesson to warm-up the body), there were some *blind spots* where the physical activity was lower (e.g., when some active child was performing an excellent play, while the less active one was nearly standing still and waiting). Of course, this can vary depending on given sport and children attitude to sports activity.

DISCUSSION

Before we approach to the discussion of possible implication for the school practice, we would like to describe the limitations of this pilot study that we found out during the research. We believe it is correct to do so before formulation of the finishing statements as it can help to replicate the research without these obstacles.

Limitations

The authors of the paper are aware of several limitations of the presented research. Data collection was limited by the technological burden of the used device. The chest strap with the heart rate detector is primarily designed for an adult body. For children, the length of the chest strap had to be adjusted. Although we try to fix the strap on the children's chest, sometimes the detector was not recording the data for all of the 10-seconds intervals (in cases of very slim body type). The percentage of the measured data averages over 75 % for all pupils; the data significance level p has been calculated for the measured data sets, which is in all cases $p > 0.20$, meaning that the differences between the measured data are not significant and can be used for further analysis. Another limitation is the quite small sample, so we cannot allow generalizing the results on the population. Though the limitations of the obtained results, but we believe this can be a valuable tool for the larger-scale measurements and deeper statistical analysis of physical activity achieved during school activities of Czech pupils.

Implications for School Practice

At a time when the physical fitness of youth is decreasing (Madarasová Gecková et al., 2016; Lobstein, James, & Cole, 2003; Lobstein & Jackson-Leach, 2007; Lee, Stodden, & Gao, 2016) already from an early age compared to previous years, the schools should seek different ways to contribute to the development of pupils in this field. One of the ways how elementary schools can contribute to the development of movement activity to a certain extent is through the more frequent incorporation of outdoor education, both in short-term (1–2 learning hours) and medium-term forms (usually one day), as well as long-term forms (two and more days outside the school building). During well thought-out outdoor learning sessions, pupils are given a chance to be engaged in natural unstructured movement (walking, running, cycling) and, at the same time, to develop their knowledge and skills while not missing out on their schoolwork.

The results of pilot study suggest that the movement activity performed by pupils during outdoor education could be comparable to the activity that pupils perform during some physical

education lessons. Nonetheless, there are limited hours for PE during a school week. However, outdoor education can be cross-sectionally incorporated into almost all subjects and, inter alia, develop inter-subject links – naturally between physical education and other subjects. It is also an advantage not only for the natural sciences that pupils learn in a real environment, which corresponds to current trends in education (Vlček et al., 2016; Adkins & Simmons, 2002).

However, the principles of incorporating outdoor education into school education are not elaborated in great detail in the Czech education system. Many teachers still incorporate outdoor education in poorly designed ways (e.g. without links to the schoolwork discussed in class, with little pupil's own activity). Therefore, further research steps consist of: 1) the extension of the sample of measured pupils in different types of learning to make results of measurements more relevant, and 2) the preparation of the methodology of outdoor education, including the deepening of inter-subject cooperation. The teachers could be helpful partners in both – the cooperation in measurement of physical activity and preparation of school conception with clearly defined objectives how to strengthen the role of outdoor education at their school.

CONCLUSION

In the approach to the measurements, the researchers have been inspired in particular by researchers (Steele et al., 2009) who used the ActiGraph device for investigations of patterns of children sedentary and vigorous physical activity throughout the week. In another research (Fairclough, Beighle, Erwin, & Ridgers, 2012) authors measured the patterns of physical activity of differently active pupils during a school-day.

The results of the research on the movement activity of school-age pupils suggest that the outdoor education can contribute to its increasing (just simple walking during the outdoor education seems to be a great booster of MET rate and daily energy expenditure). Based on the results, it can be concluded that outdoor education can contribute to the development of the natural movement activity of pupils. It seems to be valuable to look deeper on the outdoor education from the point of the physical activity and thus it can be interesting for school authorities.

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Publication 5

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Chapters 7.1, 7.2, 7.5, 7.6, 10.2, 10.3

7 / The Czech Republic

7/1 Introduction

The Czech Republic has been an independent European country since 1 January 1993. It is a landlocked country in Central Europe bordered by Germany to the west, Austria to the south, Slovakia to the southeast and Poland to the northeast. Prague, the capital and largest city, has over 1.2 million residents. The Czech Republic includes the historical territories of Bohemia, Moravia, and Silesia, and with a total area of 78 889 km² is a middle-sized European country. The Czech Republic has 10.5 million inhabitants (June 2016), which puts it in the 13th place in Europe (out of 43 countries). Density of population is 134 inhabitants per sq. kilometre.

The Czech landscape is exceedingly varied. Bohemia, to the west, consists of a basin drained by the Elbe and the Vltava rivers, surrounded by mostly low mountains, such as the Krkonoše range with the highest point in the country, Sněžka (1 603 m). Moravia, the eastern part of the country, is also quite hilly. It is drained mainly by the Morava River, but it also contains the source of the Oder River.

The Czech Republic has a temperate continental climate, with warm summers and cold, cloudy and snowy winters. The temperature difference between summer and winter is relatively high, due to the landlocked geographical position.

The president is the formal head of state, and a bicameral Parliament is the supreme legislative body of the Czech Republic. The Czech Republic is a member of NATO and the European Union. It is also part of the Visegrad Group.

7/2 The educational system of the Czech Republic

As many sources state, the history of Czech education begins in 863 with the invitation by Rastislav of Moravia to Cyril and Methodius to come to Great Moravia and serve liturgy in the Slavic language. A big step forward occurred on 7 April 1348 when Charles IV founded the first university in Central Europe. Compulsory school attendance for every child between ages 6 to 12 was introduced in 1774 by the Habsburg emperor Maria Theresa of Austria (1740–1788).

Nowadays, all types of education are found in the Czech Republic, ranging from the pre-school, primary, secondary, tertiary, postgraduate to lifelong education. Compulsory school attendance is nine years, from 6 to 15 years old, but schooling continues for many students until they turn 17. As shown in Figure 1, compulsory education takes place either in continuing (single structure) primary (elementary) schools, or in primary schools and the lower classes of secondary schools, since students can enrol in 8- or 6-year Gymnasia after either Grades 5 or 7 respectively.

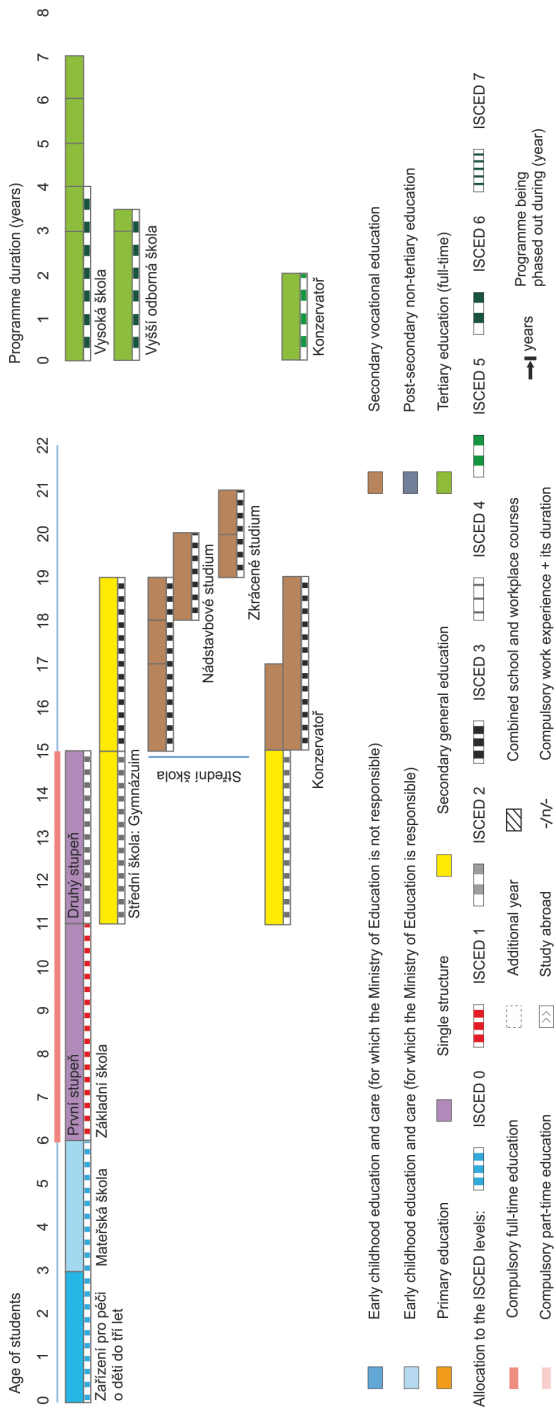


Figure 1 *The educational system of The Czech Republic (Euridice, 2014)*

Education in the Czech Republic is free, but there are some exceptions like preschools, where only the pre-elementary school year is free and parents pay for any additional years. There is also a long-standing policy discussion about paying university tuition fees. However, currently parents only pay for textbooks, basic equipment and food if their child eats in a school cafeteria. The state also pays health insurance for students up to 26 years of age (up to 28 years in case of PhD study).

The education system of the Czech Republic is divided into relatively independent educational levels corresponding to school type:

- preschools—from 2 to 5 years of age (last year mandatory),
- primary (elementary) education—from 6 to 15 years of age, mandatory,
- secondary education in professional secondary (high) schools, grammar schools, vocational schools and courses,
- tertiary education at universities.

Nursery schools (preschool) provide institutional preschool education of children aged from three until they start attending primary school, typically at the age of six. In cooperation with families, preschool education ensures all-round child-care, supplementing family upbringing as well meeting socialization needs. Attendance in a nursery school is not compulsory and does not provide any level of formal education; as stipulated by the law, it is a preschool institution, not a school.

Primary (elementary) education lasts nine years and is compulsory for all eligible children. It provides pupils with basic education and intellectual, ethical, work-related, aesthetic, and physical education, and prepares them for further studies and practice. It is divided into a two levels. Level 1, elementary school (ISCED 1), lasts five years, from Grades 1 to 5. The classes are usually lead by one teacher for all subjects (sometimes there is a second teacher for foreign language or physical education classes, etc.). Level 2, the lower secondary school (ISCED 2) lasts four years from Grades 6 to 9. A student completes this level either in a continuing (single structure) primary school or at the lower secondary level of a 6- or 8-year Gymnasium. Every subject is taught by a specialised teacher (most teachers have two specialisations).

After obligatory primary education, at the age of 15, pupils can continue in higher types of schools that vary in the number of years, type of qualification

and possibility of university studies. The upper secondary school (ISCED 3) builds on the curriculum acquired during primary education. It provides students with a wider context of general education, or vocational education combined with general education, and hence with the knowledge and skills required for a job or further studies.

Secondary schools can be divided into three basic types: gymnasium (grammar schools), secondary professional schools, and secondary vocational schools.

- **Gymnasia (grammar schools)** provide a comprehensive secondary education finished by a school-leaving (*maturita*) exam and primarily prepare their students to study at a university. The study program is four, six, or eight years long with some students completing their compulsory school years at the longer 6- and 8-year schools. These grammar schools are mostly for talented children and entrance exams are required.
- **Secondary professional schools** provide students with a comprehensive secondary, professional education finished with a school-leaving (*maturita*) exam and prepare their students for specialist and/or professional jobs or for university studies. The study program usually lasts four years. Secondary professional schools may also offer short-term programs; however, these do not have a school-leaving exam and do not allow students to study at a university.
- **Secondary vocational schools** prepare students for skilled and semi-skilled occupations and are designed for students who did not finish all nine years of their primary education or because they failed Grade 9. The study program typically lasts three years and is finished with a final school exam. Some students will attend the schools on a part time basis and also attend training centres to acquire the skills required by specific jobs. Secondary vocational schools may also offer 4-year study programs providing a complete professional education finished with a state organised school-leaving (*maturita*) exam.

Higher education (ISCED 5) in the Czech Republic consists of public, state (police and military) and private universities. Studies at public universities are unlimited and free, but students older than 26 are not entitled to the student status from social services and the state will not pay their health insurance should they continue to study. At private universities tuition fees vary between €2 000 and €3 000. For BSBA and MBA (not accredited by the Ministry of Education)

study programs tuition fees vary between €3 000 and €10 000. The prestige and quality of education and research in public and state universities is much higher than in private ones.

7/3 Introduction of the official curricula

Major educational changes took place in the Czech Republic after the social, political, and economic changes that occurred in 1989. During the 1990s there were changes to the curriculum at all educational levels and in all types of schools. Curricular projects were developed exclusively at the national level by staff at the Ministry of Education and research institutes under the responsibility of the Ministry. Unfortunately teachers and their associations were rarely asked to participate in these projects.

The outcome was the educational revisions set out by The National Programme for the Development Education in the Czech Republic (or White Paper) approved in February 2001. It aims at a policy where school curricula are developed at two levels. The centrally developed Framework Education Programmes (FEPs) define the educational objectives and content of the curricula. These centrally-drafted curricular projects are binding for all schools. They provide a foundation for the School Education Programmes (SEPs) that are set at the school level to help teachers refine and customize the objectives and content of the subjects they teach.

The FEPs specify (1) the level of key competences that students should acquire by the end of specific education levels, (2) define an obligatory content of education (expected outcomes and curriculum), and (3) integrates cross-curricular topics as an obligatory part of education. The document encourages a complex approach towards the content of education, including cross-curricular lessons or teaching, and expects the use of various teaching techniques, methods and tuition forms in accordance with students' individual needs. It is an open document, regularly updated according to the changing needs of society.

For the compulsory stage of education (Grades 1 to 9), the Framework Education Programme for Elementary Education (FEP EE) defines the binding scope of education at this level.

7/5 Description of Geography curriculum

In elementary education, the Geography curriculum is a part of two educational areas, Man and his World and Man and Nature (FEP, 2016).

Man and his World is the only educational area in the FEP EE that is designed solely for Stage 1, (Grades 1 to 5) of elementary education (ISCED 1). This is a complex area with broad educational content concerning man, family, society, home country, nature, culture, technology, health, etc. It works with the past in mind as well as the present, and leads towards the acquisition of skills for real life through its broadly conceived, integrated content.

The condition for success in this educational area is the pupil's own experience, in actual or hypothetical situations, in acquiring the necessary skills, course of action and decision-making. The teacher's personal example also contributes significantly. The interconnectedness of this educational area with real life and practical experience greatly helps pupils cope with new life situations, including their new role as pupils where it helps them find their position among peers and reinforces their work and regimen habits.

The instruction in this educational area is aimed at forming and developing key competences by guiding the pupil towards:

- developing work habits both through simple independent work and teamwork,
- becoming familiar with the financial issues and values and responsible personal budget administration,
- becoming familiar with the world of information and interconnecting historical, geographical and cultural information in terms of place and time,
- expanding his/her vocabulary in the topics being studied, describing observed facts and capturing them in his/her own forms of expressions, opinions and creations,
- discovering and understanding differences between people, towards adopting cultivated and tolerant conduct and behaviour on the basis of jointly created and accepted or generally applied rules of coexistence, towards fulfilling duties and common tasks,

- acting independently and self-confidently, communicating effectively and in such a way as to avoid problems and conflicts even in less common situations, becoming acquainted with his/her uniqueness (potential and limits) and influencing it,
- developing a considerate attitude to nature as well as cultural products, and towards seeking ways of actively participating in their protection,
- expressing positive feelings towards himself/herself and his/her surroundings naturally,
- discovering and becoming acquainted with everything in which he/she has an interest, that he/she likes and that could be an area of future success,
- learning about the essence of health and the cause of diseases and injuries and their prevention,
- learning and reinforcing preventative behaviour, effective decision making and useful conduct in various situations where his/her health and safety as well as those of others are endangered.

The educational content of the educational area Man and His World is divided into five thematic areas:

- Place where we live;
- People around us;
- Man and time;
- Diversity of nature.
- Man and his health.

The Geography curriculum is concentrated into the first and fourth above mentioned thematic areas. In the first thematic area, Place where we live, pupils learn by becoming acquainted with their immediate surroundings, and with the relations and connections therein, as well as gaining an understanding of the organisation of family life, school life, life in the municipality and in society. They learn to participate in everyday life with their own activities and ideas, to seek new and interesting things and to be able to exist safely in this

world. Emphasis is placed on traffic education, practical learning about local and regional information and on developing the pupil's personal experience. Various activities and tasks should naturally encourage pupils to form a positive relationship with the place where they live, and gradually develop their national consciousness in relation to our country.

In the fourth thematic area, Diversity of Nature, the pupils learn about the Earth as a planet in the solar system where life was created and has been developing. They discover the great diversity and variability of both animate and inanimate nature in our country. They are guided towards realising that the Earth, and life on it, constitute a whole, where all major actions are in mutual harmony and balance, and that this can be easily disturbed by Man and restored only with difficulty. Through practical exploration of their surrounding area and by research, pupils learn to seek evidence of changes in nature, to make use of and evaluate their observations and records, and to monitor the impact of human activities on nature. They also learn how to contribute in age-appropriate ways to protecting nature, improving the environment and to creating long-term sustainable development.

The fifth thematic area, Man and His Health, offers considerable opportunity for integration with the PE curriculum. In this area, pupils are provided with information mainly about themselves as living human beings with biological and physiological functions and needs. They learn how Man develops and changes from birth to adulthood, and what is suitable and unsuitable regarding daily regimen, hygiene, diet, interpersonal relations, and so. They acquire basic information on health and disease, on wellness and first aid, and safe conduct in various real life situations, including emergencies endangering the health of individuals as well as entire groups of people. Pupils gradually realise how responsible each person is for their individual health and safety, as well as the health of others. They learn that health is the most precious value of life. They acquire the necessary knowledge and skills by observing visual aids and specific situations, and through role playing and solving hypothetical situations.

In Stage 2 (ISCED 2) of elementary education (Grades 6 to 9), the geography curriculum is defined in the educational area, Man and Nature, and includes a range of topics associated with the investigation of nature. It provides pupils with the tools and methods for a deeper understanding of natural facts and their inherent laws, thus giving them the necessary foundation for a better use

and understanding of modern technologies and helping pupils better orient themselves in everyday life.

The instruction in this educational area is aimed at forming and developing key competences by guiding the pupil towards:

- investigating natural facts and their interconnections while employing various empirical methods of cognition (observation, measurement, experiment) as well as various rational methods;
- needing to ask questions regarding the course and causes of various natural processes, to formulate these questions properly and to seek adequate answers to them;
- such thinking that requires verifying expressed hypotheses on natural facts through several independent methods; assessing the importance, reliability and correctness of collected natural-science data in order to confirm or refute previously articulated hypotheses or conclusions;
- becoming engaged in activities aimed at considerate behaviour towards natural systems, his/her health and the health of others;
- understanding the connections between human activities and the state of the natural and living environments;
- thinking and behaving in a way that prefers as efficient a use of energy resources in practice as possible, including the widest use of renewable energy resources possible, in particular solar radiation, wind, water and biomass;
- forming the skills to act appropriately when coming into contact with substances or situations which represent a potential or real threat to the life, health, property or environment of Man.

According to the FEP EE (2016), the educational fields of Man and Nature, namely Physics, Chemistry, Natural Sciences and Geography, allow pupils through activity- and research-based instruction to develop a deeper understanding of the laws governing natural processes. Thus, they become aware of the usefulness of natural-science knowledge and its application in everyday life.

What is especially significant is that pupils, in studying nature through a range of specific learning methods, master important skills. These include the following: to observe, experiment and measure systematically, objectively and reliably; to

form and verify hypotheses regarding the nature of observed natural phenomena; to analyse the results of this verification; and to draw conclusions from them. Thus, pupils learn how: to investigate the causes of natural processes and the connections or relations between them; to ask questions (How? Why? What would happen if?) and to seek answers; to explain the observed phenomena; to seek and solve cognitive or practical problems, and; to use their knowledge of the laws governing natural processes to be able to predict or influence them.

The educational content of Man and Nature at this level (Grades 6 to 9) is divided into seven thematic areas:

- Geographic information, data sources, cartography and topography;
- A natural image of the Earth;
- Regions of the world;
- The social and economic environment;
- Environment;
- The Czech Republic;
- Field geographic education, practice and application.

The FEP document defines expected outcomes and subject matter for each area as shown in the following from the example of Geographic information, data sources, cartography and topography (FEP, 2016, p. 75):

Geographic information, data sources, cartography and topography.

Expected outcomes

The pupil shall:

- organise and evaluate geographic information and data sources adequately from available cartographic products and studies, from graphs, diagrams, statistical and other information sources;
- use basic geographic, topographic and cartographic terminology with comprehension;
- assess geographic objects, phenomena and processes in the landscape area, their certain regularities, inherent laws and differences, their

interconnectedness and conditionality adequately, and distinguish borders (barriers) between fundamental spatial components in the landscape;

- create and utilise his/her own mental schemes and mental maps to orient himself/herself in specific regions, to perceive and assess places, objects, phenomena and processes in them spatially, and to form attitudes towards the world around.

Subject Matter

- geographic and cartographic terminology—selected widely-used geographic, topographic and cartographic terms; basic topographical formations: important points, significant linear formations, surface formations and their combinations: networks, surfaces, foci—plexi; main cartographic products: plan, map; map terminology: symbols, conventional markings, legends; statistical data and their graphic expression, tables; basic information geographic media and data sources;
- geographic cartography and topography—globe, globe scale, geographic grid, meridians and parallels, geographic coordinates, determining geographic position in the geographic grid; scale and content of plans and maps, orienting plans and maps with respect to the cardinal points; practical exercises and applications using cartographic products available in printed and electronic forms.

7/6 Possible ways to combine PE and Geography in the Czech curricula

Czech pupils have Geography and PE lessons throughout all the nine years of compulsory education. However, in higher secondary schools, while PE is always part of curricula, Geography is only taught at some secondary schools, mainly gymnasias, business schools, and travel and tourism schools. The same is true of these lessons at university. While PE lessons are part of all universities' curricula, Geography lessons are only included in the study programs of the Faculties of Education, and geographical studies are only taught at Faculties of Science. However, Geography may also be taught as part of study programs dealing with travel and tourism or with economics.

It is apparent, therefore, that the greatest opportunities for integration of the PE and Geography curricula can be found in the elementary 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 (from 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 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 one described in the previous section (Geographic information, data sources, cartography and topography), 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, the FEP EE 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 depending on the conditions of the school and the interests of their pupils. 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 in the following ways:

- the importance of movement for health—the pupil's exercise regimen, movement length and intensity;
- preparation of the organism—pre-movement preparation, cool down after exertion, tensing and stretching exercises;
- health-oriented activities—proper body posture, proper load lifting; training, compensation, relaxation and other health-oriented activities and their practical application and development of various forms of movement speed, endurance, strength, flexibility, coordination;
- 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.

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 sport activities such as skiing or running.

Further opportunities for combining PE and the Geography curricula can be found in the Cross-Curricular Subjects. Cross-curricular subjects in the FEP EE examine current problems of the contemporary world. These subjects 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. Fieldwork has been embedded in the curricula of the Czech Republic for more than 100 years and provides many opportunities for integration. As stated before, one of FEP's priorities is consistent exploitation of interdisciplinary links and integration of individual subjects. Fieldwork, as an inseparable part of many subjects, is a suitable teaching method that explores these interdisciplinary links and encourages cooperation between teachers of different subjects.

FEPs introduce fieldwork as early as at the lower level of primary school, especially in the educational area Man and His World, which lays down the basics of natural and social sciences and recommends the use of places where children go to school. There are, for example, topics connected to outdoor orientation. The basics of natural history and geography also contain other factors such as practical observations and easy outdoor measurements, for example, monitoring weather, phonological observations, etc. Students learn how to keep records, for example in field diaries, sketches and herbaria. PE teachers also work with students outside the school, and there may be field exercises, such as skiing and skating. There are also opportunities for long-term fieldwork during extended outdoor camps or excursions. It is up to the teachers how they implement all these activities in the SEP.

Conclusion

In conclusion, one of the priorities of the FEPs 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 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, this includes, for example, outdoor excursions such as camping and summer and winter training courses. One could therefore conclude that the conditions for the application of fieldwork in the Czech educational curriculum are sufficient.

Fieldwork, however, is precise and its preparation is time-consuming; it is demanding both for teachers and for students. Preparation includes perfect planning, preparation of tools and methodical materials, choice of places suitable for short-term and long-term fieldwork, and identification of their geographical characteristics. Fieldwork is also financially demanding and it is important to meet the strict safety criteria set by internal school regulations, for example, first aid box, providing parents with information, and so on. On the other hand, it fosters a range of skill in students connected with practical activities in the nature, and, generally, pervades the whole primary school curriculum in the Czech Republic.

9-year, single-structure system, which is divided into two stages—primary and lower secondary. However, lower secondary education can also be provided by multi-year general secondary schools and 8-year conservatories. In both the Republic of Slovenia and Denmark, primary and lower secondary education is integrated into single-structure schools, of nine years and ten years duration respectively. In Denmark the ten years includes Grade 0, a transitional year between kindergarten and primary school.

Upper secondary education in all three countries is provided by upper secondary schools in either general and vocational fields. In the Czech Republic, upper secondary schools are divided into three basic types: grammar schools (4 to 8 years with a school-leaving exam); secondary professional schools (3 to 4 years with a school-leaving exam) and secondary vocational schools (3 to 4 years with a final exam or a school-leaving exam). In the Republic of Slovenia the upper secondary education consists of general education with different types of 4-year grammar school programmes that finish with a school-leaving exam and vocational (2 to 3 years) and technical education (4 years or 3 plus 2 years with a final exam or a school-leaving exam). In Denmark, there are three types of upper secondary schools: grammar schools (3 years), trade schools (3 years) and vocational schools (3 to 5 years). There are some specifics regarding **the tertiary level of education** although in all three countries the systems are organised in accordance with the Bologna process and the Lisbon Strategy.

10/2 Comparison of the analysed curricula

10/2/1 Questionnaire for the C.A.L.M.A.Z. member countries experts

Method: 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. Their expertise is evident from the number of scientific papers that they have authored.

We established first contacts at the C.A.L.M.A.Z. inaugural meeting in September 2013 in Ljubljana (Slovenia). All authors 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, according to the following questions:

0. Structure of the educational system

- 0.1 What is the compulsory age for children to attend school in your country?
Age x-y
- 0.2 How many compulsory PE/Geography classes shall be held for one week and for one year at certain school levels?
Level x (e.g. elementary school), Age x-y: y hours
- 0.3 For which of these school levels do you have specific PE/Geography curricula in your country?
- 0.4 What is the current political situation of PE/Geography at school in your country?
- 0.5 Have there been any educational reforms done in the last 5 years or are there any going to be the following years?
- 0.6 Which are the most urgent problems of PE/Geography?

1. Formal issues of the curriculum (asked for both elementary and secondary school)

- 1.1 What is the name of the subject?
- 1.2 When did the current core curriculum enter into force?
- 1.3 Who is responsible for the elaboration of the curriculum?
- 1.4 How centralized or decentralized is your curriculum? (e.g. national level, regional level, school level, ...)
- 1.5 What is the structure of the main curriculum and what are the main thematic chapters?
- 1.6 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, ...). (e.g. for Geography: place, local-global perspectives, interaction of man and nature, ...)
- 1.7 Is the curriculum rather content based (physical activities, concepts, models) or outcome based (competences)?
- 1.8 Does the curricula define any standards? If yes, in what sense? (you can show an example)
- 1.9 Is there any quality control system monitoring the implementation of the provisions of the curriculum? If yes, who are the responsible and how is it organized?

1.10 In how far is it possible to detect any difference between the prescribed curriculum and the real curriculum implemented in the field?

2. Objectives, content and assessment issues of the curriculum (asked for both elementary and secondary school)

2.1 Which are the main general objectives defined in the curriculum?

2.2 Do the following development areas appear in some way or another in the curriculum?

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, constructive, critical thinking.

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).

2.3 In how many areas is the content divided and what are their names?
PE/Geography

2.4 Which activities, contents, appear in the curricula content and which are the dominant ones? PE/Geography

2.5 Is there any kind of central (governmental) assessment on any class level? If yes, in which class level, what is its purpose?

2.6 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, ...)

Source: authors' own questionnaire survey

The authors had a text delivery deadline of June 2016. The first papers varied somewhat in quality and structure. It was decided that the answers had to undergo careful revision and comparison with the content of the descriptive chapters (Chapter 7, 8, 9). The main goal was to guarantee comparability between statements from different countries. This in turn facilitates cross-sectional study. We steadily sent feedback to those authors whose papers we felt would benefit from some changes before work by the language editor.

10/2/2 Juxtaposition of the questionnaire for the C.A.L.M.A.Z.
member countries experts

Table 12 The results of the comparison of the PE and Geography curricula

Czech Republic		Denmark		Slovenia	
PHYSICAL EDUCATION					
Structure of the educational system					
What is the compulsory age for children to attend school in your country?					
6-15		6-15		6-15	
How many compulsory PE classes shall be held for one week and for one year at certain school levels?					
All grades: 2 classes / week		Grades 1-3: 2 classes / week Grades 4-6: 3 classes / week Grades 7-9: 2 classes / week		Grades 1-3: 3 classes / week Grades 4-6: 3 classes / week Grades 7-9: 2 classes / week	
For which of these school levels do you have specific PE curricula in your country?					
2 curricula: Elementary school Grades 1-5 Elementary school Grades 6-9		4 curricula: Elementary school Grades 1-2 Elementary school Grades 3-5 Elementary school Grades 6-7 Elementary school Grades 8-9		There is only one curriculum for PE, covering all nine years of elementary school. It is divided into three parts: Elementary school: Grades 1-3 Elementary school: Grades 4-6 Elementary school: Grades 7-9	
What is the current political situation of PE at school in your country?					
Long tradition. Discourse about launching third class a week. academic discussion about changing health oriented goals toward physical literacy.		New reform in 2014 PE got one extra lesson per week at Grades 4-6 class and exam in PE after Grade 9.		Nowadays in a rather good position.	
Have there been any educational reforms done in the last 5 years or are there any going to be the following years?					
2004		2014		2007-2008	

Czech Republic		Denmark		Slovenia	
Which are the most urgent problems of PE?					
Congruence (fidelity) of curricula levels. Low acceptance of new curricula.		Getting PE teachers around the country educated to handle the PE exam.		Implementation of the modern educational trends.	
Formal issues of the curriculum (asked for both elementary and secondary school)					
What is the name of the subject?					
Physical (body) education		Physical education		Physical education	
When did the current core curriculum enter into force?					
2004		2014		2011	
Who is responsible for the elaboration of the curriculum?					
National Institute for Education led by Ministry of Education, Youth and Education		Ministry of Education		Ministry of Education, Science and Sport	
How centralized or decentralized is your curriculum? (e.g. national level, regional level, school level, ...)					
Decentralized: The Framework Education Programme (national level) → The School Education Programme (school level).		Centralized on national level.		Centralized on national level.	
What is the structure of the main curriculum and what are the main thematic chapters?					
1) Health enhancing activities. 2) Skills enhancing activities. 3) Activities enhancing physical activities learning.		1) Versatile sport. 2) Sports, culture and relationships. 3) Body, workout and well-being.		Grades 1–3: ABC of athletics, ABC of gymnastics, natural movements, ball games, dance games, outdoor activities, swimming. Grades 4–9: athletics, gymnastic with rhythmic gymnastics, dancing, volleyball, football, handball, basketball, outdoor activities.	

Czech Republic		Denmark		Slovenia	
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, ...).					
<p>PE was embedded in the educational area related to health promotion. The current concept of Czech PE is not accepted universally by the teachers. According to the latest educational programmes a wide variety of physical activities concerning especially health goals should be used in the PE classes.</p>	<p>The key concept is bodily competence, sports competence, social competence and personal competence.</p>	<p>The overall objectives of PE in elementary program:</p> <p>Proper movement efficiency and the creation of a healthy lifestyle.</p> <p>The acquisition of skills that enable participation in various sports activities.</p> <p>Understanding the usefulness of regular exercise and PE, and their role in providing quality free time.</p> <p>The creation of positive patterns of behaviour.</p>			
<p>Both content and outcome-based</p>		<p>Outcome (competence) based</p>		<p>More content than outcome based</p>	
Does the curriculum define any standards? If yes, in what sense? (you can show an example)					
<p>Standards are formulated in a form of expected outcomes; expected outcomes are developed into indicators.</p>	<p>Only standards of what the student knows and is able to do.</p>	<p>Standards are formulated in a form of expected outcomes.</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>Czech school inspection should monitor teaching at schools and implementation of curricula. Though, implementation of the curriculum is not monitored in reality.</p>	<p>Quality control comes with the multiple choice national test (Grade 8) and final oral exam together with biology and physics-chemistry (Grade 9). Both test and exam is initiated by the Ministry of Education.</p>	<p>In Slovenia teachers are obliged to follow the curriculum/syllabus of the subject they teach. The headmasters can (whenever they decide so) participate during their lessons and check their materials. All that can be also checked by school inspectors.</p>			

Czech Republic	Denmark	Slovenia
<p>In how far is it possible to detect any difference between the prescribed curriculum and the real 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>There has not yet been a review after the new reform, but that will come as well.</i></p>	<p><i>In Slovenia the 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 and written and oral exams' results of teacher's national level the implementation can be checked. In reality by PE teachers a lot of written goals aren't realized, which is an important problem for the quality of PE (especially in first and second triennium).</i></p>
<p>Objectives, content and assessment issues of the curriculum (asked for both elementary and secondary school)</p>		
<p>Which are the main general objectives defined in the curriculum?</p> <p><i>General objectives of PE in CZR are all concerned with health issues.</i></p>	<p><i>...to learn to be part of versatile sporting contexts where it is vital that pupils achieve physical skills and knowledge of physical activity and experience joy and the desire to pursue sport in many different areas.</i></p>	<p>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.</p>
<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 self-knowledge, self-esteem and cooperative attitude; forming responsible behaviour; developing problem-solving, constructive, critical thinking.</p>	<p><i>Yes</i></p>	<p><i>Yes</i></p>
<p><i>Yes, the dominant ones: educating children to lead physically active lifestyle; developing the knowledge for health-conscious lifestyle.</i></p>	<p><i>Yes</i></p>	<p><i>Yes</i></p>

Czech Republic		Denmark	Slovenia
Which activities, contents, appear in the curricula content and which are the dominant ones?			
<p><i>Physical education in the curricula – health issues, reality is different.</i></p>	<p><i>Gymnastics, Ballgames, Dance and expression, Outdoor activities, Athletics, Swimming, Physical training.</i> <i>Dominant ones are the first 3 activities.</i></p>	<p><i>Athletics, Gymnastic, Dancing, Natural Movements, Ball Games, Mountaineering, Swimming, Gymnastic with Rhythmic Gymnastics, Volleyball, Football, Handball, Basketball. There is no dominant activity; all activities are equal.</i></p>	
Is there any kind of central (governmental) assessment on any class level? If yes, in which class level, what is its purpose?			
<p><i>It is proposed to launch centralised evaluation in Grades 5 and 9.</i></p>	<p><i>After Grade 9 pupils take a PE exam, which is both theoretical and practical. This is evaluating knowledge, skills and competences.</i></p>	<p><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></p>	
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, ...)			
<p>The school determines marking – testing is done during school year</p> <p>In the middle and at the end of the school year students get report card with written assessment (lower grades) or marks</p>			
<p>There are no universally agreed criteria; PE assessment is seldom formalized.</p>	<p>A written statement from the PE teacher in Grade 8, and a final examination when finishing Grade 9.</p>	<p>At different moments during the school year it is regarded as the determination of the achievement of objectives; achievements are assessed.</p>	

GEOGRAPHY	
Czech Republic	Slovenia
Denmark	
Structure of the educational system	
6–15	6–15
What is the compulsory age for children to attend school in your country?	What is the compulsory age for children to attend school in your country?
How many compulsory geography classes shall be held for one week and for one year at certain school levels?	How many compulsory geography classes shall be held for one year at certain school levels?
<p>Grades 1–3: “Přvouka” 2–3 hrs/week, Grades 4–5: “Vlastivěda” 1–2 hrs/week, Grades 6–9: “Geography” 2-2-2-1 hrs/week</p>	<p>Grades 1–6: <i>Geography is integrated in the Science-Technology subject having 1–3. hrs/week.</i> Grades 7–9: <i>Geography a separate subject.</i> Grade 7: 2 hr/week Grade 8: 1 hr/week Grade 9: 1 hr/week</p> <p>Grades 1–3: <i>Environmental studies, 3 hrs/week</i> Grades 4–5: <i>Social studies: 2 hrs/week</i> Grade 6: <i>Geography 1 hr/week</i> Grades 7–9: <i>Geography: 2-1,5-1,5 hrs/week</i></p>
For which of these school levels do you have specific geography curricula in your country?	For which of these school levels do you have specific geography curricula in your country?
<p>Elementary school Grades 1–5 Elementary school Grades 6–9</p>	<p>Environmental Studies Curriculum (Grades 1–3) Social Studies Curriculum (Grades 4–5) Geography Curriculum (Grades 6–9)</p>
What is the current political situation of geography at school in your country?	What is the current political situation of geography at school in your country?
<p>“Stealing” of geography curriculum by other subjects (environmental education, biology, civics, history, ...).</p>	<p>The curriculum for geography, biology and physics-chemistry (Grades 7–9) has the same structure emphasising common science competences (investigation, modelling, perspective, and communication) + 6 interdisciplinary science subjects. In 2017 there will be one common oral examination including all three subjects.</p> <p>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.</p>

Czech Republic		Denmark		Slovenia	
Have there been any educational reforms done in the last 5 years or are there any going to be the following years?					
2004		2014		2007–2008	
Which are the most urgent problems of geography?					
Descriptiveness, encyclopaedic learning, lack of practical use – fidelity.		<p>Many uneducated geography teachers, The municipalities are going to pay for the teachers' in-service training.</p> <p>The 2014 reform of geography emphasis physical geography and the teachers might "forget" the human geography when teaching.</p>		Beside implementation of the modern educational trends, no urgent problems.	
Formal issues of the curriculum (asked for both elementary and secondary school)					
What is the name of the subject?					
Prvouka – vlastivěda – zeměpis (Elementary studies – Geography – Geography) Grades 1–3: "Prvouka" (Elementary studies) Grades 4–5: "Vlastivěda" (Geography) Grades 6–9: "Zeměpis" (Geography)		Grades 1–6: Science-technology Grades 7–9: Geography		Grades 1–3: "Spoznavanje okolja" (Environmental studies) Grades 4–5: "Družba" (Social studies) Grades 6–9: "Geografija" (Geography)	
When did the current core curriculum enter into force?					
2004		2014		2011	
Who is responsible for the elaboration of the curriculum?					
National Institute for Education led by Ministry of education, youth and sport		Ministry of Education		Ministry of Education, Science and Sport	

Czech Republic		Denmark		Slovenia	
How centralized or decentralized is your curriculum? (e.g. national level, regional level, school level, ...)					
Decentralized: <i>The Framework Education Programme (national level) → The School Education Programme (school level)</i>		Centralised on national level		National level	
What is the structure of the main curriculum and what are the main thematic chapters?					
<p>For Geography 9 thematic units (3 of them contain geography):</p> <p>Grades 1–5: thematic unit “Man and his world”,</p> <p>Grades 6–9: thematic unit “Man and nature”</p> <p>contains “Planet Earth, Regional geography of continents, Geography of the Czech Republic and general physical and human geography and cartography”</p>		<p>Grades 1–6: Science-technology, emphasise on topics from physical geography.</p> <p>Grades 7–9: Four geographical core topics: Demography and economic geography, the earth and its climate, globalization, and natural resources and living conditions.</p> <p>The three science subjects Grades 7–9 (geography, biology and physics-chemistry) also have to work interdisciplinary with six topics several of them concerning sustainability.</p>		<p>Grade 6: Planet Earth</p> <p>Grade 7: Regional Geography of Europe and Asia</p> <p>Grade 8: Regional Geography of Africa, Australia and Oceania, America and Polar regions</p> <p>Grade 9: Geography of Slovenia</p>	
What is /are the key concept(s) that your curriculum is referring to? (e.g. for Geography: place, local-global perspectives, interaction of man and nature, ...).					
Recent unsuccessful attempts to understand processes in nature.		<p>Geographical key concept: Interaction of man and nature, place, local to global scale.</p> <p>Students competences: investigation, modelling, perspective, and communication.</p>		<p>Geography helps to acquire knowledge, abilities and skills, which can help them to understand the environment.</p>	
Is the curriculum rather content based (physical activities, concepts, models) or outcome based (competences)?					
Focus both on the content (content-based curriculum) and on the outcomes (outcome-based curriculum).		Competence base, which means focus is on student outcome.		More content that outcome based.	

Czech Republic		Denmark		Slovenia	
Does the curriculum define any standards? If yes, in what sense? (you can show an example)					
<i>Standards are formulated in a form of expected outcomes; expected outcomes are developed into indicators.</i>	<i>Only standards of what the student knows and is able to do.</i>	<i>Standards are formulated in a form of expected outcomes.</i>			
Is there any quality control system monitoring the implementation of the provisions of the curriculum? If yes, who are the responsible and how is it organized?					
<i>Czech school inspection.</i>	<i>National test (Grade 8) and final exam (Grade 9). Both are initiated by the Ministry of education.</i>	<i>School inspectors.</i>			
In how far is it possible to detect any difference between the prescribed curriculum and the real curriculum implemented in the field?					
<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>	<i>The curriculum of geography was changed in 2014. Since then, no research has been conducted concerning the implementation of this curriculum.</i>	<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>			
Objectives, content and assessment issues of the curriculum (asked for both elementary and secondary school)					
Which are the main general objectives defined in the curriculum?					
<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>The main geographical objective is that students achieve competence to apply knowledge from the following main areas, in appropriate connections: Demography and economic geography, The Earth and its climate, Globalization, Natural Resources and living conditions.</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>			

Czech Republic	Denmark		Slovenia
<p>Do the following development areas appear in some way or another in the curriculum? 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>			
<p>Competence to learn, competence to solve problems, critical/geographical thinking.</p>	<p>Ability to organize and achieve data collection and to use their knowledge in different geographical contexts. In the preamble of geography, action competence and citizenship are emphasized.</p>	<p>Action competence, citizenship, critical thinking, problem-solving competence, organizing practical work, aesthetic awareness.</p>	
<p>In how many areas is the content divided and what are their names?</p>			
<p>Elementary schools: Grades 1–5 have 5 thematic units with Geography concentrated in 2 units. Grades 6–9 have 7 thematic units (Note in Secondary Schools: Grades 6–9 have only 6 thematic units).</p>	<p>Grades 1–6: weather and climate, Danish landscapes, plate tectonic, environmental studies. Grades 7–9: Demography and economic geography; the earth and its climate, globalization, natural resources and living conditions.</p>	<p>Grades 1–3: Spoznavanje okolja – learning the Environment. Grade 4–5: Družba – Social studies. Grades 6–9: Geografija.</p>	
<p>Which activities, contents, appear in the curricula content and which are the dominant ones?</p>			
<p>No dominant activities, there are several balanced topics. Geography should explain processes in the world in general, but reality is that geography describes the world.</p>	<p>No dominant activities. However, it is vital that the students are able to organize and conduct data collection; and process, interpret and speculate on the material collected in the appropriate contexts. This implies that students have to do practical work when having geography. This might be lab. work, fieldwork, outdoor learning etc.</p>	<p>Geography focuses on understanding the world, understanding the 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.</p>	

Czech Republic		Denmark		Slovenia	
Is there any kind of central (governmental) assessment on any class level? If yes, in which class level, what is its purpose?					
It is proposed to launch centralised evaluation in Grades 5 and 9.		National assessments in Geography at Grade 8 (national test) and Grade 9 (final exam).		The National Assessment of Knowledge (NAK) at the end of Periods 2 and 3, i.e. for pupils in Grades 6 and 9, is compulsory.	
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, ...)					
The school determines marking – testing is done during school year In the middle and at the end of the school year students get report card with written assessment (lower grades) or marks					
Testing during school year by the teacher. The knowledge is assessed. No other assessment.		Only national test (Grade 8) and final exam (Grade 9). The geography teacher might use some other summative tools (e.g. on the internet) to evaluate the students learning.		Assessment at different moments during the school year. It is regarded as the determination of the achievement of objectives; achievements are assessed.	

Source: authors' own questionnaire survey

10/2/3 Comparison of the PE and geography curriculum- -C.A.L.M.A.Z member countries experts' answers

Physical Education

Structure of the educational system

The current state of PE within the educational system is relatively strong in all three countries in the study. PE has a long tradition in the Czech Republic and currently the possibility of a third class per week is being discussed. At the same time, there is a debate among academics about shifting the focus of PE from the current health oriented goals toward physical literacy. School reform in Denmark in 2014, resulted in an increase in the number of PE lessons for Grades 4 to 6, and an exam in PE after the Grade 9. When asked about the current policy in PE, the Slovenian respondent states that currently PE is in a rather good position within the basic education system.

Nevertheless, in all countries PE is experiencing problems. 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 Denmark, the issue is educating PE teachers around the country to handle the PE exam and in Slovenia, there is a problem in implementing modern educational trends.

In the Czech Republic, the minimum time allocated for all grades is two lessons of PE per week. In Denmark, it is two lessons for Grades 1 to 3 and for Grades 7 to 9, and three lessons for Grades 4 to 6. In Slovenia, Grades 1 to 6 have three lessons of PE per week, and only two lessons per week in the last two primary education grades.

In all three countries, the PE curriculum changes during primary education. In the Czech Republic, there are specific curricula for Grades 1 to 5 and for Grades 6 to 9. In Denmark, there are four curricula specific for Grades 1 to 2, Grades 3 to 5, Grades 6 to 7, and Grades 8 to 9. In Slovenia, there is only one curriculum covering all nine primary education grades, but nevertheless, it is divided into three parts, one each for Grades 1 to 3, Grades 4 to 6, and Grades 7 to 9.

The implementation of the curriculum is quality assured in different ways. In the Czech Republic, inspections are carried out by the Czech School Inspectorate; however, in reality the implementation of the curricula is not checked directly

and remains the responsibility of the school itself. In Denmark, quality is assured by a national testing regime initiated by the Ministry of Education. In Slovenia, inspection is carried out at a school level and is initiated by the director of a school.

Formal issues

In this section we make some general comments on the PE curricula in the three countries involved in the study, identified through the respondents' answers to ten questions that referred to both the lower and higher primary education level.

All countries use the same name for the subject—"physical education", although in the Czech Republic they sometimes refer to PE as "body education". The oldest curriculum is that of the Czech Republic (2004), although the document has been modified since then, most recently in 2011, with another revision planned for the autumn 2016. Slovenia and Denmark have more recent curricula that were introduced in 2011 and 2014 respectively. In these two countries the curricular documents are developed by their respective Ministries of Education, while in the Czech Republic, the Ministry of Education commissions the National Institute for Education to develop curricula.

Unlike Denmark and Slovenia, where development of the curricula is centralized at the national level, the Czech curriculum is developed both at the national level (The Framework Education Programme), and at the school level (The School Education Programme). The Czech curriculum includes activities encouraging health, skills and learning physical activities, Denmark's curriculum typically supports versatile sport, sports, culture and relationships as well as body, workout and well-being. In lower grades, Slovenia's curriculum lays down the ABC of athletics, the ABC of gymnastics, natural movements, ball games, dance games, outdoor activities, and swimming; these are further developed in higher grades by adding sports such as volleyball, football, handball, and basketball.

The concepts underpinning the PE curriculum are also different. In the Czech Republic the focus is on encouraging health. Denmark's curriculum focuses on achieving competence—bodily competence, sports competence, social competence, and personal competence. Slovenia's curriculum focuses on achieving lifelong physical activity and emphasises 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 PE and the creation of positive patterns of behaviour.

The three curricula also differ in their educational approach. When asked “Is the curriculum content based (physical activities, concepts, models) or outcome based (competences)?” the Czech respondent said “both content and outcome-based”, the Danish respondent said “Outcome (competence) based” and the Slovenian respondent said “more content than outcome based”. All the three curricula contain standards which are usually defined as expected outcomes (Czech Republic and Slovenia), and as standards of what the student knows and is able to do in Denmark.

In all three countries, the potential of the intended curriculum often fails to be fully realised. In the Czech Republic, there is a significant problem for the quality evaluation of PE because of a low congruence between the planned and realized curriculum. In Slovenia, planned goals often fail to be realized by PE teachers. In Denmark, the reform has been implemented only recently and results are not yet available.

From the results of the study it appears that general characteristics of PE curricula in the three countries differ in many aspects.

Objectives, content and assessment issues of the curriculum

In the following section we explore in detail the specific objectives, content and assessment issues of the PE curriculum in the three countries.

The objectives of the PE curricula differ. In the Czech Republic all objectives refer to health issues, while in Denmark, the objective is that students learn to be part of versatile sporting contexts where it is vital that pupils achieve physical skills and knowledge of physical activity and experience joy and the desire to pursue sport in many different areas. In Slovenia the main objectives are 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.

Respondents all agree that their national curricula include the ideas of 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, and developing problem-solving, and constructive, critical thinking.

The PE educational content is similar with all three curricula including gymnastics, athletics, ball games, dancing and swimming. Gymnastics, ball games, and dance and expression, are dominant in the Denmark's curriculum, which further contains outdoor activities and physical training. Unlike others, Slovenia's curriculum also offers natural movements and mountaineering. The Czech curriculum is divided into activities that impact health, activities that influence the level of locomotive skills, and activities encouraging locomotive learning. Besides the common content, it further contains martial arts activities, tourism, and outdoor stays.

Formal assessment of pupils in PE lessons is obligatory in Slovenia and in Denmark. In Denmark, pupils receive a written statement from the PE teacher in Grade 8 and are tested at the end of Grade 9 for knowledge, skills and competences. In Slovenia, achievement of objectives is assessed at different times during the school year and compulsory testing is conducted within the National Assessment of Knowledge (NAK) at the end of in Grades 6 and 9. In the Czech Republic, formal testing is not compulsory although national testing at the end of the Grades 5 and 9 is being debated. Currently, however, only progress testing is carried out.

Geography

Structure of the educational system

In the Czech and Slovenian curricula some themes in Geography overlap the content of other subjects, for example, Civics, Biology, History, etc., Interestingly, this is perceived by the respondents in a rather negative way. However, Denmark's curriculum aligns geography with Biology and Physics-Chemistry. From 2017, there will be one common oral examination including all three subjects. The new structure emphasises common science competences (investigation, modelling, perspectivation, and communication) and six interdisciplinary science subjects.

The study reveals that there are only minor issues with the geography curricula across the three countries. In the Czech Republic, there are issues with excessive descriptiveness, encyclopaedic learning and lack of practical use. In Denmark, the problem is the many uneducated geography teachers. In response to this situation, the municipalities are going to pay for in-service training for teachers. Furthermore, since the 2014 reform, the emphasis has been placed on physical geography and there may be an issue that teachers "forget" human geography

when teaching. In Slovenia, as stated previously, it is only the implementation of modern educational trends that is problematic, as stated previously.

There are different structures between countries in the Geography curricula for primary education. In the Czech Republic, Geography has a single curriculum for primary schools further divided into “*Prvouka*” (Elementary studies) for Grades 1 to 3, “*Vlastivěda*” (Geography) for Grades 4 to 5, and “*Zeměpis*” (Geography) for Grades 6 to 9. In Denmark, Geography in Grades 1 to 6 is integrated in the Science-Technology subject having 1 to 3 hrs/week. In the higher primary level Geography is an independent subject, with the emphasis on the cooperation between Geography, Biology and Physics-Chemistry (Science), with two lessons per week in Grade 7 and one lesson per week in Grades 8 and 9. In Slovenia, the curriculum is divided into three—Environmental Studies Curriculum (Grades 1 to 3), Social Studies Curriculum (Grades 4 to 5) and Geography Curriculum (Grades 6 to 9).

The implementation of the curriculum is quality assured in the same ways as the PE curricula. In the Czech Republic, inspections are carried out by the Czech School Inspectorate; in Denmark, quality is assured by a national testing regime initiated by the Ministry of Education. In Slovenia, implementation of the current curriculum is tested by means of lesson preparations, written and oral exam results of students, and results of final exams on national level. Inspection is carried out at a school level and is initiated by the director of a school.

Formal issues

In all three countries Geography is taught under different names in different school years. The word “geography” does not appear in any of the curricula until higher primary grades, since the subject content in the lower primary grades is merged with elements of history, biology, and basics of physics and chemistry.

The oldest geography curriculum can be found in the Czech Republic (2004); however, as with PE, it has been modified several times. Slovenia and Denmark have considerably more recent curricula, dating back to 2011 and 2014 respectively. As with PE, curricula documents in these two countries are developed by their respective Ministries of Education, while the Czech Ministry of Education commissions the National Institute for Education to develop the curriculum.

As stated previously for PE, in Denmark and Slovenia the curricula are developed centrally, at the national level, while the Czech curriculum is developed

both at the national level (The Framework Education Programme), and at the school level (The School Education Programme).

In the lower primary grades, in all three countries, Geography deals predominantly with physical geography and, in general, covers the world nearby, for example, Man and his World in the Czech Republic, and Environmental Studies in Slovenia (home, school, local community, basic terminology, and orientation) and then Social studies (geographical, historical, sociological topics of home region and Slovenia).

In the higher primary years in all three countries, the subject content focuses on learning about the Earth and regional geography of the world including detailed geography of their own country. However, Denmark's curriculum explores the subject in more depth and focuses on four geographical core topics: demography and economic geography, the Earth and its climate, globalization, and natural resources and living conditions. The Czech curriculum also goes beyond the physical geography in the higher primary grades where it deals with general physical and human geography and cartography.

The key concepts underpinning the Geography curricula differ between countries as it did for the PE curricula. 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. In Denmark, the focus is on understand the interaction of man and nature, place, local to global scale. The student's competences are investigation, modelling, perspectivation, and communication.

The curricula also differ in their educational approach, in the same way as the PE curriculum does. When asked "Is the curriculum rather content based or outcome based?", the Czech respondent said that it focuses both on the content and on the outcomes, the Danish respondent said it is competence based, which means the focus is on student's outcomes, and the Slovenian respondent said it is more content than outcome based. From this point of view, the geography curriculum in the countries discussed does not differ considerably from the PE curriculum. All the three curricula contain standards which are, as in PE, most often defined as expected outcomes (in the Czech Republic and Slovenia), and as standards of what the student knows and is able to do in Denmark.

The Czech Republic seems to be the least successful in realizing the planned curriculum as teachers do not understand the goals of the reforms or do not

want to implement them because it is easier to teach in old and set ways than to implement new things. The situation in Denmark was monitored at a national level in 2004 and 2011; however, evaluation of the new curriculum has not yet been carried although is expected in summer 2017. In Slovenia, implementation of the current curriculum is tested by means of lesson preparations, written and oral exam results of students, and results of final exams on national level.

Objectives, content and assessment issues of the curriculum

The main objectives of the Geography curricula are very similar in all three countries. In the Czech Republic it is geographical thinking about man and nature, environment, use of energy and so on—exploration of facts, processes and their context, using various methods of cognition. In Denmark, the main objectives focus on competence and the emphasis is on the ability of students to apply their knowledge, in the appropriate context, of the following: demography and economic geography, the Earth and its climate, globalization and natural resources, and living conditions. In its description of objectives, Slovenia's curriculum lists the 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.

All the curricula seek to develop certain competences. In the Czech Republic these are the competence to learn, competence to solve problems, and critical/geographical thinking. Denmark's curriculum emphasises action competence and citizenship as well as the student's ability to organize and achieve data collection, and to use their knowledge in different geographical contexts. Slovenian curriculum includes action competence, citizenship, critical thinking, problem-solving competence, organization of practical work, and aesthetic awareness.

In the Czech Republic and in Denmark the geography subject content is divided into two levels, and in Slovenia, into three. In the Czech Republic, the first level (lower primary) has five thematic areas—Place where we live, People around us, Man and time, Diversity of nature and Man and his health. For the second level (higher primary) there are seven thematic areas—geographic information, data sources, cartography and topography; then a natural image of the Earth, regions of the world, social and economic environment, environment, Czech Republic and field geographic education, practice and application. In Denmark, the first level (Grades 1 to 6) deals with weather and climate, Danish landscapes, plate tectonic, environmental studies, and the second level (Grades 7 to 9) consider

demography and economic geography, the earth and its climate, globalization, natural resources and living conditions. The geography content of the Slovenian curriculum is divided into three levels: Environmental Studies (Grades 1 to 3), Social Studies (Grades 4 to 5) and Geography (Grades 6 to 9).

Topics in the geography curricula are equally balanced with no topic predominant. The content of the Czech and Slovenian curricula seeks to make pupils get to know and understand the world; however, in Czech school, teachers tend to focus on the description of the world. Denmark's curriculum emphasises students' ability to organize and conduct data collection, and process, interpret and speculate on the material collected in the appropriate contexts. This implies that students have to do practical work in geography. This might be laboratory work, fieldwork, outdoor learning etc.

Central assessment of the student's knowledge of Geography is similar to the assessment of PE knowledge and skills. In the Czech Republic, there is a debate about introducing formal testing at the end of the Grades 5 and 9. In Denmark, testing is carried out at the end of Grade 8 with a national multiple-choice test and in Grade 9 for knowledge, skills and competences. In Slovenia, compulsory testing is done within the National Assessment of Knowledge (NAK) at the end of Grades 6 and 9. Progress testing in geography is usual in Slovenia and the Czech Republic, while in Denmark, according to the respondent, teachers might use some other summative tools (for example, on the internet) to evaluate the student's learning. Progress tests in all the countries are only carried out by teachers. In the Czech Republic, it is usually done via oral or written tests, while in Slovenia, the achievement of objectives is assessed.

10/3 The questionnaire survey analysis–PE and Geography integration

The questionnaire survey was carried out in the school year 2015/2016, in the three countries involved in C.A.L.M.A.Z. (the Czech Republic, the Republic of Slovenia, and Denmark) in order to determine how experts (teachers in lower and higher primary classes, university experts, or other specialists) perceive the integration of physical education and geography. The questionnaire survey was developed using Google Docs forms and completed on-line by participants.

The questionnaire contained 11 questions, four of which were identification questions—about the respondents’ country of origin, their sex, age, and contact details. Further questions enquired about the respondent’s experience with the integration of physical education and geography, in their studies or in practice. The respondents were to state whether or not they regarded integration as important, and if they did, they were asked to list goals and examples of integration. If they did not consider integration important, they were asked to provide reasons and potential barriers and problems related to integration. The results can be further sorted according to the length of the respondents’ teaching practice.

Questionnaire for teachers of Physical education and Geography

Background information

Male / female (M / F):	The main school level you teach: 1.–5./6. grade (X): 5./6.–9. grade (X): Secondary school (lower grade) (X):
Age:	
Years of teaching experience:	
Country (Denmark, Slovenia, Czech Republic):	
Please write below the subject(s) you teach this school year (2015/16)	

1. Do you have any **experience** (personal, colleague, during studies ...) with **combining physical education and geography**?

YES

• If yes, please give a short description (max. 5 lines):

NO

2. Do you find **combining** of physical education and geography **important**?

YES

- If yes: Can you mention the 3 most important goals when combining physical education and geography (1. being the most important goal and so on).

1.

2.

3.

NO

- If no: Why not?

3. Can you see any **possibilities** to combine physical education and geography in primary/secondary education?

YES

- If yes, please describe, how (in general or concrete activities)?

NO

- If no, why not (describe barriers, problems or threats)?

Source: author's own on-line questionnaire survey

A total of 69 responses were received; 14 from Denmark, 16 from the Czech Republic, and 39 from Slovenia. In closed questions (mostly identification questions), basic statistical methods (addition, average, and correlation) were used. For the remaining questions, given the number of respondents and the open nature of most of the questions, the survey is regarded as qualitative and all answers are included in the results. In these questions, the qualitative research method of key words analysis of individual statements was used. Actual statements from respondents are used for illustration purposes.

It is important to note that responses from the countries concerned did not differ in essence. Table 13 shows the breakdown of respondents according to

gender and age. The numbers of men (30) and women (39) are quite even. Most respondents are aged between 50 and 59 and the average age of respondents is 42.9 years. The length of teaching practice is proportional to their age. A correlation coefficient calculated by means of function CORREL in MS Excel from the age of a respondents and the length of their teaching practice amounts to a value of 0.9418, which represents almost a linear relationship between these two quantities. The average length of the respondents' teaching practice is 16.9 years.

Table 13 *Characteristics of the survey's respondents according to their gender and age*

Age	Female	Male	Total (abs., rel. in %)	
< 29	5	5	10	14.5%
30–39	9	10	19	27.5%
40–49	7	9	16	23.2%
50–59	8	13	21	30.4%
> 60	1	2	3	4.3%
Total	30	39	69	100.0%

Source: author's own on-line questionnaire survey

The overwhelming majority of respondents were teaching in primary education when they were asked to fill in the questionnaire, with only five respondents working in a different type of education such as a university. Seven teachers teach only in lower primary classes (typically Grades 1 to 5 but including Grade 6 in Slovenia), 49 teachers teach in higher primary classes (or lower secondary level (Grades 5/6 to 9) in Czech gymnasias), the other eight teachers work at both levels.

The combinations of subjects taught by the respondents are diverse. Respondents teach physical education most often (41), either as the only subject or combined with another subject (most frequently a language, geography in seven cases, or mathematics). A total of 20 respondents teach Geography, either as the only subject or combined with another subject. Ten respondents teach almost all subjects in lower primary classes.

A total of 33 respondents have personal experience with the integration of physical education and geography (i.e. the respondents experienced integration during their studies or they know a colleague who is involved in it, or they are involved in integration themselves), while 36 respondents have no experience.

Interestingly, teachers without experience of integration are more likely to think that integration is not important. A total of 55 respondents including even the 19 respondents who lack the experience, consider the integration of physical education and geography important (see Table 14).

Table 14 *Matrix of respondents' responses regarding their experience with the integration of physical education and geography, and the importance of integration*

		Do you find combining of physical education and geography important?		
		Yes	No	Total
Do you have any experience (personal, colleague, during studies ...) with combining physical education and geography?	Yes	31	1	33
	No	24	12	36
	Total	55	13	69

Source: authors' own on-line questionnaire survey

Integration is considered very important by all teachers who teach both physical education and geography; 25 (71%) of physical education teachers and 11 (84%) of geography teachers see the integration of exercise and geography as important. However, geography teachers, no matter whether they teach geography only or in combination with another subject, adopt a more favourable attitude towards the integration of physical education and geography than teachers of physical education.

Three core activities were frequently given as examples of personal experience with the integration of physical education and geography; each of them was mentioned in approximately one third of all responses although some responses mentioned more activities:

- orientation in nature with map, compass, GPS and orienteering (36% of responses),
- outdoor teaching (34%),
- excursion, outdoor sport/project day (30%).

The respondents were also asked to list their three most important goals when combining physical education and geography. The results reveal four key goal areas:

1. for enhancing the learning process from the student's and teacher's point of view

"By being outdoor, students can feel the nature, smell it, touch it; not only see it from the classroom."

"As teacher you can describe landscape from different point of view."

"Working in more holistic way such as projects within school work."

"By being active. Students can observe the landscape in a different, more active way."

"Students work out and study in one time."

"Fieldwork = reasons and consequences."

"To stimulate learning."

"Learning by doing."

"Learn to work interdisciplinary."

"Active approach to teaching (both students and teachers)."

"Learning through other means than usual."

"Better explanation and understanding of problem."

"Movement promotes learning."

"The education in real environment."

"Convert theoretical knowledge into practise."

"Learning with (all) senses."

2. for health

"Be fit."

"Increase physical fitness and resilience of students."

3. for communication and cooperation

"Better communication and cooperation between students."

"Enhancing team work."

"More fun."

4. for real life

“Understanding the World we live in.”

“Complex development of students.”

“Linking knowledge and skills from different subjects and their application in practise.”

“The care for open clean, less polluted environment in the future.”

“The combination might give a better picture of why, how and what to do in nature in a more sustainable way.”

If respondents did not consider integration of physical education of geography important (13 respondents), they were asked to explain their reasons. The most frequent reason (five respondents) was *“I do not see any connection”*. Another reason given is that physical education and geography are not suitable subjects for integration. The combination of physical education and biology was mentioned as one offering better possibilities. Other reasons included time constraints and the fact that such integration is not part of the curriculum. In particular, teachers mention the fact that such lessons are very demanding in terms of organization, and that teachers have not been professionally trained to integrate the two subjects. One of the teachers asked why pupils should be forced into integration if boosting their attitude to sport and exercises would be sufficient.

Although more than 50% of teachers and experts have no experience in integrating physical education and geography (36 respondents as compared to 33) and some of them cannot see reasons for doing so, 60 out of 69 respondents could see potential in the integration of physical education and geography in lessons. The integration via orientation in nature with a map/GPS and orienteering is most often mentioned (18 responses). Other activities include sports days or courses (cycling, biking, canoeing, skiing, mountaineering and caving), school outdoor stays, and other outdoor activities. Other non-traditional activities mentioned are disc golf with a compass, playing settlers in large format, geocaching or where I go, parkour in urban environments and battle games in woods. Some teachers even see the possibilities of integration in for example, collecting rocks, transport planning, or ecological lessons. One of the teachers, however, points out the indispensable knowledge of first aid and awareness of risks connected with outdoor lessons.

Respondents were given space for free comments at the end of the questionnaire, which only a few of them took advantage of; however, two interesting views were provided: *“Geography is a multidisciplinary science. Through educational system, tourism and economy, a placement of sport facilities and national health strategy strongly connects geography with physical education.”* or *“Great to be PE and geography teacher!”*

Publication 6

Vlček, P., Svobodová, H., & Resnik Planinc, T. (2019). Integrating Physical Education and Geography in elementary education in the Czech Republic and the Republic of Slovenia. *Compare: A Journal of Comparative and International Education*, 49(6), 868–887. <https://doi.org/10.1080/03057925.2018.1466267>

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ATTACHMENT 1

Other selected author's texts on outdoor education. Listed by a year of publication.

No.	Type of publication	Publication
A	certified methodology	Svobodová, H., Mísařová, D., Durna, R., Češková, T., & Hofmann, E. (2019). <i>Koncepce terénní výuky pro základní školy. Na příkladu námětů pro krátkodobou a střednědobou terénní výuku vlastivědného a zeměpisného učiva</i> . Masarykova univerzita. 110 pp. https://doi.org/10.5817/CZ.MUNI.M210-9246-2019
B	journal paper (WoS)	Svobodová, H., Hofmann, E., Kejíková, I., Durna, R., & Dubový, A. (2016). Modelové využití QR kódu ve výuce geografie. <i>Geografia Cassoviensis</i> , 10(1), 82–88. https://www.gcass.science.upjs.sk/gc2016-1
C	journal paper (WoS)	Hofmann, E., Svobodová, H., & Mísařová, D. (2016). Realizace terénní výuky očima učitelů. <i>Geografické informácie</i> , 20(2), 111–120. https://www.kggrr.fpvai.ukf.sk/340
D	journal paper (ERIH)	Durna, R., Svobodová, H., & Koníček, A. (2017). Analýza progresu učebních úloh vztahujících se k terénní výuce v českých učebnicích zeměpisu pro základní školy. <i>Geografická revue</i> , 13(2), 29–39. http://dx.doi.org/10.24040/GR.2017.13.2.29-39
E	journal paper (ERIH)	Trávníček, M., Svobodová, H., & Durna, R. (2018). Assessment of pupils' physical activity during diverse types of teaching lessons. <i>Studia Sportiva</i> , 12(1), 141–148. https://doi.org/10.5817/StS2018-1-16
F	journal paper (Jrec)	Durna, R., Jelen, J., & Svobodová, H. (2019). Práce v terénu jako součást zeměpisných olympiád. <i>Geografické rozhledy</i> , 28(4), 24–25. https://www.geograficke-rozhledy.cz/archiv/clanek/2873
G	journal paper (SCOPUS)	Svobodová, H., Durna, R., Mísařová, D., & Hofmann, E. (2019). Komparace formálního ukotvení terénní výuky ve školních vzdělávacích programech a její pojetí v modelových základních školách. <i>Orbis Scholae</i> , 13(2), 95–116. https://doi.org/10.14712/23363177.2019.25