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## Nature wandering as a means of environmental education

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### Abstract

Environmental problems have been crying for solutions for decades, however the present-day Hungarian education system, still does not emphasize nature conservation and environmental protection adequately. As teachers it is our task to draw students' attention to the vulnerability of nature as well as to enhance that they can also make a change. This can only be achieved through environmental education by evoking students' love of nature in outdoor settings and giving them the opportunity to recognize our natural values. The main objective of our research was to examine the effects of extracurricular hiking activities on the lifestyle of students. Furthermore, we were eager to investigate whether the habits and environmental attitudes of hiking students differ from those who did not take part in these school-organized activities. A total of 64 students completed an internet-based survey from two Hungarian secondary schools where hikes are carried out throughout the year. We found that the habits and environmental attitudes of the participating students are more positive compared to those who are not engaged in these activities. Our results also support the idea that extracurricular hiking activities have a significant impact on the life of students. This can make them feel responsible for our fragile environment and can develop such emotional connection by which we can raise new generations capable of and willing to contribute to environmental awareness.

*Keywords:* nature wandering; hiking; environmental education; secondary school

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### 1. Introduction

Nowadays, there seems to be a growing demand for nature based activities especially during the ongoing course of the coronavirus pandemic (Kazdin & Vidal-González, 2021). We have known for years that nature serves as a perfect opportunity for outdoor recreational and physical activities and has many positive effects on the lives of the population (Pasanen, Tyrväinen, & Korpela, 2014; Pretty, 2004). Recent studies have already confirmed that not only hiking trails and forest roads are suitable for outdoor activities (Frühauf, Schnitzer, Schobersberger, Weiss, & Kopp, 2020) but even urban nature, including city parks, and various green spaces promote the resilience of urban population (Samuelsson, Barthel, Colding, Macassa, & Giusti, 2020; Venter, Barton, Gundersen, Figari, & Nowell, 2020). Gradually, if not so far, many people are

just starting to realize the importance of recognizing, maintaining and protecting the surrounding environment as well as our natural values.

However, natural environments not only provide an excellent potential for recreational activities but also offer such prospects in terms of education that we, as teachers, should take advantage of. According to Lee & Eason (2015) educators must have a real passion and enthusiasm for nature while teaching and these must be incorporated into the methods of education in order to serve as a credible source for students. Rachel Carson has already drawn our attention to environmental problems as early as the 1960s (Carson, 1962) but still most of them have not been solved. Since then, both adults and children have become aware of the effects of global climate change, the extinction of endangered species and environmental pollution. However, many present-day education systems, for example in Hungary, still do not emphasize the importance of nature conservation and environmental protection. When talking about nature and environment, many students still feel desperate in connection with their precarious future and often disregard any possible discussions in connection with such issues claiming that there is nothing that they can do to prevent these global problems (Worsley & Skrzypiec, 1998). As teachers, it is our task to raise environmentally literate students as well as to draw their attention to the vulnerability of nature, to develop their critical way of thinking and further enhance that they can also make a change (Altin, Tecer, Tecer, Altin, & Kahraman, 2013). We assume that this can only be achieved through environmental education by evoking students' love of nature in outdoor settings and giving them the chance to recognize our natural values.

According to Nicol (2014) many people support the idea that outdoor education practice is often described as 'having fun in the outdoors' although it carries so much more. With the help of environmental education and education for sustainable development we can provide an opportunity for students to acquire a great variety of practical knowledge based on personal experience. As a result of this, students will be able to learn about and better understand the complexity of natural and environmental sciences, as well as their interdisciplinary connection. By this, they will also be able to develop such perspectives so that they can feel responsible for our environment. Fortunately, many schools around the world emphasize the importance of environmental education as a model example by adopting a great variety of outdoor settings (Tan & Atencio, 2016). For instance, according to the new educational curriculum in Finland teachers are encouraged to advocate various means of outdoor education, regarding any of their taught subjects (Halinen, 2018). However, in Hungarian education only a fraction of this has

been perceived recently, although there are many possibilities that we should take into consideration.

## 2. Environmental education and sustainability

Humans have almost completely occupied all the habitable areas around the planet and it is almost impossible to encounter absolutely untouched natural environments. The measure of the nearly irreversible damage has drawn people's attention during the past decades when researchers concluded that due to the excess exploitation of natural resources and continuous growth of anthropogenic activities, natural habitats are highly degraded (Giddens, 1994; McKibben, 1990). Nowadays we have to live with the fact that this situation still has not changed significantly, and that our consumer society is driven by the satisfaction of human needs. Fortunately, environmental education may offer such potentials and methods that contribute to the first steps towards a sustainable future (Hill & Fülöp, 2020; Mónus & Lechner, 2017). For instance, several studies have shown that attitudes and behaviours can be developed by environmental education (Kövecses-Gösi, 2015; Leskó, 2018). However, the role of other factors, mainly those relating to socio-economic background may be even stronger (Mónus, 2019), and outline the need for studies investigating the effects of different possibilities and pedagogical methods.

### 2.1. *The emergence and main objectives of environmental education and sustainability*

The first usage of the term 'environmental education' appeared in the 1960s (Stapp, 1969) when a conference was held at Keele University in the United Kingdom, 1965. The main purpose of this conference was to investigate the conservation of the countryside and its implications for education. According to this, environmental education "should become an essential part of the education of *all* citizens, not only because of the importance of their understanding something of their environment but because of its immense educational potential in assisting the emergence of a scientifically literate nation" (Wheeler, 1975:8).

Palmer (2003) emphasized that the main purpose of environmental education is that human beings are a part of nature. As soon as they understand and accept its way of functioning, humans will be able to live in harmony with it. He also thought that it is time to face environmental problems and to find such solutions, before making the same mistakes again, that involve individual and social responsibility. Furthermore, he enhanced the importance of

emotional connection towards nature as well as the formation of such attitudes as a result of which we can find solutions to these global problems (Palmer, 2003).

Based on the UNESCO-UNEP Tbilisi Declaration (1977) the role of education is highly important regarding environmental problems. The main objectives of environmental education include the acquisition of *awareness* and sensitivity of both individuals and social groups to the environment and environmental challenges. This also means that students should explore and exploit their ideas of *knowledge* and understanding of natural and environmental concepts through education. It is highly important to emphasize that they should be the ones to realize that their *attitudes* and motivations do matter thus it can contribute to environmental improvement and protection. As teachers, it is our responsibility to provide them with such potential and *skills* by which they will acquire to express their own opinions and develop their ability of problem solving. Furthermore, we should advocate the active *participation* of students in order to acquire the ability to take a stand on environmental problems through critical thinking and to practice their own decision-making skills.

It is also important to mention that environmental education can only be achieved with the help of social responsibility and sustainability. According to the Brundtland Report (1987) sustainable development is "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Soon after this report, several conferences were held around the turn of the century to promote the development of environmental awareness and sustainability. The UN further enhanced the importance of sustainable development by dedicating an entire decade between 2005-2014 to the 'Decade of Education for Sustainable Development' in order to create a more sustainable future for the population of the world by relying more on educational resources (UN Decade of Education for Sustainable Development, 2005). Unfortunately, the still existing global problems do not reassure that significant changes followed this decade regarding education. In our opinion education is the key element to finally take one step further. We need to consider that students should be the targets of sustainable development because we can change their minds more easily than the mind of their parents in order to find solutions and change the way of thinking of future generations.

## 2.2. *The methods of environmental education*

Fortunately, a great variety of environmental educational methods are already available for educators that should be applied regularly in order to raise new generations capable of and

willing to contribute to environmental awareness. The following table (Table 1.) summarizes the most important skills and competences that we should focus on during environmental education applying a great variety of possible methods and proposals based on the work of Schróth, 2004.

Although Schróth (2004) listed several of these elements (Table 1.), we also propose some important additional skills and competences indicated by *italics* such as *decision-making, critical thinking, mindfulness and concentration, interdependence and assistance* to be applied as a means of environmental education. We also suggest the importance of *forest schools* embedded in *cooperative learning, project pedagogy and forest pedagogy* as a means of environmental education. Since the 1980s, many studies have appeared to promote the relevance of forest schools (Kosztolányi, 2002) in environmental education including teacher education (Mónus & Kiss, 2019).

Table 1. The skills and competences that should be developed during environmental education applying a variety of methods and proposals (Schróth, 2004)

Skills and competences to be developed	Methodology, proposals
problem-solving, <i>decision making</i>	individual investigation, field trips, summer camps
dealing with conflicts	activities involving nature conservation and environmental protection
cooperation	<i>role-play simulations</i> , situational plays, drama plays
gaining knowledge, <i>promoting social interactions</i>	interviews, questionnaires
analysis	sociometric surveys
observation	article reviews and analysis, creating posters
communication	student presentations, essays
debate, <i>critical thinking</i>	the reliability of the internet, applying models
presentation skills	associative learning, working individually, teamwork,
<i>mindfulness, concentration</i>	<i>cooperative learning, project pedagogy, forest pedagogy</i>
<i>interdependence, assistance</i>	

For instance, according to Czippán (2002), Kováts-Németh (2010) and Leskó (2018) forest schools are considered to be the real fields of environmental education where many of these listed methods and proposals can be accomplished while developing various skills and competences. Leskó (2018) also proved that the nature-based activities carried out in forest schools positively change the environmental attitudes of the participating students. If we consider all those various activities such as walking in the forest or observing the natural environment during forest schools, we may assume that short-term nature wanderings, especially hiking activities might also be adequate potentials for environmental education.

### **3. Nature wandering and hiking**

#### *3.1. The concept of wandering in nature*

The burst of economic and technological development in the past few decades brought about such transformations that overshadowed the importance of nature. We have almost forgotten that humans originally socialised in natural environments. The development of cities, the industrial revolution all contributed to the fact that there is a continuously increasing demand for wandering in nature (Fülep, 2009). According to Vosátka (1978) the term wandering in nature may refer to both short-term (*walking, going on trips, hiking*) and long-term (*campings, road trips...etc.*) activities in natural environments while adopting natural and social approaches, combined with physical exercises as well as the acquisition of cultural and practical knowledge. Fülep (2009) considered the following educative options that can be integrated into the various forms of nature wandering:

- moral and ideological education
- education for occupation
- patriotic education
- education for community building
- ecological education
- education for consciousness and awareness
- aesthetic education
- education for mental and physical health

### 3.2. *The benefits of wandering in nature*

Many studies have already confirmed the positive effects of nature-based school activities and outdoor lessons on the cognitive development, physical and mental health as well as on the lives of children with attention and behavioural disorders (Ernst, Johnson, & Burcak, 2018). Pretty et al., (2009) found that students experience less stress if they are allowed to spend more time outdoors. Dankiw, Tsiros, Baldock, & Kumar (2020) collected 16 research studies in which different nature-based extracurricular activities positively influence the physical and cognitive development of children.

One of the most obvious physical and mental effects of wandering in nature is that it helps to increase the strength and amount of skeletal muscle in the human body by continuously exerting physical work on it. In addition, it strongly relies on our respiratory system that results in the increase of our lung capacity and an increased rate and efficiency of respiration. It also has many positive advantages by stimulating our cardiac output and our nervous system (Fülep, 2009). Furthermore, it improves the functioning of our digestive system for example appetite while decreasing body mass and the amount of blood lipids and cholesterol. White, Alcock, & Grellier (2019) also stated that spending at least 120 minutes a week in nature is associated with general good health and well-being.

Nowadays, several children are affected by attention and behavioural disorders. These children have to fight each and every day to receive appropriate attention, concern and acceptance from the surrounding society. In many cases we may find that by relying on the traditional teaching methods it is much harder for these students to master the curriculum of different subjects. Additionally, it can make students become even more introverts due to their continuous failure experience or may result in producing such disruptive behaviours that are unacceptable in the school environment (N.Tóth, 2015). Aydeniz, Cihak, Graham, & Retinger (2012) and Kaldenberg, Watt, & Therrien (2015) applied the methods of environmental education to students with cognitive and behavioural disorders. They found that as a result, their school performance improved and the ratio of disruptive behaviours decreased. According to a study on ADHD (Attention Deficit and Hyperactivity Disorder), by wandering in nature the symptoms of the disorder reduced in children between the ages of 7-12 (Faber Taylor & Kuo, 2009; Kuo & Faber Taylor, 2004). Moore, Daniel, & Thomas (2016) also conducted research built on environmental education and tested the effects of hiking on a class where two of the

students experienced ADHD. Their results suggest that these two students were more likely to participate in various activities while hiking than during the traditional school-based lessons.

In conclusion, we may state that wandering in nature promotes health care, physical activity, as well as various educational purposes such as environmental education. Advocating the concept of wandering in nature through various activities such as hiking, may give another chance to develop all those previously mentioned skills and competences (Table 1.). Moreover, several studies emphasize that environmental education programs with integrated outdoor activities positively develop many different progress outcomes of students (Mónus, 2020). Thus, we should take into consideration the emergence and potentials of wandering in nature as an alternative means of environmental education.

### 3.3. *National core curricula of Hungary*

According to the governmental decree on the 1995 National Core Curriculum of Hungary one of the key competences highlighted the development of mathematical, scientific and technological studies. In primary school education the term '*hiking*' appeared in the area of physical education and sports as possible nature-based activities by which students acquire the most important knowledge and actions regarding hiking. Furthermore, the introduction of the 2012 National Core Curriculum governmental decree created an opportunity to develop a more complex approach of environmental education where all the key competences were suitable for the integration of these proposals. Scientific and technological competence focused on the connection between natural and man-made environments as well as individual and social responsibility by adapting education for sustainable development. The most important goals of the 2012 National Core Curriculum were physical and mental health, sustainability, environmental awareness and scientific education with the help of which students were able to realize the harmony between natural and man-made environments. *Hiking and field trips* were also emphasized during physical education lessons. Primary school education also offered such opportunities through *field trips and forest schools* as well as the use of *hiking trails* to promote experiential learning. During secondary school education, ecological *field-trip* investigations were advised to be carried out as well as visits to *national parks, protected areas* to examine and conserve biodiversity.

However, the new governmental decree on the Hungarian National Core Curriculum of 2020 does not promote education areas specialised in scientific approach by reducing the number of scientific lessons as well as enhancing the integration of different scientific subjects.



Although, primary schools do focus on sustainability and suggest *hiking activities, field trips, forest schools* to be integrated into the main subjects, unfortunately none of these nature-based activities are proposed during secondary school studies. Sánchez-Llorens, Agulló-Torres, Del Campo-Gomis, & Martínez-Poveda (2019) concluded that primary school students are characterized by stronger environmental awareness than secondary school students and that their interest in nature and environment is inversely proportional to their age. One of the reasons behind this could be that younger children still believe in protecting the environment and are eager to do so. They have many possibilities during education to acquire a great variety of concepts regarding environmental awareness, while these concepts are not emphasized properly in secondary school education thus teenagers are rather pessimistic in connection with their precarious future. It is important to highlight that environmental awareness should also be formed and developed during the years of secondary school because after graduating they may never have the chance to deal with these issues in further detail. If environmental education comes to a halt at the level of primary school education, we cannot expect the rise of such generations who are capable of and willing to contribute to environmental awareness.

#### *3.4. Extracurricular hiking activity in a Hungarian secondary school*

Throughout the past years of teaching we have seen that hiking activities, short trips, visiting natural environments and national parks are substantial elements of the school years. Due to this, we assumed that short-term nature wanderings such as extracurricular hiking activities could also promote environmental education. We initiated our hiking activities in the 2018/2019 school year at Kürt Foundation Secondary School, Budapest with another colleague. The most important aim of these hiking activities was to evoke students' love of nature and hiking as well as to draw their attention to the present-day and soon-to-be status of existing natural and close-to natural areas around our capital city.

These extracurricular hiking activities are facultative, anyone from the school can join. During these occasions, we focus on exploring the most beautiful hiking trails in the close proximity of Budapest that offer marvellous panorama, an insight into the flora and fauna of the area and cultural heritages. We have already carried out 15 hikes where we visited several surrounding mid-altitude mountainous areas such as the Buda Hills, Börzsöny, Visegrád and Pilis so that students could examine the various geological and biological features of the given area, such as the difference between karst mountains and mountains with volcanic origin. We organize these hikes either on weekend days or on school and national holidays. Originally we

were planning on 7-8 hikes, equally distributed throughout the school year in order to experience all different types of weather. Unfortunately, due to the coronavirus pandemic in the past year we could not achieve the planned number of hikes.

### *Pre-trip preparations*

The exact dates and short descriptions of these hikes are advertised a few weeks before the actual hike on various sites for example in our school and hiking group on Facebook, posters in the school. These posters contain the exact time of gathering, departure and return as well as the recommended equipment, clothes, minimum amount of water. The planned length of the hikes (usually between 8-14 km) is also presented as well as the differences in altitude thus allowing students to decide in advance whether they want to join the given hikes assessing their own abilities. We always take public transportation to reach the starting point of the hiking trails so as to reduce our ecological footprint. We also need to consider the time/month of the year during the planning period to avoid hiking in darkness and at lower temperatures. Although at the end of the 20<sup>th</sup> century pre-trip visits were strongly advised before going on field trips and hiking activities (Chandler, 1985; Gemake, 1980; Millan, 1995) with students, we only occasionally carry out pre-trip visits to the chosen hiking route as there are many available applications and websites that offer a precise description about them. Most of the hikes are organized with the help of internet-based tourist route planners, in addition there are many already existing hiking routes available on these websites. There are also such mobile applications where students can track our chosen hiking trails. We usually provide them with paper-based maps as well to improve their orientation skills and to prevent the possibility of getting lost in the forest. It is always very important for students to choose such hiking trails that lead to beautiful panorama and viewpoints, to avoid crowded areas and the most frequent tourist destinations. In the past years, an average of 2-9 students participated in the hikes.

### *During the hiking activity*

As soon as we arrive at the starting point of the hiking route, it is advised to go through what type of hike is ahead of us, if there are any regulations in our chosen territory, whether we are in a national park or at protected areas. It is important to mention the exact number of planned kilometres and the sites of resting periods so as to prepare mentally. During each hike, it is worth keeping students informed about where we are going exactly by using the paper-based maps. It is also recommended to clarify the various symbols used on a map because there could be new members of the group who might not be familiar with them. As teachers and the

leaders of the hikes we should be prepared with the geography, geology, biology, ecology and history of the area. Lavie Alon & Tal (2015) found that those educators who used storytelling while on field trips highly affected student motivation and learning thus we should use our creativity and imagination to provide a complex perspective of these subjects. Students are usually quite enthusiastic regarding questions during these hikes. They are affected by several naturally occurring impulses relying on their five senses. We should offer them enough time to wander around and explore the area while respecting nature.

During these hikes there are many possibilities to develop those skills and competences listed before (Table 1.) such as *observation, cooperation, problem-solving and decision making*. These skills and competences are essential in order to be part of the natural environment and to understand its way of functioning. As a result of the unpredictability of nature, students might develop such *strengths and competences* that they previously have not been aware of. For example, a more exhausting hike further develops their *mindfulness and concentration* skills as well as their *interdependence*. They not only experience to rely on each other but also to accept one's *assistance* if needed. As Aydeniz et al., (2012) and Kaldenberg et al., (2015) also concluded, these hikes also provide a possibility for students with attention and behaviour disorders to open-up and confidently and informally develop their *communication* skills. In addition, when encountering such areas that had been affected by anthropogenic activities, for example piles of rubbish in the middle of the forest, students are immediately inspired by our current problems that they must face regarding the natural environment. Due to these first-hand experiences they might develop their environmental consciousness and come up with some ideas in order to prevent it. This can further be integrated into the upcoming lessons and be distributed throughout the students of the school.

#### *Post-trip activities*

After 4-5 hours of hiking, especially during the winter, students are always grateful if we have the time and possibility to relax in any of the local cafés and to share the experience of the day. They can also upload their photos to our hiking group on Facebook.

## **4. Aim of the research**

The main objective of our research was to examine the potentials of wandering in nature as possible means of environmental education. Furthermore, we aimed at exploring the effects of extracurricular hiking activities on the everyday lives of students. We were also eager to investigate whether the habits and environmental attitudes (hiking attitudes) of such

participating students differ from those who are not engaged in these activities. We also planned to examine whether these extracurricular hiking activities are suitable for environmental educational purposes.

## 5. Materials and methods

### 5.1. The interview and the questionnaire

During our research an interview consisting of 17 questions was carried out with one of the organizers of the extracurricular hiking activities of the Kőbányai Szent László Secondary School. Furthermore, a total of 64 students completed an internet-based questionnaire from two Hungarian secondary schools (Kürt Foundation Secondary School (n=41) and Kőbányai Szent László Secondary School (n=23)) seated in Budapest, where similar short-term (one day) school hikes are organized throughout the year. The questionnaire was completed by such classes of both schools in which at least one student has already attended one of the school-organized extracurricular hiking activities in the past few years. The participation rate was measured according to the fact that a student has already taken part in the school-organized extracurricular hiking activities at least once in the past four years, while non-participants were considered those students who solely perform hiking activities outside their school.

There were 21 questions in the survey, 14 of them were single select multiple choice, closed-ended questions. Out of these 14 questions two assessed the hiking habits (concerning 11 items) and environmental attitudes (8 items) of students. These items were our self-constructed statements where students had to declare on a scale of 1-6 whether the mentioned hiking habits and attitudes applied to them or not (1= not relevant for me at all, 6= completely true for me). Likert scale measurements examining the environmental attitudes of students are frequent methods used in environmental education, usually on a scale of 1-5 (Havas & Varga, 1998; Leskó (2018)). However, here we adopted this 1-6 scale so as to avoid students being able to give an average value for an answer thus to promote their decision-making skills. We also used reversed statements in the case of two questions measuring students' attitudes and four questions in connection with hiking habits in order to maintain different perspectives.

A multi-select multiple choice question with 14 items was also used to enable students to select the most appropriate answers from the given choices in connection with a question on the experienced effects since they have started school-organized hikings. There were also six open-ended questions for the formation of individual opinions. The results of the survey were exported into an Excel document.

During our analysis, first we compared the answers of the two secondary schools, however, we did not receive representative differences and data due to the small sample number. Thus, we relied on comparing the answers of those students who take part in the extracurricular hiking activities in any of the schools to those who are only engaged in self-organized hikes.

### *5.2. Statistical analysis*

Statistical analysis was carried out using the RStudio 4.1.0. version of R Core Team 2020 statistical program. Mood's Median test was used to examine the difference of the 14 single select multiple choice questions regarding the hiking attitudes and habits of students. In the case of the items of the multi-select multiple choice question, two-sided exact binomial tests with a 95% confidence interval were used to compare the differences between participant and non-participant students.

## **6. Results**

### *6.1. Interview*

To support our research, we examined the possibilities and methods of nature wandering as an extracurricular hiking activity in another secondary school, the Kőbányai Szent László Secondary School, Budapest. We interviewed a Biology and Chemistry teacher, who is one of the organizers of the extracurricular hiking activities of their school.

During the interview, we learned that these extracurricular hiking activities have been organized since 2008 in their secondary school. Nowadays, they run not much less than our 7-8 hikes in a school year, although we also carry out winter trips. She also mentioned how they choose the distinct hiking routes and their most preferred hiking spots. Apart from one area (Cserhát) this is almost exactly equivalent to our favourite hiking areas (Börzsöny, Pilis, Buda Hills) thus supporting that there are many hiking trails available in the close proximity of Budapest. We also got to know that approximately 15-20 students participate in their hiking activities often performing 15-20 km/hikes. In contrast to this, according to our experience at Kürt Secondary School, there are less participating students/hikes and our students prefer moderate hikes. One of the reasons behind this could be that we also focus on various short-term activities while wandering in nature to promote the development of distinct skills and competences. She also strongly confirmed that the primary purpose of these hiking activities is to evoke students' love of nature and hiking.

## 6.2. Survey in two Hungarian secondary schools

One of the aim of our research was to investigate whether there is a difference between the hiking habits of those students who take part in school-organized extracurricular hiking activities and those who do not. To examine these questions, 64 students of the two previously mentioned secondary schools filled out our internet-based questionnaire. Out of these, 36 students have already participated in one of the school-organized hiking activities at least once, while 28 students relied only on self-organized hiking activities.

All students had to declare whether the listed 11 items (A-K) on a scale of 1-6 (1= not relevant for me at all, 6= completely true for me) regarding hiking habits and attitudes towards participation in hiking applied to them or not (question items A, B, G and H were reversed statements) (Fig.1).

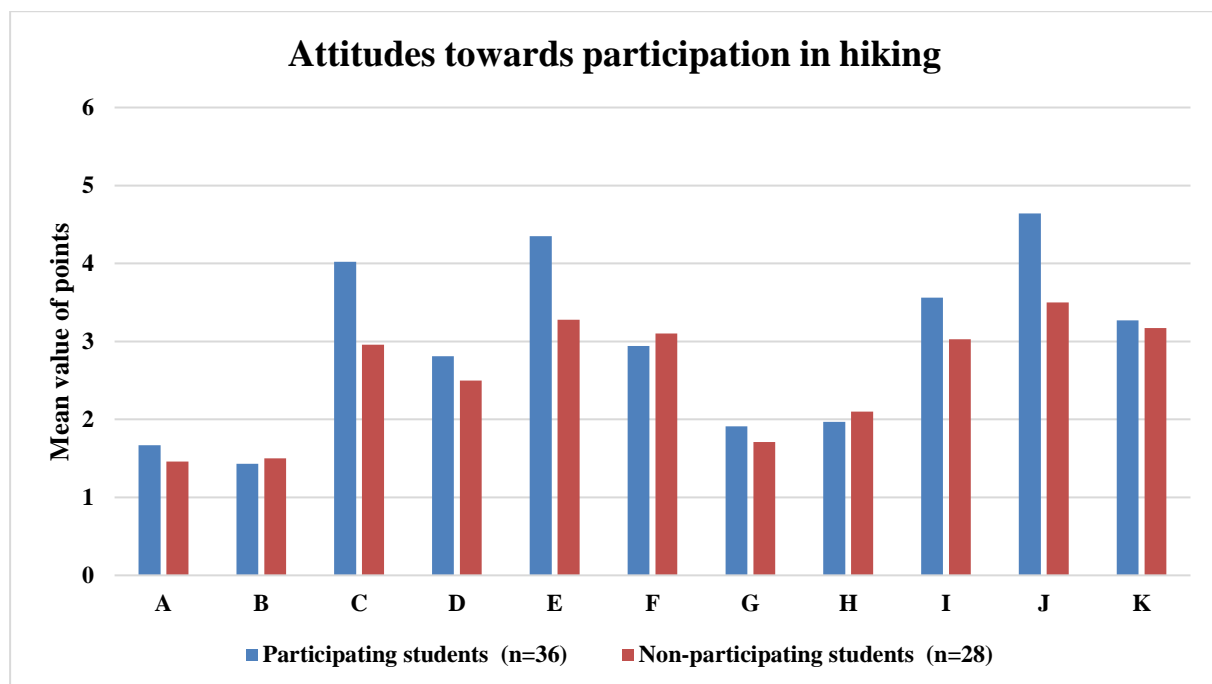


Fig.1. Attitudes towards participation in hiking

**A:** I only take part in the hikes because of my parents' pressure.; **B:** I only participate in the hikes so as to have a better relationship with my classmates and teachers.; **C:** I take part in the hikes so as to spend more time with my friends.; **D:** I take part in the hikes to ensure my daily physical exercise.; **E:** I like going on hikes so as to explore various places.; **F:** I go on hikes so as to set free from the crowded city.; **G:** I am not certain about my physical abilities that is why I do not go on hikes.; **H:** I do not participate in the hikes because it is too early in the morning.; **I:** We usually go hiking with my family as well.; **J:** I have the necessary clothes for hiking (e.g. hiking boots); **K:** I warn my hiking mates if they do not behave properly in the forest.

In our everyday experience we observed differences between the hiking habits and the attitudes between students who participate in our hikes, as well as received several comments from students that they experience many positive effects as a result of the hiking activities. Here, we used Mood's Median test to examine the difference of the 11 single select multiple choice questions however, we did not receive significant statistical differences between participating and non-participating students regarding any of the items, that might be due to the small sample size. It is interesting to mention that some students in the survey highlighted that sometimes they avoid participating in school-organized hiking activities because they prefer hiking individually (supporting item F). Exploring various places is seemingly one of the most important reasons to take part in school-organized hikes for teenagers, although the difference was not significant ( $p=0.07$ ) here. We should also mention that spending quality time with friends is a strong motivation to attend the hikes, although in this research we did not receive a significant difference ( $p=0.2$ ) regarding this item either. In order to enhance these important factors, further research is needed including an increased sample size.

Moreover, based on the previous methods, we also examined the environmental attitudes concerning hiking of students (Fig.2). Here, we can see that there is a higher mean value for statements L-P, although we found no significant difference regarding these items. Question items Q and R were reversed statements with no compelling distinction. It is interesting to mention that based on this survey, if not statistically significantly ( $p=0.07$ ) but students are more likely to take photos (item S) when they are hiking individually or during non-school organized hiking activities. This is probably due to the fact that when hiking with less people around, there is more time to capture the beauty of the surrounding area.

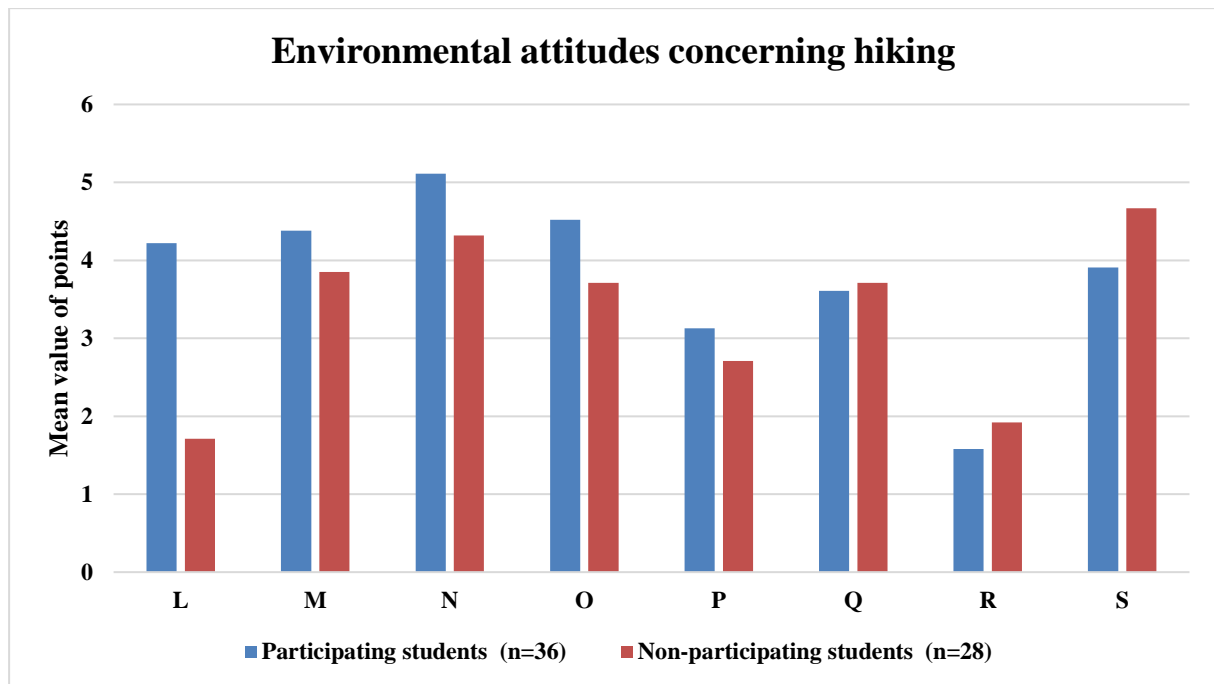


Fig.2. Environmental attitudes of students concerning hiking

**L:** I like going on extracurricular hiking activities.; **M:** I usually go hiking for the love of nature.; **N:** I like walking in the forest and going on trips.; **O:** I am willing to go on hiking trails where I have already been once.; **P:** It does not matter whether it is raining during the hike.; **Q:** I only prefer hiking when the sun is shining.; **R:** I am afraid of the dangers of forest (e.g. animals, plants, fungi, storms).; **S:** I like taking photos during the hikes.

The multi-select multiple choice question with 14 items enabled students to express the experienced effects of school-organized hiking activities since they have started it. Our results suggest a significant difference between participating and non-participating students regarding the ability to develop their acquaintances by meeting various students from the school ( $p < 0.001$ ) as well as inviting their close friends ( $p = 0.0002$ ). Furthermore, we have managed to confirm that students gain a significantly great variety of experience ( $p < 0.001$ ) as well as orientation skills ( $p = 0.0015$ ) due to these school-organized hiking activities compared to non-participating students. A significant ratio of students (50%) also bought some hiking equipment as a result of the organized hikes (Fig.3).



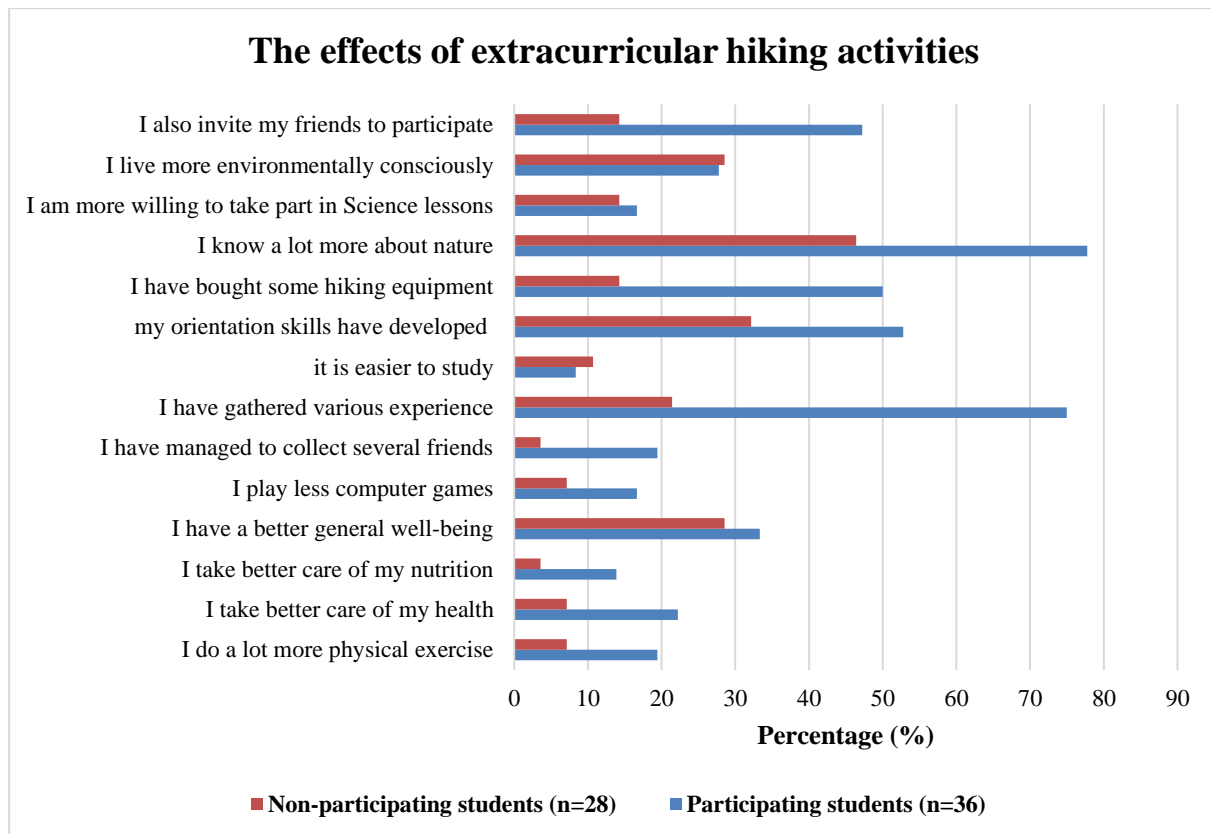


Fig. 3. The effects of extracurricular hiking activities on the lives of students compared to those with self-organized hiking activities

The open-ended questions of the survey gave an opportunity to form individual opinions. Some of the students highly expressed that the reason behind that they do not take part in these school organized extracurricular hiking activities is that they prefer wandering in nature individually to better focus on themselves and to avoid the interaction with people. According to students the best experience during these hikes is that they form a community, they can easily share their thoughts with each other. Many of them mentioned that they could carry out such private conversations with each other and their teachers during these hikes that might not occur when they are at school. Furthermore, it always amazed them when they encountered some rare animals such as beavers, badgers or simply a beautiful caterpillar. Many students are also in favour of those hikes where their own dogs can escort them according to the type of the hike. They also loved the snowy winter hikes apart from the cold weather. Their most preferred hiking areas were the following: Rám-szakadék, Dunakanyar (Zebegény and Nagymaros), Pilis-tető, Nagy-Kopasz, Hármashatár-hegy. According to their answers, some students would like to avoid hiking on steep sided mountains or areas covered by mud. They also listed those more negative factors that they found annoying during these hikes such as environmental pollution, habitat degradation.

## 7. Conclusions

Environmental education serves as an integral part of education in the 21<sup>st</sup> century. We should rely on such obvious possibilities and methods that enhance the importance of first-hand experience and practical knowledge. This can increasingly be achieved in outdoor settings where students are exposed to persistent impulses and the permanent adjustment of the natural environment. Fortunately, a great variety of environmental educational methods are available for educators in order to develop distinct skills and competences. Among these, we should take into consideration the concept of wandering in nature. The various activities of wandering in nature such as hiking may offer considerable prospects to acquire all those potential skills and competences that should be developed with the help of environmental education.

During our research, we were eager to investigate the possibilities of wandering in nature in a form of extracurricular hiking activities in two Hungarian secondary schools. Furthermore, we also aimed at verifying the concept that secondary school students might experience changes in their lifestyles due to the school-organized hiking activities and that there is a difference between the environmental habits and attitudes of those students who participate in these activities compared to those who do not. We found that students who participate in these hiking activities indicate a more positive environmental (and hiking) attitude when compared to the non-participating students, although the difference was not significant statistically. However, we strongly believe that with a greater sample size, this research has a further potential to support our idea that these extracurricular hiking activities cause positive attitude changes in students. Here, we should also take into consideration the fact that those students with a more positive environmental attitude are more likely to participate in these school-organized hikes.

The results of the multiple-choice questions strongly verified that many items of extracurricular hiking activities have a significant effect on the life of participating students such as bonding with friends and gaining a great variety of experience as well as orientation skills. The interview also supported our primary ideas and aims so that the main objective of these hiking activities is that students are able to connect with their environment. These results suggest the idea that wandering in nature might be also an adequate possibility to enhance environmental education. With the help of nature wandering activities they may fall in love with nature and evolve such emotional connections and attitudes that they can take advantage of in their future and by which they are willing to contribute to environmental awareness.

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