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Educational and creative project "Together for the Beautiful": Mastering of Fine Arts

The challenges of a global pandemic and transition of education to distance and blended learning formats, teaching community is searching new, alternative to traditional, forms and technologies of teaching school-age students. The issue of learning in the new conditions of art, in particular fine arts, due to the specifics of this art form and the peculiarities of conducting fine arts lessons is considered.

The author notes a separate creative experience of teachers on the Internet, which is a practical component of teaching fine arts (video workshops, practical lessons on teaching various art techniques).

The author's educational and creative project "Together for the Beautiful" for primary schoolchildren and adolescence as well as methods of its implementation is presented. It covers the author's approach in mastering of fine arts by students in the online lessons. The purpose, features of the project and its organization are presented. The project contains: interpersonal communication between students and teachers with feedback; various types of artistic activity of students (perception, interpretation and evaluation of art works, mastery of artistic concepts, artistic and game activities, artistic and creative activities); individualization of education (multilevel tasks) with the prospect of mastering fine arts in depth; educational, self-educational, developmental and entertaining functions due to the possibility of multiple views of lessons recording on YouTube video hosting by students, by their parents and all together; educational and leisure task, which was provided by the developed content of lesson, with the possibility for joint knowledge of art in organized family leisure.

The ways how to implement the project is described. The first cycle combines such lessons as: "The beauty of the ordinary spot" and "The art of graphics: his majesty's silhouette". Forms and methods how to work with students, taking into account different students' ages capabilities are identified. The results of the project, conclusions on the developed idea and it implementation into practice are presented.

The author's work will be useful in order to develop the latest forms of teaching fine arts in formal and non-formal education.

Key words: educational and creative project, "Together for the Beautiful", online lessons, organization of fine arts education, schoolchildren, art of graphics, silhouette.

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STUDENT ENGAGEMENT IN ARTS-BASED SCIENCE LEARNING

Пошук шляхів сприяння залученню учнів до навчання є одним із найважливіших наукових напрямків у сучасній освіті. Залучення трактується як високий рівень зацікавленості, виражений через поведінкові, когнітивні та емоційні категорії, або як сукупність елементів зосередженості, внутрішнього інтересу, інтерактивності, мотивації та функціональності. Залученість до навчання може бути перевірена шляхом вивчення конкретного контексту та виміряна за допомогою різних інструментів. У цьому дослідженні методологія тематичних досліджень проєкту CASE цілеспрямовано застосовувалась у другому класі литовської школи протягом двох місяців, коли 24 учні вивчали основи наук через творчість. Наприкінці періоду реалізації проєкту діти створили та виконали театралізовану історію, пов'язану з науковими проблемами.

Основним методом збору даних у дослідженні був обраний photovoice, якісний метод, що застосовується для документування та відображення реальності, який допоміг почути голос дітей, побачити інтеграцію мистецтва та науки їхніми очима. Суть навчання основ наук, що базується на мистецтві, полягала в застосуванні художніх навичок, процесів та досвіду в нехудожніх дисциплінах та сферах, коли різні художні жанри використовувались для того, щоб надати дітям краще розуміння поняття чи теми, залучити їх до спільної діяльності та активізувати їх у навчанні.

Протягом усього проєкту діти зробили 79 фотографій тих моментів власної участі у проєкті, які вони вважали найбільш значущими; наприкінці проєкту вони відібрали та описали 15 фотографій, які найкраще показали, як проєкт був реалізований. Результати дослідження продемонстрували, що наука, яка базується на мистецтві, посилила мотивацію учнів до навчання, допомогла їм здобути різноманітний досвід та збільшила залученість до навчання. Залученість студентів проявлялась у всіх трьох категоріях: поведінковому, емоційному та когнітивному. Більшість випадків залученості спостерігалось у роботі в парі чи групі та під час художньої практики.

Ключові слова: *наука на основі мистецтв, залучення, метод photovoice.*

Introduction

New teaching and learning strategies are needed in order to implement learner-centered curricula and to educate individuals able to live and work in a complex and ever-changing world. Therefore, innovative teaching methods are required that encourage engagement in learning, comply with student needs and abilities, help them develop a wide range of competencies and self-confidence, and ensure learning success in and out of school. One of the ways to engage students in learning is arts-based learning.

Arts based learning as a way of arts and science integration. Arts-based learning is an educational strategy that helps teachers to engage learners in learning processes, foster understanding of multiple perspectives, and connect cognitive and affective domains of learning (Springborg & Ladkin, 2018; Zakaria et al, 2019). Arts-based learning is based on the purposeful use of artistic skills, processes, and experiences as educational tools to foster learning in various disciplines and domains (Rieger & Chernomas, 2013). Various artistic techniques (poetry, storytelling, visual arts, drama, dance, music, performance) are used to help students better understand the concept or the topic, engage in collaborative activities, and be active in learning (Brenner, 2014; Stivaktakis & Krevetzakis, 2018).

The term of arts-based learning is closely related to the concept of arts integration. The principles of integrity and systematicity have been actualised by both theorists and practitioners of contemporary education systems, with emphasis placed on learners' ability to discover links between individual disciplines, to identify common problems relevant to them, and to explain natural and social phenomena (Fogarty, 2009). Finding and integrating the interrelationships of academic subjects makes learning meaningful, helps to memorise information faster, deepens and links knowledge and skills, stimulates learning motivation, develops collaborative competences, allows better allocation of learning time, and encourages teachers to work in teams (Jacobs, 2010).

Interdisciplinary connections are developed mainly between academic subjects belonging to one or another area of science, e.g. between natural sciences (chemistry, biology, physics) and humanities (the native and foreign languages and arts). Finding links between inherently different areas, such as science and arts, is a much more complex process. Both from a theoretical and practical points of view, insight and flexibility are necessary to combine the ideas, goals, objectives, teaching materials, assessment, and teaching tools in integrated teaching of arts and science. It is necessary to know the ways and models of integration (subject-specific, parallel, multidisciplinary, interdisciplinary integration, an integrated day, or full integration) in order for integration to be enriching rather than formal and encumbering learning (Aprill, 2010; Hartle et al, 2015).

Traditionally, arts and science have been considered to be different areas of human cognition. However, quite a few studies have focused on what is in common between the two areas. First of all, it is worth noting that both arts and science explore the natural world and strive to better understand and experience it (Hadzigeorgiou, 2016). Both are human activities aimed at enriching human life. In both areas, observation capabilities are crucial. In both arts and science, mental images, analogies, and creative imagination play a key role. Finally, both scientific ideas and works of art help us change the perception of reality (Hadzigeorgiou, 2016). Scientific cognition is recognised as an important basis for the development of artistic processes, while arts are seen as an important means by which science teachers can humanise the exact and natural sciences.

The integration of arts and science became of particular interest in the development of the conception of STEAM education in the early 21st century. It was found out that the integration of technological and engineering subjects did not yield the expected results: students assessed the learning of those disciplines as difficult and uninteresting, just an insignificant increase in student performance was recorded, and STEM education only marginally stimulated interest in engineering and technological professions (Costantino, 2018; Perignat & Katz-Buonincontro, 2019). The inclusion of the arts was expected to lead to innovativeness of the education process and its results (Costantino, 2018; Hansen, 2014), stronger student learning motivation (Hunter-Doniger, 2018), acquisition of more diverse experiences (Allina, 2018), and wider applicability of STEAM programs (Knochel, 2018). Numerous research findings have been published to substantiate how arts can contribute to the improvement of educational processes and outcomes.

The role of arts in science learning. When considering the role of arts in science learning, researchers discuss the importance and extent of arts in creating a supportive learning environment (Glass & Colleen, 2016; Maeda, 2013), and what abilities and personality traits are developed during artistic practices (Perignat & Katz-Buonincontro, 2019). Researchers note the dual purpose of arts in integrating the disciplines of art education: instrumental and in-depth. The instrumental purpose of arts is related to strengthening students' emotional engagement in (self-)education processes (Costantino, 2018) and improving their academic performance (Payton et al., 2017) as well as developing their collaborative skills (Knochel, 2018) and creative and critical thinking (Peppler & Wohlwend, 2018). According to Costantino (2018), art enables a new glance at the environment around us and helps science to become inclusive through activities that require collaboration and teamwork. Arts have a special place in presenting the results of research and academic achievements. Not only do arts help visualise, but also present the outcomes of scientific activity in an attractive, artistic way. Rolling (2016) argues that beautiful forms, structures, and exclusive (artistic) solutions contribute to understanding scientific ideas and outcomes of scientific activity and create the conditions to enjoy them, reflect on them, and discover encoded symbolic meanings.

An in-depth purpose of arts is identified through highlighting the opportunities for student to experience a sense of wonder and discovery through artistic activities, to experiment with ideas, materials, and objects (Glass & Colleen, 2016), to raise and solve relevant problems of human and social existence (Hunter-Doniger, 2018), and to discover new meanings of learning (Welch, 2011). In this case, the following meanings of artistic practices are cited to substantiate the value of arts integration: greater emotional engagement in activities (Perignat, Katz-Buonincontro, 2019), «humanisation» of technical creation, learning to raise and solve current problems of human and social existence; a way to find the meanings of learning, to have a new and fresh glance at objects and phenomena (Welch, 2011), the opportunity to apply knowledge in different and individual ways, to express views on past, present, and future societal problems (Hunter-Doniger, 2018), to experience a sense of wonder and discovery, and to experiment with ideas, materials, and objects (Glass, Colleen, 2016). According to Payton, White, and Mullins (2017), an artist will view a problem completely differently than an engineer. First of all, he will choose a human-oriented approach, and he will see not only a technological but also a social meaning in scientific activity. Representatives of this approach to the integration of arts argue that education must be organised in such a way as to make lessons culturally important and call such a concept of education culturally responsible (Hunter-Doniger, 2018). An in-depth understanding of the purpose of arts can complement the ways of scientific cognition by promoting an understanding of the goals of education and learning to raise and address issues of human existence: What does our work mean? What will it mean for others? What ideas do we want to convey to others? How will our work help people learn about the world and themselves? Such questions reveal a culturally meaningful conception of science and technology that is much broader than the traditional one.

In this abundance of opinions and arguments, it can be seen that arts are understood as a factor in creating a learning-friendly environment (Hunter-Doniger, 2018), a way of developing creative and critical thinking (Peppler & Wohlwend, 2018), and a prerequisite for developing communication and collaboration skills (Maeda, 2013). Almost all of the above publications emphasise the strengthening of student learning motivation and engagement in education processes through arts-based science learning. Research indicates a strong correlation between artistic practices and students' academic performance and engagement in learning (Nissley, 2010).

Student engagement in learning. The issue of student engagement in learning is one of the most important goals of teaching in general and teaching science in particular (Hadzigeorgiou, 2016; Hadzigeorgiou & Schulz, 2014). The scientific discourse of engagement perception is ambiguous. In educology, engagement is perceived as an ongoing process that can be observed at different levels and described from different viewpoints. Engagement can be perceived as a high level of interest expressed through behavioural, cognitive, and emotional categories (Fredricks, Blumenfeld, & Paris, 2004). Engagement can also be described as a set of elements of focus, inner interest, interactivity, perceived control and choice, motivation, and functionality (O'Brien & Toms, 2008). Harris (2008), who summarised the literature on engagement, argues that engagement is characterised by a) general participation in class activities and adherence to school rules, b) interest in school processes and satisfaction with participation in them; c) motivated and self-confident participation in school activities, d) thinking, e) meaningful learning to achieve one's goals, and f) acceptance and appreciation of learning.

Although engagement in an educational sense is usually understood as the amount of time and effort that students devote to learning and other educational activities, researchers present different engagement schemes. Thus, e.g., Fredricks, Blumenfeld, and Paris (2004) distinguish between behavioural, emotional, and cognitive dimensions of engagement. Behavioural engagement occurs when student engages in academic, social, and extracurricular activities. Emotional engagement is observed when student feels positive emotions with regard to school, teachers, peers, and learning. Cognitive engagement occurs when student makes a personal effort to focus on learning on a strategic and self-regulatory basis. Gresalfi & Barab (2011) distinguish the following categories of engagement: procedural, conceptual, consequential, and critical. Procedural engagement occurs in activities that require care and attention; conceptual engagement is associated with in-depth studies of the structure of concepts or objects; consequential engagement is described as careful search for a solution and its implementation; and critical engagement manifests itself in the analysis and evaluation of objects, phenomena, procedures, and the results of the activity.

Due to such a concept of multidimentional engagement, it is impossible to provide universal and all-encompassing recommendations on how to strengthen student engagement in learning. The nature of the engagement may vary depending on the specifics of the activity or task, its place in the curriculum, and the variables of an individual student or their group. Some educational strategies may be effective in promoting behavioural engagement, while others in strengthening emotional or academic engagement. In order to strengthen student engagement in learning, it is equally important to recognise the nature of engagement and to understand which aspects of engagement dominate or should be encouraged. The aim of the current study was to find out how students engage in arts-based science learning.

Methodology

To find out how students get engaged in arts-based learning, a methodological approach of qualitative research was used. Photovoice was chosen as the main method of data collection, by means of which individuals «can identify, represent, and enhance their community through a

specific photographic technique» (Wang & Burris, 1997, p. 369). Students were asked to take photos of the learning process. The selected arts-based science learning moments were discussed in small groups of the study participants, thus revealing students' experiences of engagement in learning from their own perspective.

Photovoice is a participatory action research method that provides an opportunity to express an opinion to those whose voice is usually left unheard (Wang & Burris, 1994). Images are very important in the world of children and young people because it can be difficult for them to verbalise, to name their feelings and experiences. Photovoice provides children and young people with an opportunity to express themselves in ways that are not dependent on words alone (Ford & Campbell, 2018). Images used to analyse young children's learning are typically taken from the photographer's outsider (etic) viewpoint. Photovoice, meanwhile, seeks to capture the insider's (emic) perspective (Wang & Burris, 1994, 1997). The study was based on a belief that students themselves are best placed to reveal the nature of engagement in learning and to provide new insights and perspectives on externally invisible aspects of engagement and art-based science learning. The research was conducted in October-November 2020 in one Lithuanian school, which is a partner of the CASE project *(CASE is a project implemented in five European countries in the framework of ERASMUS+ programme. It is an intervention in science education at a time of growing recognition of the cultural and pedagogical value of integrating arts into science learning. The goals of the project include: strengthening the profile of teaching professions and widening teachers' abilities, skills, and competencies; encouraging scientific creativity in young people; and developing sustainable communities of creative scientific education practice. For more information about the project and its methodology, see at www.project-case.eu.)*.

Research participants. The project participants were 24 second form students (age 8). They implemented a class project organised in compliance with the CASE methodology for two months, allocating 4 academic hours each week. At the beginning of the project, six volunteer students (3 boys and 3 girls) took on the roles of photographers and captured the learning moments that they considered most important during the project activities. At the end of the study, those students described the photos they had taken and, based on them, explained what had happened during the project. The method of group discussion was used to discuss the photos.

Application of arts-based learning principles in the project implementation. Given the principles of arts-based learning and the CASE project methodology, the students implemented the project *Where Frogs Winter*. From the six inquiry-based science learning methods *(Educational resources of the project: http://www.project-case.eu/educational-resources/)* offered by the CASE, the case of Learning Science Through Theatre *(Learning Science Through Theatre: http://www.project-case.eu/learning-science-through-theater/)* was chosen, in which learners were involved in the study of a scientific topic through creating a performance on its basis. The principles of arts-based learning were followed in all seven stages of inquiry-based science learning:

1. Question. In an attempt to formulate a scientific question, which was afterwards to be answered by the students, they wrote the question in different colours and fonts and illustrated with drawings.

2. Evidence. When trying to find out how the data / facts related to the raised question were to be collected, the students searched not only for scientific information but also for works of art (paintings, fairy tales, films, and songs).

3. Analyse. In the analysis of the collected data, students evaluated not only their scientific validity but also their artistic value; moreover, they were looking for ideas for a performance.

4. Explain. The students developed a scenario for a performance based on scientific facts; they described and individualised the characters.

5. Connect. During the preparation of the theatrical performance, the students created dialogues of the characters, planned the artistic design of the performance, and selected the music for it.

6. Communicate. The students communicated with peers of other forms and teachers and told them about the science-based performance as well as prepared its poster.

7. Reflect. The students discussed the activities and the outcomes of the project and self-assessed not only scientific activities, but also the artistic aspects of the performance and the process of its creation.

Before the project, the primary school teacher working with the students was introduced to the essential arts-based and inquiry-based science learning principles and the CASE methodology. Each step of the project was in detail discussed with the teacher, and the potential difficulties and ways to overcome them were assessed. The teacher consulted with music, art, and theatre teachers working at school on the inclusion of arts in the project activities.

Data collection. The main way of data collection was taking photos by six students. The project initiators assumed that young children were able to take photos, and photography itself was a fun activity for the study participants. When children talk and also use drawings / photos in the process, they feel more comfortable and more confident than relying on words alone (Ford, Campbell, 2018). Before the project, the students were given a camera and trained in photography. A discussion followed of what could be captured in the photos, and students were asked to take photos of what they found interesting and memorable during the project. Any student could decide when and what to photograph. The camera was placed in a visible place in the classroom throughout the project, and each student could pick it up and take pictures at any time. They agreed with each other which one was to take photos of what.

By the end of the study, 79 photos had been taken. Together with the students, 15 photos were selected for analysis. The students decided by themselves which photos best reflected what had been happening in the classroom during

the project. The six photographers took part in a group discussion in which they told why they had taken photos of one moment or another, and what was going on in the photos.

During the study, the researcher sought to be «mindful and reflexive and consider ethics as a dynamic process that goes through all aspects of planning and carrying out a participatory study» (Water, 2018, p. 54). Ethical principles, i.e. truthfulness and confidentiality, autonomy and informed consent, beneficence, and justice, were responsibly observed in conducting the research, the analysis of the data, and their presentation. The students were informed about the study and agreed to participate in it; their parents' consents were obtained to conduct the study and use the photos to present the outcomes of the study. Following ethical requirements, neither the location of the study nor the characteristics that can identify the students are provided. In the presentation of the study outcomes, the names of the children were changed.

Data analysis. Qualitative content analysis was used to process the research data, which helped to cover the obtained information (photos and transcripts of group discussions), to divide the data into groups and categories, and to draw conclusions based on it. A sequence of a three-step data analysis was applied (Nyumba et al., 2018). In the first stage, the transcripts of the students' group discussion were read and the comments were written down; the second stage ended with the primary encoding of the data, which included the generation of categories without limiting their number. In the final (focused encoding) stage, the coding categories, identified in the second stage, were compared with the engagement categories identified in scientific literature. The behavioural, emotional, and cognitive dimensions of engagement, identified by Fredricks, Blumenfeld, and Paris (2004), were chosen to summarize the results of the study.

Results

Interesting and valuable information about the students' engagement in arts-based learning was provided by both the photos taken by the students and the accompanying stories. Therefore, the results of the study are presented by separately analysing the photos selected by the students and their stories.

Photos as artefacts attesting to student engagement. 15 photos were selected for the analysis by student co-decision, including two to four photos of each student responsible for taking them. We first sought to discuss what the students had photographed. The distribution of photos according to the ratio of captured people and objects and inquiry-based learning stages and artistic activities is presented in Table 1.

The first section of the table shows what was captured in the photos. Two-thirds (10) of the photos presented the moments of students' learning in pairs or in a group (group discussion, search for information on the Internet, presentation of works). Only two photos captured one student, three photos included no children at all, i.e. student works and learning aids were photographed. It was observed that the students themselves paid attention to different aspects of learning. Thus, e.g., it was important for Anna to capture the works of the students. Ana commented on one of her photos: «Ina created a very interesting story, beautifully wrote it down, and drew a puffed-up frog». Titus, meanwhile, photographed exclusively his own work and that of the group of his friends. His

Table 1. The content of student-taken photos selected for the analysis (N-15)

Picture No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
Objects and people captured in the photo s																
Objects					+			+		+						3
One student				+			+									2
A group of students	+	+	+			+			+		+	+	+	+	+	10
Artistic activities																
Drama					+	+		+		+	+	+	+	+		8
Literature		+					+				+					3
Art	+	+	+	+	+	+			+	+				+	+	10
Music												+	+			2
Stages of inquiry-based learning																
Question	+	+														2
Evidence			+	+	+											3
Analyse						+	+	+	+	+						5
Explain											+	+	+	+		4
Connect															+	1
Communicate																0
Reflect																0
Author of the pictures	Ina	Lena	Jonas	Ina	Ana	Titas	Lary	Ana	Lary	Ana	Lary	Ina	Jonas	Lena	Titas	

photos and story revealed the specificity of group work: «At first we argued, but then we agreed on what our performance would be about».

Student engagement in artistic practices could be seen in all the photos or was discussed by speaking about them. Although the final outcome was to be a performance on the topic, two-thirds (10) of the photos captured artistic activities or their outcomes: drawings, search for paintings or photographs, applications, or artistic construction. More than half of the photos depicted drama activities: writing a scenario, discussion of characters, and theatrical presentation. Literary work (3 photos) was associated with storytelling and scenario, and music (2 photos), with the selection of musical background for the performance. When discussing photographs, children often named several interrelated artistic activities. An example would be Anna's story, in which she named drawing and creating the character of the play: «Ina <...> drew a puffed-up frog. An arrogant, mulish frog was our main character.»

In the analysis of the stages of inquiry-based learning that students had recorded, it was found out that the selected photos characterised the first five stages. We also noted that, in the process of project implementation, the children both participated in scientific research and also associated it with art, drama, literature, and music. Only the last two stages *(communicate, reflect)* were not recorded. According to the students, at that stage, they all wanted to take part in the performance, and therefore nobody was willing to take photos.

Characteristics of student engagement in arts-based science learning. An analysis of photos and discussions with students demonstrated how diverse student engagement in arts-based science learning was. All the dimensions of engagement identified by Fredricks, Blumenfeld, and Paris (2004) were found: behavioural, emotional, and cognitive.

Behavioural engagement occurred when the students:

• collected the information needed for the project activities: *«I couldn't tell if it was more fun to look for information or prepare for a presentation. I liked everything, it wasn't boring. We worked a lot»* (Lary);

• created a scenario for the performance and the characters: *«Here we argued about who [which character] was to be the most important. We all had our opinions. We discussed for a long time»* (Ana); *«We came up with an interesting idea»* (Ina);

• prepared for the performance and rehearsed its individual episodes: *«Kids were wondering how to put shapes together and how to make them colourful»* (Jonas); *«We rehearsed for two lessons until we succeeded»* (Ina).

Emotional engagement occurred when the students:

• worked in pairs or groups: *«It was a lot of fun working together»* (Jonas), *«We laughed a lot»* (Lena), *«I really enjoyed creating shapes»* (Lary), *«Our group was fun»* (Ina);

• received praise from the teacher and positive fedback from peers: *«I was happy when the teacher praised me»* (Lena), *«Children applauded when we told them about our performance»* (Titas);

• created the characters of the performance and their dialogues: *«What kind of characters were they? The frog was conceited, the fish wise, and the mosquito cheerful. It is fun when everyone is different»* (Lary).

Cognitive involvement occurred in the following stages of project implementation:

• When deciding on the topic of the project by means of formulating a scientific question: *«Here we are thinking of the question. We first wrote ten questions on the sheet, and then we spent a long, long time on selecting the best»* (Ana);

• When searching for information relevant to the project and selecting the most important one: *«We spent almost the entire lesson at the computer looking for information»* (Titas).

Table 2. The character of engagement in art-based learning:

Excerpt from a group discussion (Titas' perspective)	Category of engagement in learning
We spent almost the entire lesson at the computer looking for information. There were a lot of things there. I looked for information. Lukas was working hard with pictures. Both of us worked very hard. I found more information. Lukas' pictures were very interesting. I was happy about his success. I praised Lukas.	Cognitive engagement Behavioural engagement Emotional engagement

The dimensions of engagement in learning identified by researchers were recorded in the speech of all students. Often, two or even three categories of student engagement could be seen in describing a single photograph.

In many cases, engagement is associated with pair or group work or artistic practices. The use of arts in learning helped students to better understand and reveal themselves as well as to see the perspective of others. Friends-oriented or socially constructed learning situations allowed students to communicate with others and to experience the sense of community.

When talking about the project implementation process, the students also described the process of taking photos. They enjoyed the assumed role of photographers of the learning process, i.e. they were happy to observe learning from the outside, to think about who and from what angle could be photographed, and to work with a camera, an instrument that had not been used at school before. Because the students did not have the opportunity to view the photos before the group discussion, they were surprised to see how many photos had been taken and what diverse moments had been recorded by different students. Photovoice was an attractive way for students to tell about their learning.

Conclusions

Implementation of innovations in education is inevitable, as the forms and content of education must adjust to the spirit of the times and help to ensure the comprehensive engagement of learners. The essence of arts-based learning is the application of artistic skills, processes, and experiences in non-artistic disciplines and areas, when different artistic genres are used in order to provide students with a better understanding of a concept or topic, to engage them in collaborative activities, and to make them active in learning. It has been found out that arts-based science learning strengthens students' learning motivation, helps them to gain various experiences, and increases learners' engagement in learning. In the implementation of an arts-based science learning project, we recorded behavioural, emotional, and cognitive engagement. Most cases of engagement were seen in pair or group work and during artistic practices.

Photovoice is an effective research method to reveal the perspective of the research participants on the topic of interest to the researcher, to enable students to be important participants in the research, and to make the learning process visible through photos. The participant pupils who were taking photos experienced the sense of engagement to the same degree as their peers implementing the project activities. They liked the assumed role of those who captured learning moments, presented their photos, and created a narrative based on them. Treating students as research partners and giving priority to their own collected data and interpretation means realisation of the principles of democratic, student-centered education when conducting research with young children.

In summary, the problem of integration of arts and science is under-explored, and especially in showing the practical moments of integration. Looking to the future, more projects or lessons integrating science and art should be described and analyzed. The use of other methodologies (activity research, participatory observation, narrative, etc.) could help to look at the processes of artistic education from the perspective of the teacher and parents. The photovoice used in this study helped to hear the voice of the students, to see the integration of arts and science through their eyes. The advantages of this method can be used in other educational research, also while exploring arts and science integration.

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Student Engagement in Arts-Based Science Learning

Search for ways to promote student engagement in learning is one of the most important research focuses in contemporary education. Engagement can be defined as a high level of interest expressed through behavioural, cognitive, and emotional categories or as a set of elements of focus, inner interest, interactivity, motivation, and functionality. Pupil engagement in learning can be examined by exploring specific contexts and be measured by different instruments. In the present study, the case studies methodology of the CASE project was purposefully applied in the 2nd form of a Lithuanian school for two months, when 24 students learned science in a creative way. At the end of the project implementation period, students created and performed a theatralised story related to scientific issues. The photo voice was chosen as the main method of data collection. Throughout the project, students took 79 photos of what they considered to be the most significant moments of their own participation in the project; at the end of the project, they selected and described 15 photos that best revealed how the project was implemented. The results of the research showed that arts-based science learning strengthened students' learning motivation, helped them gain various experiences, and increased engagement in learning. Student engagement manifested itself in all three categories: behavioural, emotional, and cognitive. Most cases of engagement were observed in pair or group work and during artistic practices.

Keywords: arts-based science learning, engagement, photo voice.

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