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Slovak Elementary Teachers' Attitudes towards Schoolyard Education

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Abstract: *The sum of literature and research emphasising the use of schoolyard as a teaching tool grows every year, however, research that investigates the teachers' attitude towards this novel educational concept is quite limited. Even fewer papers focus on usage of schoolyard as an educational tool in Central European conditions. Therefore, a questionnaire-based research was conducted on 306 Slovak teachers. The research aimed to investigate teacher's attitudes towards schoolyard education, including the frequency of teaching at schoolyard, and to identify factors that may influence the attitude. The results imply that the attitude towards schoolyard education is generally positive. The factors that showed significant influence on the attitude were teachers' personal preference and the region of Slovakia that they come from. On the other hand, no significant relationship has been identified between attitude and gender, experience, and the location of school (rural-urban). Results also imply, that teachers of vocational and physical education teach outside the most often. An open question asking the teachers for suggestions to make the schoolyard education at their school better was also included. The answers imply, that the most important barrier that the Slovak teachers face is the lack of material equipment and finance.*

Keywords: *outdoor education, attitudes, attitudinal scales, schoolyard education, schoolyard, garden-based education.*

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Introduction

In past decades, *outdoor education* (OE) had become an important topic in science education. No wonder – there are several papers that indicate its several benefits; e. g. a positive influence on students' knowledge, attitudes towards subjects, (Arıkan, 2021; American Institutes for Research, 2005 Taylor, Butts-Wilmsmeyer & Jordan 2022), social skills (Cooley et al., 2014), psychical well-being and motivation (McConnell & van Der Hoeven Kraft, 2011; Skinner et al. 2012; Behrendt & Franklin, 2014), and physical activity (Romar et al., 2018). Despite it proposed advantages, some researchers claim that teachers still neglect this educational concept (Orion & Hofstein, 1994; Martin, 2003). On the other hand, in some countries, e. g. in USA, Canada, Australia or Scandinavia, OE is a part of curriculum and have a long tradition in both education and research (American Institutes for Research, 2005; Ayotte-Beaudet, 2023; Picknoll et al. 2023; Bentsen & Jensen, 2012). However, regarding schools in central Europe, mentions of OE in curriculum or research papers are, to our best knowledge, scarce (Martin, 2011; Svobodová et al. 2020; Nikbay Arslantaş & Bavlı, 2022; Kmeť & Karolčík, 2024; Kmeť et al., 2024 among others). Moreover, most local research papers focus on *informal education* in spite of *school-based* OE.

In natural sciences it is considered ideal when the OE takes place in the very location which is the subject of the lesson. I. e., outdoor lessons of biology take place in natural ecosystems; geography in landscape; etc. This approach is called *place-based learning* (Elder, 1998; Elfer, 2011). This sort of lessons is often organised in a form of a trip. However, not every lesson can be place-based, due to time, safety, and financial barriers (Munge et al., 2017; Rickinson et al., 2004). This often makes the *schoolyard education* a suitable alternative, although some of the barriers apply to schoolyard education too. *Safety* is one of the most cited concerns, as well as *lack of teachers' confidence in teaching outdoors*. Other important barrier is an overall *lack of support* both in terms of finance and curriculum (Rickinson et al. 2004). Some of these factors (such as safety) are partially addressed in the concept of schoolyard education; others (such as lack of curricular support and teachers' confidence) are persistent and need to be addressed systematically.

Schoolyard education is novel, though not exactly new approach in science education. Its main feature is that it takes place at schoolyard, which is seemed as an extension of the conventional classroom (Feille & Nettles, 2019; Feille, 2021, Burke & Grosvenor, 2003). The literature investigating the use of schoolyard as a pedagogical tool usually focus on its impacts on students' attitudes towards environmental and food concerns (Chawla, 2023;

Blair, 2009; Zhanga et al. 2022; Martin, 2003; Carrier, 2009), knowledge and evaluation of curriculum (Martin, 2003; Carrier et al., 2013; Blair, 2009), and the analysis of barriers and challenges of teaching at schoolyard (Munge et al., 2017; Carrier et al., 2013; Henriksson, 2018).

Often, the concept of schoolyard education overlaps with that of *garden-based education* (GBE). Educational gardens are indeed an important part of many schoolyards around the world; many schools in US have their own gardens (American Institutes for Research, 2005; Blair, 2009). GBE has many positive impacts on pupils; many of which it shares with OE in general (Plaka & Skanavis, 2011; Nikbay Arslantaş & Bavlı, 2022; Williams & Dixon, 2013). However, GBE has a potential to enhance pupils' vegetable consumption through facilitating more frequent contact with fresh vegetable produce (Wright & Rowell, 2010).

Yet, only a few hitherto published papers focus on teachers' attitudes towards the schoolyard education. Henriksson (2018) investigated how the Finnish teachers described their use of outdoor learning, and their perception of possible implementations of outdoor learning in school leadership, teacher education, and in-service education. Among other interesting findings, this research implies that teachers of biology have the highest preference for teaching outdoors among STEM teachers. Most teachers in this research have chosen environments *close to school* (schoolyard) in their outdoor lessons. Barriers of teaching outdoors, such as resources, time-management, and transport have also been identified. Nonetheless, most respondents viewed outdoor lessons positively, as motivational for children and increasing their interest in lessons. Larsson & Rönnlund (2021) aimed to compare the French and Swedish teachers' and principals' opinions on everyday use of schoolyard. The study implies, that teachers from both nations tend to seek control of the schoolyard, however, the French teachers viewed the schoolyard more as a place to relax, while Swedish teachers viewed it as a place to learn. Borsos et al. (2022) compared the opinions about outdoor education among several countries: Serbia, Hungary, Croatia and Spain. They haven't found any significant differences among the teacher attitudes towards OE in these countries and their conclusions were, that the attitude is generally positive. Skamp (2009) concludes, that teachers feel motivated to teach at the schoolyard, but in order to make outside lessons better, more professional development, curriculum materials and management support is needed. Also, several motivational factors for more effective outdoor learning have been proposed, such as positive feedback from the students, or within-school community of teachers fond of schoolyard pedagogy. Study by Feille & Nettles (2019) also presented some interesting findings. Implication was, that

teachers of lower grades teach outside more often. According to this research, teachers showed slightly positive attitude towards teaching outside. The participants also picked what they use the schoolyard for, and the most common answers were '*to have students make observations*', and '*for students to conduct an investigation/experiment*'. The participants who reported moderate use of the schoolyard used the highest variety of schoolyard features (flower beds, vegetable gardens, seating areas…). The authors have also identified that the teachers who felt support from the school and local authorities regarding the usage of schoolyard are also using it more frequently.

The prior research indicates, that the teacher's attitude towards schoolyard education is overall positive. However, several barriers that the teachers struggle with have been identified, most of them being *outside barriers*, such as lack of financial, curricular, or school management support.

Research objectives

The research aimed to answer the following questions:

- What are the teachers' attitudes towards schoolyard education?
- Which factors may influence teachers' attitudes towards schoolyard education?
- What changes would the teachers suggest to make the schoolyard education effective?

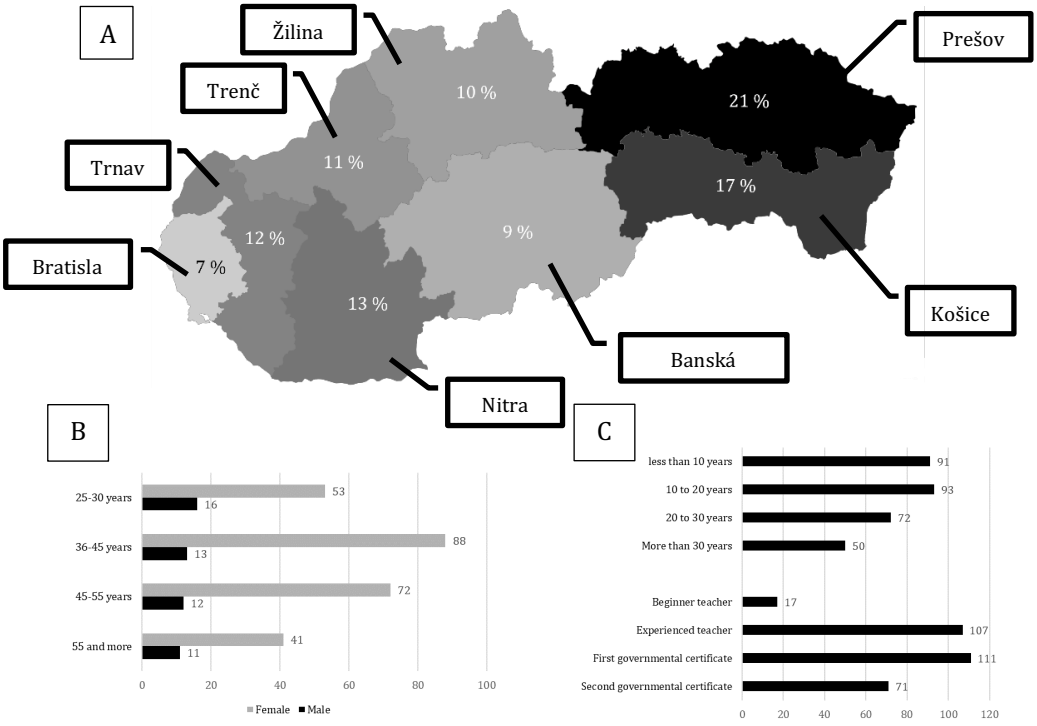
Methodology

Research sample

The research sample consisted of 306 teachers from Slovak elementary schools (ISCED 2). The respondents resided in all Slovak regions, with Eastern Slovakia being most prevalent (Fig 1a). In terms of gender, females prevailed (254) over males (54) and regarding age, most respondents were aged 36-45 (Fig 1b). In terms of experience, most respondents were experienced teachers with 10-20 years of teaching experience and the "first" governmental certificate[1] (Fig 1c). The study included teachers from primary and secondary schools in Slovakia who voluntarily responded to the online questionnaire distributed through school directors. Participation was open to all teachers regardless of subject, experience, or school type. Non-teaching staff, incomplete responses, and teachers outside Slovakia were excluded from the analysis.

[1] In Slovakia, teachers in public schools apply for two main governmental certificates, which reflect their teacher education and experience, and offer several benefits.

Fig 1. Demographic and professional characteristics of the research sample



Biology, geography, mathematics, physics, physical education, and vocational education[2] teachers participated in the research. All respondents have agreed with both filling in the questionnaire and publication of data.

Research instrument

A questionnaire was administered via Google Forms platform from January to April 2023. The questionnaire was sent to school directors across Slovakia; they were then further administrating it to the teachers.

The questionnaire consisted of an introductory sequence with instruction regarding its completion; a couple of items asking for respondents' demographic and professional characteristics (gender, school location, experience, subjects they teach). Next, the teachers' attitudes towards schoolyard education were assessed using 12 five-point Likert-type items. Last item of the questionnaire was an open question, asking for teachers' recommendations about schoolyard education.

[2] Vocational lessons are a mandatory part of elementary education in Slovakia.

The quantitative data were further coded and underwent statistical evaluation. In order to determine construct validity of the attitudinal items, exploratory factor analysis (EFA) was used. EFA suitability was further tested with Kaiser-Meyer-Olkin test (0,894) and Bartlett sphericity test (χ^2 = 1833,6; df = 66; p = 0). EFA has divided the items into two dimensions: (1) schoolyard in the educational process, and (2) conditions for schoolyard education (Table 1). These two dimensions represent 60.93% of the total variance. According to Reckase (1979), first factor should account for at least 20% of the total variance, and the difference between the second and third factor should be smaller than the difference between the first and second factor.

Reliability of each dimension was determined using Cronbach's α, with value α = 0.88, thus an acceptable reliability (Jacob, 2017). The values of Cronbach's α for each of the two dimensions also show strong internal data consistency (Table 1).

Table 1. Reliability (Cronbach's α) and construct validity (EFA) of the questionnaire.

	reliability Cronbach's α	Dimension 1	Dimension 2
(1) Schoolyard in the educational process	0,87		
1. Pupils show interest in schoolyard education		0,600	
2. Schoolyard education enhances pupils' motivation in learning.		0,814	
3. Schoolyard education enhances pupils' interest in educational process.		0,817	
4. Schoolyard education enhances pupils' interest in nature.		0,632	
5. Schoolyard education has a positive impact on pupils' learning results.		0,707	
6. Schoolyard education enhances pupils' self-realisation and creativity.		0,662	
7. Schoolyard education helps to build positive relationships between the teacher and pupils and among pupils.		0,621	
12. Schoolyard education is suitable for use in all educational fields.		0,417	
(2) Conditions for schoolyard education	0,88		
8. The schoolyard at our school provides suitable conditions for the educational process.			0,789

9. The state curriculum in the subject I teach supports the realisation of schoolyard education		0,636
10. Our school provides enough space and suitable equipment to realise schoolyard education		0,881
11. Our school supports schoolyard education.		0,795
Eigenvalue variance (%)	**44,97**	**15,96**

After determining validity and reliability, the overall score (as arithmetic mean) was calculated for the whole attitude and for each dimension. Then, normality of each dataset was tested using Shapiro-Wilk test. In datasets with normal distribution, ANOVA with Bonferonni correction was used, in those without normal distribution, non-parametric alternatives, such as Mann-Whithey and Kruskal-Wallis test with Bonferonni correction were applied. When testing correlation, Spearman's correlation coefficient was applied, as the chosen data did not have normal distribution.

Results

Overall attitude towards schoolyard education

The average score in attitude towards schoolyard education was ~ 3.6, thus a fairly positive attitude. Descriptives of the scores are shown in Table 2, distribution of responses between genders in Fig 2. As we can see, vast majority of respondents has more positive (score > 3) attitude towards schoolyard education. Negative (score < 3) or neutral (score = 3) attitudes had a low frequency among respondents.

Fig 2: Distribution of responses regarding respondents' gender

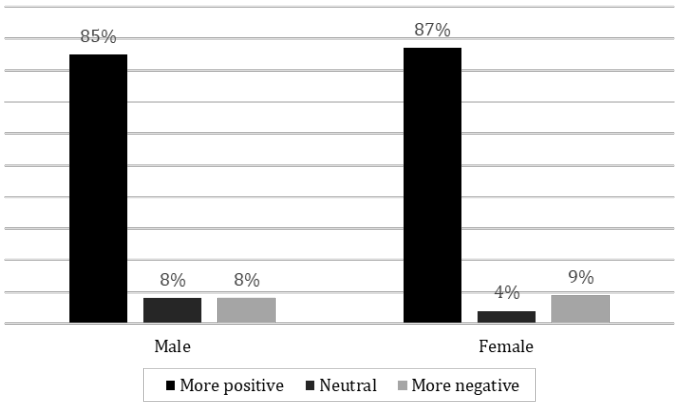


Table 2. Descriptives of teachers' attitudes towards schoolyard education.

Mean	3,599
Median	3,667
Variance	0,426
Std. Deviation	0,653
Minimum	1,000
Maximum	5,000
Range	4,000
Skewness	-0,432
Kurtosis	0,940

The results of statistical analysis show, that neither *gender, school location (rural-urban)*, nor *experience* have statistically significant influence on attitude towards schoolyard education (Table 3). However, a significant difference was identified between *regions*. Teachers from the region of Banská Bystrica (central Slovakia) have a significantly more positive attitude towards schoolyard education than those from Žilina region. No significant difference was found between other regions. Another statistically significant difference was identified between the teachers' preference for outdoor education: teachers that preferred to teach outdoor showed more positive attitude towards outdoor education than those who prefer to stay in class (Table 3).

Table 3. The results of inductive statistical analysis

Parameter		**Test**	**Sig.**
Gender		Mann-Whitney	0,320
School location	*rural-urban*	Mann-Whitney	0,476
	region	Kruskal-Wallis[1]	**0,033***
Experience	*years*	Kruskal-Wallis	0,198
	certificates	Kruskal-Wallis	0,167
Preference in education (outdoor-indoor)		Mann-Whitney	**0,000***

[1] *Bonferroni correction*
***** *Significance*

Differences between subjects taught by the teachers were also assessed. The results imply, that PE teachers have significantly more positive attitude towards schoolyard education than physics and mathematics teachers. Among other subjects, no significant differences were found. When assessing how frequently do teachers of each subject choose to teach at schoolyard, four groups with significant differences has formed. The first group, that taught at

schoolyard most frequently, were PE teachers; the second group were vocational education teachers; the third group were teachers of biology and geography; and the fourth group, which teaches at schoolyard least frequently were mathematics and physics teachers. The results are summarised in Table 4.

Table 4. Frequency of schoolyard education

Comparison	Frequency		Attitude	
	Sig.[1]	Difference	Sig.[2]	Difference
Biology – Geography		0,0613174		0,0478746
Biology – Physical education	*	**-0,869769**		-0,237344
Biology – Mathematics	*	**0,406795**		0,189777
Biology – Vocational education		-0,31923		-0,0854457
Biology – Physics		0,257374		0,156347
Geography – Physical education	*	**-0,931087**		-0,285218
Geography – Mathematics		0,345478		0,141902
Geography – Vocational education		-0,380547		-0,13332
Geography – Physics		0,196056		0,108472
Physical education – Mathematics	*	**-1,27656**	*	**0,42712**
Physical education – Vocational education	*	**-0,550539**		0,151898
Physical education – Physics	*	**-1,12714**	*	**0,39369**
Mathematics – Vocational education	*	**0,726025**		-0,275222
Mathematics – Physics		0,149421		-0,0334298
Vocational education - Physics	*	**-0,576604**		0,241792

[1] *Kruskal-Wallis test, Bonferroni correction.*
[2] *ANOVA, Bonferroni correction.*

Analysis of dimensions "schoolyard in the educational process" and "conditions for schoolyard education"

The data has been analysed in the dimensions determined by EFA as well. Average score in each dimension was fairly positive: in dimension 1 (Schoolyard in the Educational Process) ~ 3,8; and in dimension 2 (Conditions for schoolyard education) ~ 3,3 (Table 5).

Table 5. Descriptives of the scores in each dimension.

Descriptive	Dimension 1	Dimension 2
Mean	3,756	3,286
Median	3,750	3,500
Variance	0,431	0,948
Std. Deviation	0,656	0,974
Minimum	1,000	1,000
Maximum	5,000	5,000
Range	4,000	4,000
Shapiro-Wilk	0,000	0,000
Skewness	-0,549	-0,352
Kurtosis	1,329	-0,594

The further analysis implies, that *gender, school location (rural-urban or regional), experience* nor *frequency of schoolyard education* has no significant influence on the score in neither of the dimensions. The only statistically significant difference was identified between the teachers' preference for outdoor education: teachers that preferred to teach outdoor showed more positive score in dimension 1 than those who prefer to stay in class (Table 6).

Table 6. The results of inductive statistical analysis of the dimensions

Parameter		Test	Sig.	
			Dimension 1	Dimension 2
Gender		Mann-Whitney	0,247	0,373
School location	*rural-urban*	Mann-Whitney	0,441	0,858
	region	Kruskal-Wallis	0,360	0,479
Experience	*years*	Kruskal-Wallis	0,372	0,919
	certificates	Kruskal-Wallis	0,185	0,114
Preference in education (outdoor-indoor)		Mann-Whitney	**0,025***	0,155
Frequency of schoolyard education		Spearman	0,040	0,053

***** *Significance*

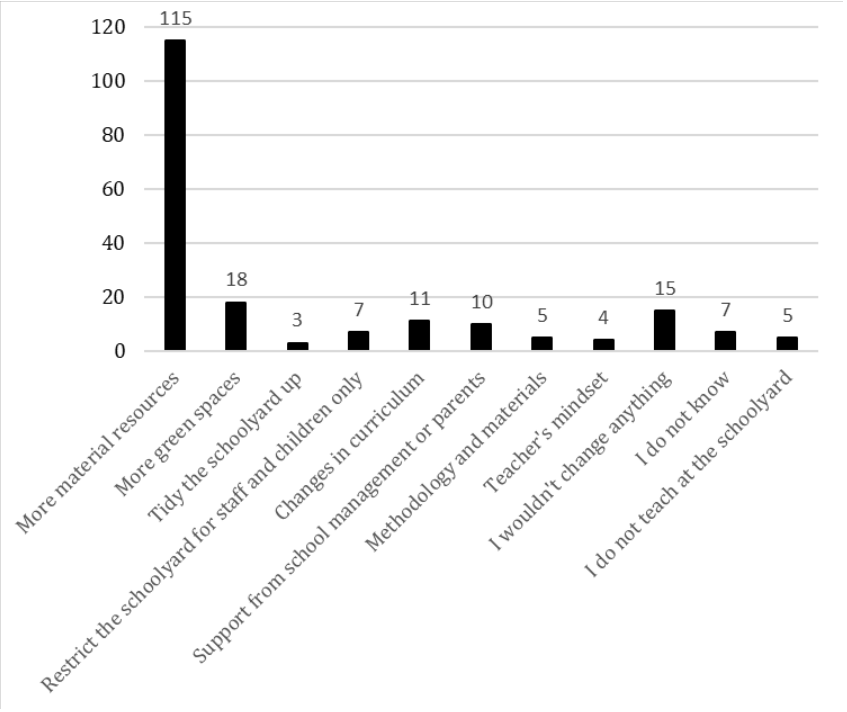
Qualitative research

The last item in the questionnaire asked the teachers to suggest what would they change to make the schoolyard education more effective. A total

of 200 answers were collected, as this was not a mandatory answer. The answers were assessed one-by one and divided into 11 categories. One of the quantitative items in the questionnaire asked about sufficient material resources on a schoolyard; this served as a simple triangulation method (Silverman, 2020). All the teachers whose open-ended question answers fell under the category "More material resources" (figure 3) has answered that their schoolyard was insufficient in terms of outdoor education needs.

As it is apparent in figure 3, a vast majority of answers advocated for **more material resources**. Most commonly mentioned resources were benches, tables, gazebos, garden tools and assets, courts, pitches, and workout spaces. Several teachers also suggested more **green spaces**, including vegetable gardens, fruit trees, and ponds. The frequency of answers in other categories was quite low, which implies, that the lack of material resources is the most important barrier, as perceived by the teachers. Only 15 teachers stated, that they wouldn't change anything about the schoolyard, since it has all that they need for effective schoolyard education.

Fig 3: Distribution of responses in the open question (What changes would you suggest to make schoolyard education at your school better?)



Some of the answers draw an interesting picture of what problems teachers face when planning to teach at the schoolyard. Some schools have

schoolyards covered in concrete, others have schoolyards not belonging to the school – therefore, no changes nor investments were allowed. One of the teachers brought up rather a curious obstacle: after finishing a project on "outdoor classroom" (with gazebo and flowerbeds), the management have forbidden its usage to prevent children from damaging the flowers.

Conclusion

The first goal of the research was to measure Slovak teachers' attitudes towards schoolyard education. Their attitudes could be summarised as fairly positive; both in overall attitude and in each of the dimensions. This could lead us to a conclusion, that teachers in general support the implementation of schoolyard education and view it as a good educational concept. However, higher score in the first dimension implies, that although the teachers seem to favour the concept, there are several barriers both in terms of space and equipment provided by schools, and support in the governmental curriculum.

In terms of factors, that influence the attitude towards schoolyard education, there have been some interesting results. The view of this educational concept seems not to depend on teachers' gender or experience. However, an important factor seems to be subject that the teacher teaches. According to data, PE and vocational education teachers have both the most positive attitude and chooses to teach outside the most often. On the contrary, least schoolyard lessons and the least positive attitude was observed amongst teachers of mathematics and physics. This makes sense since both PE and vocational education are traditionally taught outside. On the other hand, many teachers may perceive mathematics and physics as subjects, schoolyard can't bring anything interesting into, although the research proves the opposite (e.g., Ludwig et al., 2020).

It is of no surprise, that the teachers who prefer to teach outdoors show better attitudes towards schoolyard education (both in general and in each dimension). What may be more surprising is the difference found among *regions*. The regions with the most positive and the most negative attitude are both mostly rural, mountainous and lie in the Central Slovakia. One difference may be the economic status: Banská Bystrica region has some of the poorest districts of Slovakia (Michálek, 2017). A possible explanation may therefore be the lack of equipment and room suitable for indoor education (mostly in PE, since schools in poorer districts often lack gymnasium), which forces teacher to choose OE. However, these claims would require further research.

The qualitative research implies that the biggest barrier that the teachers perceive at the schoolyard is the lack of material resources. This fact may also answer the question, why the other barriers, clearly identified by

other papers (lack of curriculum materials or little support from the school management) showed up in only a small number of answers. To sum up; when the schoolyard lacks the basic assets, like a place to seat the pupils, other barriers become almost irrelevant in the eyes of the teachers. This is consistent with findings of Rickinson et al. (2004) who identified lack of financial support as one of the major barriers in implementing OE into formal education. We, therefore, suggest these findings to be applicable onto schoolyard education too.

In comparison to other, similar research, it seems that teachers in general have positive attitude towards using the schoolyard, a trend that we have also identified. Henriksson (2018) points out, that the biology teachers choose to teach outside the most often. According to our results, teachers of vocational and physical education teach outside significantly more often. Feille's & Nettles' (2009) results imply, that teachers who feel support for schoolyard education at their schools teach outdoors more frequently. Our results, however, do not support this claim, neither their claim that teachers of lower grades teach at the schoolyard more frequently.

Thus, the proposed research contributes to the ongoing discussion on the role of outdoor education in formal schooling. While schoolyard education is widely recognised for its potential to enhance student engagement, interdisciplinary learning, and connection to the environment, its implementation is often hindered by similar challenges across different educational systems. The barriers identified in this study – such as limited resources, infrastructural constraints, and insufficient curricular support – reflect broader issues faced by educators worldwide. By shedding light on these factors, this research underscores the need for systemic changes that promote outdoor learning as an accessible and effective teaching approach. Future studies could further explore strategies to support teachers in integrating schoolyard education into their practice, ensuring that its benefits can be fully realised across diverse educational contexts.

Study limits

While this research provides an interesting insight into the attitudes of Slovak elementary teachers towards schoolyard education, it is important to acknowledge certain limitations that may affect the interpretation and generalization of the results.

1. *Sampling Bias*: The research sample consisted of teachers from Slovak elementary schools, and although efforts were made to include participants from various regions and backgrounds, the sample was subject to certain limitations inherent in the sampling process.

Consequently, it is important to exercise caution when applying the findings beyond the scope of this study.

2. *Self-Report Data*: The data in this study was collected through a questionnaire, which relies on self-reported responses from participants. This method is subject to potential biases, such as social desirability bias, where participants may provide answers they believe are more socially acceptable, rather than their authentic attitudes.
3. *Regional Variations*: The study identified significant regional variations in teacher attitudes. The reasons for these variations may involve complex regional factors that were not explored in-depth in this research. Future studies could investigate deeper into the regional influences.
4. *International Applicability*: The study is limited by its national scope, as data were collected solely from Slovak teachers. Differences in curricula may affect the generalisability of the findings. Additionally, voluntary participation could introduce response bias. Future cross-national studies are needed to assess the broader applicability of these results.

Ethics statement

We confirm that the presented research did not require any special approval from the ethics committee, as it met all the ethical, human, and legal subject requirements imposed on this type of research. All participants gave their informed consent prior to their inclusion in the study. Personal information of the participants was strictly anonymised, based on which it was not possible to connect any personal data to individual people.

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