

# Earth literacy and Deep ecology principles in innovative pedagogy context and attitudes of teachers in the post-communist country

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## Abstract

This study aims to identify whether and how teachers in elementary schools in post-communist country implement Earth literacy and Deep ecology thoughts using Forest Pedagogy methods and outdoor tuition. The theoretical framework is based on Earth literacy and A. Naess's Deep ecology principles. In-depth semi-structured interviews with the 285 teachers, including 19 headmasters from elementary schools in the form of the Pyramid Model of Wengraf, probing, and cross-case analysis methodologically approached this topic. Research has shown barriers to outdoor teaching and society-wide problem, including all stakeholders. The authors submit a proposal consisting of a five-stage model of school curriculum that is internationally applicable. The results may contribute to improving environmental education.

**Keywords:** Earth Literacy. Deep Ecology. Forest Pedagogy. Outdoor Learning. Pyramid Model.

## Introduction

For man, wild nature is the material from which he made civilization. In nature, changes take place, plant and animal species disappear, while others multiply. Humanity does not perceive declining biodiversity as a loss and tries to manipulate and repair nature and the machine. Therefore, the Earth's ability to sustain and regenerate life is reduced. Sachs (2009) notes that the world is on an unsustainable trajectory of development, ecologically, demographically, and economically. Natr (2005) states that all definitions of sustainable development point to three fundamental interests of human society: environmental protection, economic development, and social justice. These three pillars are interdependent.

To continue on Earth is necessary to remind Einstein's claim that humankind must be a "master and new way of thinking" to survive. If we do not do this, the world is sent to destruction. Therefore, if humankind does not want to perish with other higher animals, the adaptive strategy must be changed again.

J. Lovelock (1979) presented his Hypothesis of Gaia (*Gaia, the ancient Greek goddess of the Earth*) as a theory that assumes the ability of the terrestrial system to regulate its climate and chemical composition the Earth remains a place suitable for life. This self-regulatory ability of the Earth is no longer enough today.

We can save our unique host environment only by radically greening our spiritual and material components. Moreover, the educational system must contribute to this effort, which can become a new transcendence and a great self-realization opportunity for today's ethos deprived of humanity (Šmajs, 2015). The trends of modern civilization and society's expectations must necessarily be reflected in a transformed education system (Radło, 2002). Britto (2017) adds that the implementation of the idea of sustainable development, including sustainable behavior in the macro and micro-systems of society, economy, and nature, is necessary from an early age of the child through educational institutions. Education gives significant power to manipulate and control the natural world, and therefore paradoxically

educated people are most trapped by the illusion of their power. Nevertheless, they do not always use this power wisely.

Therefore, today's environmental education must correspond to a higher level of sophistication, towards the Earth's literacy.

Concepts and Thoughts of Thomas Berry, Miriam T. MacGillis, Brian Swimme, Mathew Fox, Albert Einstein, Neils Bohr, Fritiof Capra, Jean Houston, Riane Eisler laid the foundation for Earth literacy, which awakens humanity from illusion and connects disciplines to initiate social changes. Earth awareness and Earth care are the two pillars of Earth's literacy (Verhagen, 2000). To be Earth literate means to understand the primary languages "spoken" by Earth. Earth Literacy is not about intellect. "You should become aware that Earth's story is your story" (Stocker, 2009). Earth literacy recognizes the Earth as an educator and honors the wisdom found in terrestrial systems. Berry (1993, 1999, 2009) recommends to become conscious members of the society of all living beings and inanimate nature Earth literacy education is based on the values of sustainability, equity, and ethics. A significant challenge is to change the purpose of education from human-centered or anthropocentric to life-centered or biocentric learning and instruction (Verhagen, 2000).

The creation of a new harmonious relationship between humans and physical nature is the goal of a deeply oriented environmental movement associated with the name of the Norwegian philosopher Arne Naess (1912-2007). Deep ecology considers nature as the best source of knowledge. Arne Naess's philosophical point of view is twofold dualism: ontological and gnoseological. Naess is considered a contradictory thinker: he leans towards fundamentalist conceptions; on the other hand, he cannot abandon the values based on humanism and plurality. Both elements then intertwine in most of his texts.

Bolstad (2012) asks the following questions of possible trajectories for future teachers:

1. How could future-oriented learning and teaching look like, what ideas and principles are fundamental, and what sets it apart from existing teaching and learning practices?

2. What are the conditions for future-oriented learning and teaching? What are the problems and challenges?
3. How can the future-oriented learning and teaching approaches be promoted, supported, and maintained? (Bolstad *et al.*, 2012, p. 1)

To respond to these queries, we can turn into A. Naess's ideas (1993), which can be very well applied in education for the 21st Century. The OECD and the Centre for Educational Research and Innovation in its Innovative Learning Environments Project defines seven principles of learning and teaching for the 21st Century. Main pillars are (1) Learners at the center; (2) The social nature of learning; (3) Emotions are integral to the learning process; (4) Recognizing individual differences; (5) Stretching all students; (6) Assessment for learning; (7) Building horizontal connection (Dumont, Instance & Benavides, 2010).

It is precisely point (3), i.e., intuition, emotionality, and empathy, thanks to which, according to A. Naess, the individual acquires the truth about the world and wisdom. "Truth is known only through compassion." (Naess, 1989).

The best practices in environmental education can be considered active participation, hands-on observation and discovery, place-based learning, cooperative and project-based learning, play-based and outdoor learning, multiple points of view (Hungerford, Bluhm, Volk & Ramsey 2001; Hungerford and Volk, 1990; Hungerford, Volk, Ramsey, Litherland, & Peyton, 2003; Jacobson, Mc Duff & Monroe, 2006; Louv, 2005). According to A. Naess and Earth literacy principle, education should consist of events and creative activities; there is not a sharp line between education and activity (Naess, 2000, p.60).

### **Reflection of Earth literacy and Deep ecology pillars in Forest Pedagogy**

Forest Pedagogy introduces the forest ecosystem in the intersection of environmental, economic, social, and legal dimensions in experiential learning, connects constructivism and experiential pedagogy, thus corresponding to the principle of Earth literacy and Deep ecology. According to A. Naess (1989), how we relate to nature is a matter of feeling. He recommends getting feelings into learning as well, because "we do not have a life of pure knowledge and a life of feelings as something separate" (Naess, 2000) and emphasizes that feelings have cognitive value. For the knowledge of nature, the essential tool is the non-rational form of cognition, i.e., empathy, identification through emotions, not through reason. We know ourselves by empathy more objectively than scientifically. This view is also supported by Wedlichova (2011) that sensory experiences also increase emotional intelligence in children.

Constructivist teaching methods are ubiquitous in the literature (Stern, Powell & Ardoin, 2010; Wright, 2008; Yager, 1991) and can be manifested in many forms. Constructivist approaches help pupils create their understanding by building on their previous knowledge and actively engaging them in real-world experience (Jacobson, McDuff & Monroe, 2006). Cornell (2012) describes four levels of experience-awakening enthusiasm, focusing attention, direct experience, and sharing inspiration. These methods and practices will entertain, cultivate, and develop children pleasantly and amusingly. Forest Pedagogy is based on holistic teaching according to Pestalozzi's concept of "learning with head, heart, and hand" (Kuhlemann & Brühlmeier, 2002).

### **Stanford Analyses**

Experts at Stanford University led by dr. Nicole Ardoin systematically analyzed 119 peer-reviewed studies published between

1994 and 2013. These studies measured the impact of environmental education on K-12 children and pupils from thirty-three countries. The studies have clearly shown that environmental education has led to many positive outcomes, from improving academic performance, enhancing critical thinking skills, developing personal growth, and life-building competencies, including self-esteem, increased civic engagement, and positive environmental behavior (Ardoin, Bowers, Wyman & Holthuis, 2018; Stern, Powell & Ardoin 2008).

We respond to the challenge of dr. Nicole Ardoin for further insight and offer findings based on qualitative research conducted in Central Europe, in the Czech Republic, in Prague. This country was chosen for research purposes because of a high standard and a history of quality education. The first University in Central Europe was founded here (Charles University in 1348). At the same time, it is a post-communist country where it is often difficult to enforce some new teaching methods and trends. Changes are coming slowly and somewhat cumbersome. Frontal teaching in classrooms and memorizing is most often applied. Another typical feature of the Czech education system is the school grading system and constant comparison of pupils among themselves. Long discussions about the inclusion of activation methods show controversy among proponents of classical and modern concepts. In the Czech Republic, forests cover over 34% of the total area. The total area of Prague is 496 km<sup>2</sup>, of which the area of forests is more than 10% of the city area.

A survey conducted by the Czech marketing agency "Median" (2017) "*For One World in Schools*" showed that despite positive outcomes regarding environmental education from Stanford Analysis, most teachers in the Czech Republic do not practice Earth literacy by outdoor teaching (<http://www.median.eu/cs/>, 2017). The search for the reasons was surveyed.

### **Aim of the Study**

This study aims to identify the reasons, whether and how teachers in elementary schools in the Czech Republic provide Earth literacy and Deep ecology tuition using Forest pedagogy methods and outdoor learning. In-depth semi-structured interviews using the Pyramid Model of Wengraf questions (2001), probing and cross-case analysis through which qualitative data was obtained, methodologically approached this topic. Objective No.2 is to present a realistic way of implementation Earth literacy by Forest Pedagogy methods as part of everyday school work within the curriculum

### **Materials and Methods**

Bassey (2006) complements three leading general data collection practices that can be applied in the school environment. These include asking questions, observing events, and reading documents. The in-depth semi-structured interview was chosen because the qualitative data are naturally organized and describe the situation. The interviewee can fully express his/her subjective views and opinions and can propose relations and contexts (Hendl, 2016).

Further preference for qualitative research is a considerably higher proportion of completed interviews than the return rate of the questionnaires, as well as the possibility of asking questions and getting ambiguous answers (Disman, 2018). The Pyramid Model of the interview was used to create the interview scheme (Wengraf, 2001). This model consists of a central research question, theory questions, and particular interview questions. An open question unlocks the potential to choose any direction and choice of words. Patton (1990) stresses that there are no fixed rules for ranking questions.

In terms of subsequent data processing, Mayring (1990) describes four methods of material transcription, literal and annotated transcription, summarizing, and selective protocol. Yin (2014) refers to the cross-case analysis to compare individual cases and investigate their similarities and differences.

### Study design, research sample, and data collection

The qualitative research was carried out in the form of in-depth individual interviews in the period from September 5, 2018, to October 10, 2019, when 19 headmasters and 285 elementary school teachers were interviewed. This qualitative research aimed to create a holistic picture of teachers' attitudes regarding environmental education, using Forest Pedagogy and outdoor teaching methods.

Data were collected at elementary schools in interaction with school actors (headmasters, school leaders, and teachers) through questioning and were verified by analyzing school documentation. For the research, elementary schools of the Faculty of Education were selected, representing the teaching base of future teachers, where the pedagogical practice of students of pedagogical fields is implemented. These elementary schools of the Faculty of Education play a fundamental role in the training of future teachers. They significantly contribute to professional competencies in teaching practice, constitute and influence the young teacher's style at the beginning of his/her career. Elementary schools of the Faculty of Education are an essential institution in the process of undergraduate teacher training and represent a place of creative search for optimal educational procedures for inexperienced young teachers. These schools participate in the search for progressive learning concepts and enable them to implement new approaches in teaching. A precise analogy can be seen in the faculty clinics' network in the preparation of future young medical doctors.

The research sample included primary school teachers of all ages and subjects, both sexes. Study participants 65% of women aged 24 and 68 years (mean = 47 years) and had between one and 43 years of teaching experience (mean = 19 years).

Transcripts of interviews were transformed and interpreted to capture the complexity of the examined phenomenon. Open coding was applied for data evaluation. The texts were analyzed in the ATLAS.ti program, where each significant sentence, word, or phrase, was highlighted and assigned a code that represented the essence of the text. According to the created codes, the information was then compared with each other. Similar and related semantic units have been associated and integrated into a larger semantic unit.

The Pyramid Model in Figure 1 presents a more detailed structure of the questions.

### Analysis of School Documentation

Schools have a legal obligation to keep the required documentation (Act 561/2004 Coll., the so-called "SCHOOL LAW"). School documentation analysis works with data such as curriculum, school register, schedule, timetable, class books and reports, catalogs, contest results, council records, accident books, inspection reports, statistics, and annual reports. The analysis aimed to exploit the potential of school-led documentation and to use it in evaluating the quality and effectiveness of the educational process for school boards, school management, chairmen of subject commissions, class teachers, and teachers. The results of the analysis can be used for continuous assessment within the school year, self-assessment, at the end of the reporting period, and assessment over time (trends). The data obtained by analyzing documents can motivate the teacher to provide a particular program for the classes. By continuously monitoring the documentation, it is possible to obtain information on the intervention (e.g., whether attendance and academic skills have improved).

### Results

Teachers most often answered why teaching takes place inside because they feel safe and comfortable inside the classroom. A Czech language female teacher aged sixty expressed a typical opinion: *"Schools are built to teach in, offer all the equipment and comfortable facilities. It does not rain or snow inside"*. Teachers were also asked to identify the obstacles to teaching outside. Replies in a similar vein were often repeated and were startling: *"When I explain to the parents that I would like to do anything differently, they respond that they do not care. Why would I bother going out with the children and then explaining to parents that child had returned home with a dirty jacket."* Alternatively: *"Parents just want their child to have good grades and get to college."*

The second most-often mentioned barrier was that teachers do not know how to conceive outdoor teaching; they do not know how to grasp it, what, and how they could teach outside.

Especially Czech language teachers are not aware of teaching grammar in nature and instead recommending outdoor teaching as a complementary activity for other subjects. Considering the grammatical complexity of the Czech language, they regard classroom teaching and writing as desirable. One example for all: *"Should I put the pupils on a log in the forest to write a dictation?"* Teachers of geography, biology, physics, physical and art education are more visionary to frequent visits to nature: *"Yes, nature offers beautiful scenery, especially landscape painting."* The geography teacher confirms that: *"Demonstration of the Earth's historical development is the best in nature."*

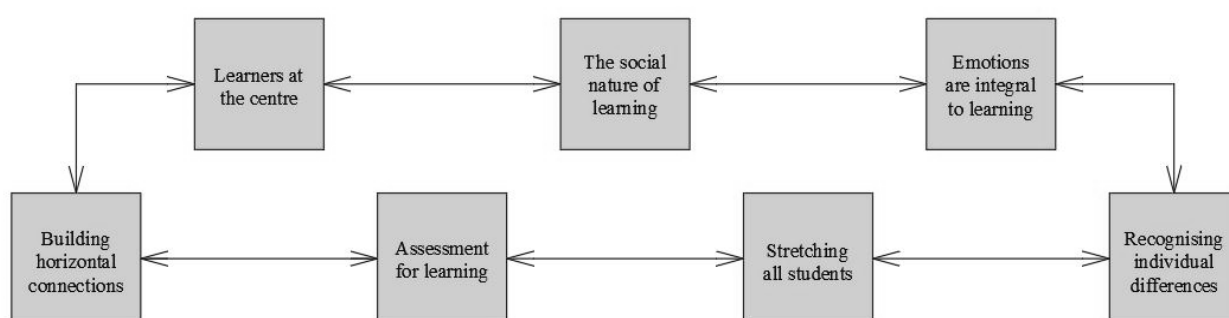
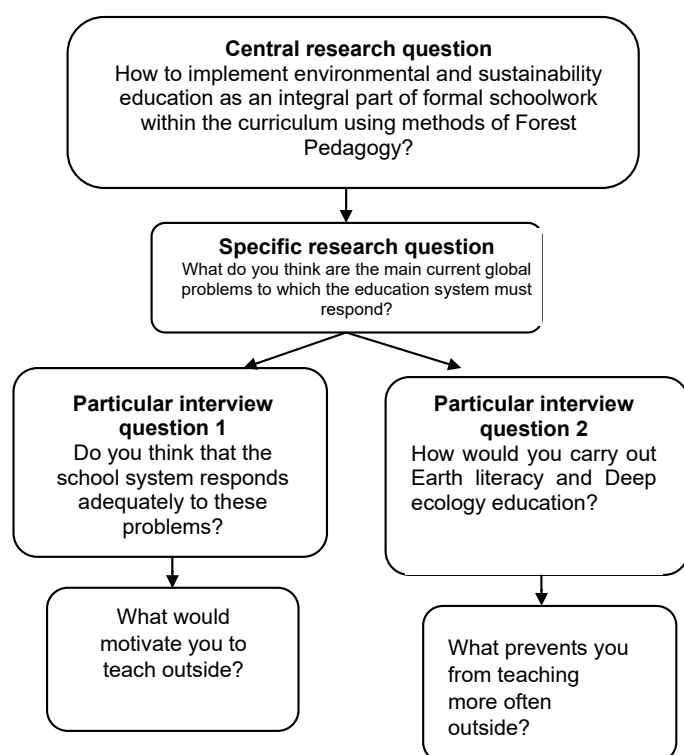


Figure 1: The seven Principles of Learning

Source: The OECD Centre for Educational Research and Innovation  
Authors' processing, 2020.





**Figure 2:** Structure of the interview in the form of a Pyramid Model  
Source: Wengraf, 2001, p. 64. Authors' processing, 2020

Also, chemistry teachers responded positively: *"Many chemical processes can be shown to the students in nature."* The teacher of mathematics opposes that: *"Teaching counting to 20 in the forest is easy, but I do not know how to calculate equations between trees."*

However, the vast majority of teachers regard outdoor learning as a school trip, something extraordinary, stating that such "outdoor excursions" would waste their time because they had to follow curricular standards. They consider outdoor teaching as the disruption of the established daily program. Very often, the reactions were repeated: *"Pupils will be absentminded, it will be hard to maintain discipline, while in the classroom, they know that there are certain rules that must be followed."*

In half of the cases, there were repeated concerns about more demanding supervision of children in nature and worries about injuries, far from ticks, colds. Only a minimum number of teachers said they do not go out with children because they have no nature around the school.

The interviews clearly showed that the best relationship to outdoor teaching have teachers who, as children, had the opportunity to go with their parents to nature. It is the contact with nature in childhood that influences their current willingness to go to nature with their pupils: *"Yes, as a kid, I threw a briefcase home every day and ran out. My parents and I were out very often on weekends and holidays."*

Teachers were most hesitant to transform the subject's content into a form that could be realized outdoors. They are accustomed to frontal teaching with the use of blackboard, which in nature is not possible. They would have to completely revise the lesson plan and start using diametrically different methods than they are already familiar with now. Perhaps best describes the statement of an older teacher of geography and biology: *"I would love to teach geography and biology in nature, especially certain chapters would be very beneficial, but I cannot imagine teaching absolutely everything."*

## Discussion

The Stanford analysis has provided evidence of the positive impact of environmental education on K-12 pupils; nevertheless, school practice in the Czech Republic does not entirely take into account the outputs and recommendations of these studies. The analysis of school documentation revealed classes at the first level visited the center of ecological education once or twice per school year. There is no evidence of regular or systematically organized events of this kind.

Finding *raison d'être* had become the driving force of research when teachers at Faculty Elementary Schools were asked to identify their attitudes to Earth literacy and Deep ecology thinking and outdoor teaching.

Survey has shown that barriers mainly concern teachers' skills, fear of losing control, overcrowded curriculum, and restrictive school practices. Studies in Swiss presented that especially more experienced and senior teachers are more experimental and more willing to forest education, and young teachers are reluctant to get involved in forest education (Lindemann-Matthies & Knecht, 2011, p. 18). Research in the Czech Republic has shown the opposite. Novice teachers were more open to new methods, and we cannot confirm that forest education was more likely conducted with increasing teaching experience.

At first glance, it might seem that Czech teachers are opposed to new methods and are inflexible. However, the interviews carried out made a more severe finding that the basis and stumbling block misunderstood the meaning of school attendance and the role of the school. Formalism, the emphasis on memorizing, a rigid system of grading is not only the fault of Czech teachers. The problem has a broader context. Our study included 285 teachers and 19 headmasters from the capital city of Prague, results from other regions may vary. However, the whole Czech education system carries consequences from the time of the Austro-Hungarian Empire in the 18th and 19th centuries when retired officers taught at schools and introduced some military elements (getting up at the beginning of the lesson, uniform order, and timetable for all, punishments, subjective evaluation). This system suppresses one's opinion, does not allow the development of a child's natural creativity and imagination, and is based on memorizing and grading. Teachers are under severe pressure from parents who do not appreciate children being cultivated. The parents require the school to pass on encyclopedic knowledge to the child to enable him/her to advance to University. Parents transmit their dismal attitude and thinking to children. There is fear at Czech schools - pupils are afraid of examinations, mistakes, tests, graduations; teachers are afraid of parents, and failure; school headmasters are afraid of parents or inspection; parents are afraid of their children's bad grades.

Interviews showed that teachers have a specific personal framework of values related to nature issues. For most of them, ecology is just a theory, not a personal attitude. Their attitudes to life do not reflect a deep ecological feeling that has roots in A. Naess's conception. The following facts show that teachers are willing to visit nature from time to time, but not to live with. Therefore, they cannot show the pupils how to move without consequences in nature, and respect all life forms, not just those beautiful, remarkable, or useful and teach not to use living beings only as means; lead to the recognition of their intrinsic value. This attitude does not correspond to Earth literacy or Deep ecology principles, when A. Naess recommends to protect the forest ecosystem as a whole, not just individual life forms and emphasizes that even people living in urban areas can be connected with deep ecological thinking even in a disturbed environment, as parts of nature can be found everywhere. The ideas of deep ecology are based on these rudiments (Naess, 1989, 1993).

Teachers have an excellent opportunity to impress children and their parents as they play a crucial role in constituting children's relationship to nature, and by influencing children, it is realistic to expect that this phenomenon will secondarily also affect children's parents. The family presents the primary social group having the most significant impact on (not only) the consumption behavior of individual members. Children are not passive recipients only. They are often the initiators of various new habits, which they transmit to their siblings, and mainly to parents. They often present opinions within the family to pass some aspects of opinions and behaviors to parents and not just parents to children (Koudelka, 1997). This effect can shape attitudes towards the natural environment and sustainable behavior in the future.

## Conclusion and recommendations for practice

Environmental and sustainability education enables people to think ahead, make informed decisions, and takes responsibility for their actions. Current graduates cannot work with information, cannot actively use foreign languages, think in context, have stunted logical thinking, are not ready for lifelong learning, and have flexibility.

It is to concur with Lindemann-Matthies & Knecht (2011) that barriers can only be overcome by involving teachers and providing background knowledge. At the national level, we project system arrangements 1-5, representing a coherent system of Earth Literacy, Deep ecology principles using Forest Pedagogy methods. We propose a five-stage model consisting of the General Educational Programs Framework for Elementary Schools - School Education Programs - Multidisciplinary Materials for Teachers - Cooperation with Forest and Environmental Centres - Faculties of Education at Universities.

A parallel way is to integrate environmental education and training for sustainable behavior directly into the school curriculum. We propose the following procedure, which includes five phases:

- 1) The amendment must be incorporated into the General Educational Programs Framework for Elementary Schools.<sup>1</sup>
- 2) Implementation into the School Educational Program (SEP is a document created by teaching staff, is approved and issued by the school headmaster, and must be publicly accessible. Teachers can profile their school and thus distinguish it from other schools, formulate their ideas about the form of education and teach creatively). The content of education can be organized into subjects or other integral parts (modules) or project teaching in the school curriculum.
- 3) Teachers must be provided with reviewed multidisciplinary learning materials, including workshops, webinars, and online courses, to help them engage pupils in environmental education. These materials should include lesson plans for all levels and topics covered and practical suggestions for each activity. Activities should be practically focused, entertaining, and aligned with national academic standards.
- 4) Intensive cooperation with forest educators, environmental and forest centers.
- 5) Systematic support and cooperation with the faculties of education at Universities, especially in the field of environmental education of

<sup>1</sup>The Educational Programs Frameworks represent the specific objectives, forms, length, compulsory content of education, organizational structure, professional profile, conditions for educating pupils with special educational needs, including health and safety conditions. Educational Programs Frameworks must correspond to the latest knowledge of scientific disciplines and psychological-didactic methods appropriate to the learner's age and capability of the learner.

future teachers – e.g. environmental education courses including cooperation on environmental education projects, seminars, workshops, and conferences realizations. The faculties of education should provide further education for pedagogical staff that focuses on the teacher's work with the pupil/student in the field of reflection and self-reflection.

The parallel platform for cooperation between the elementary faculty schools and faculties of education at Universities could be joint publishing activities, the creation of a database of examples of functional practice evaluation of educational practice. Pedagogical faculties in the future should primarily support systemic feedback from elementary schools. The good-quality combination of pedagogical faculties that train future teachers and faculty schools can be an essential way of strengthening the professionalization of the teaching career. This partnership could enrich both students and faculties of education at the Universities.

High-quality cooperation of pedagogical faculties training future teachers and elementary schools represent one of the crucial ways of strengthening the professionalization of the teaching career.

The research enters the 2nd stage, when the selected teachers with their classes will voluntarily complete at least one to two teaching activities outside each month during the school year, including a program with a forest pedagogue. Pupils complete a didactic test. The results of the experimental group with the control group will then be measured.

## Limits of the research

The time limits, which are based on the respondents and the researcher's possibilities, can be considered as limits of the research as the number of interviewed teachers and headmasters (n = 285) in Prague.

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The authors reported no potential conflict of interest.

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