

MATHEMATICS AND NATURAL SCIENCES TEACHING MODELS IN PRIMARY SCHOOL USING OUTDOOR EDUCATION

Tabitha Bernadet PASINSZKY,
Preschool teacher, Mamaruta Kindergarden, Arad
torkostabitha@yahoo.com

Editha Margareta COȘARBĂ, Ph.D. Cdt.,
University Assistant, PhD candidate, University of Aurel Vlaicu from
Arad
ecosarba@yahoo.com

Henrietta TORCOS, Ph.D.,
University Lecturer PhD, University of Aurel Vlaicu from Arad
torkos_henriette@yahoo.com

Abstract: *Natural Sciences and Mathematics are a set of disciplines concerned with discovering, researching, and comprehending the laws that govern the natural world. People who are passionate about exact sciences have created the majority of the big discoveries that have revolutionized our planet. The goal of learning natural science is to increase scientific knowledge and understanding, improve science process skills, and get a better grasp of science's role in society. The goal of scientific education is to promote and empower pupils to develop curious minds and a fascination with science and the natural world. In scientific and other contexts, acquire knowledge, conceptual understanding, and skills to solve problems and make informed decisions. The present article, presents teaching models for the above-mentioned school subjects, by transposing it to the outdoor environment. The national curriculum for primary school was analyzed before creating the teaching patterns and activities.*

Key words: *math; science; environment; primary school; outdoor education.*

Introduction

The world is changing and developing. Passed down from generation to generation, the demands of society are growing. Therefore, the modern education system is under pressure to meet these requirements, training competent young people who can easily adapt to the environment they belong to. The new era needs new people, who need to be trained in an open education system, which is always one step ahead of the changes that may occur along the way. Education in the 21st century is one that can respond to the economic, technological and societal changes that are taking place at an ever-increasing pace. (Chiş, 2002) It is an education that prepares children to succeed in a world where everything is based on the acquisition of new skills, abilities and attitudes. The role of educators in the modern century is to help each student learn how to learn, encourage collaboration, think critically and communicate effectively. These are skills that students need to develop during schooling to adapt to the dynamic workplace of today and tomorrow. (Roman & Balaş, 2010)

Theoretical foundation

Different sorts and specific styles of education can be carried out in various educational environments. Formal education, non-formal education, and informal education are the three most common types of education studied. These sophisticated educational methods might be regarded as lifetime learning. Even though these three types of education have various fields of activity and functions throughout the educational process, they can all play a role through mutual reliance.

Outdoor education, teaching and learning in nature, kindergarten, and forestry school are terms that have lately surfaced in our country's educational environment. Because the notion is so broad, it necessitates a definite conceptual and semantic boundary. The terms "outdoor education," "outside education," and "outdoor learning" are commonly used in the Romanian educational system to characterize the notion. They can generate terminology confusion, just like borrowed words (mostly new words). Many names have been used in the literature to characterize outdoor learning spaces: outdoor, park, outdoor classroom, outdoor area, playground, and campus.

Outdoor education can take place during school hours or after school, while respecting the school curriculum. Its activities can be used as a supplement to class time or can be carried out independently of class time, as long as the content of the school curriculum is relevant and respected for each age group. It is worth mentioning that outdoor sports or recreational activities cannot be included in the field of outdoor education, as they are not

organized for educational purposes and therefore do not seek to achieve goals that lead to learning outcomes. (Egerău et al, 2020)

Recent perspectives

Teachers are constantly concerned with the criteria for choosing the methods to use in the instructional-educational process. Education is constantly evolving and changing, and teachers need to keep up with social and educational updates. Trends are imposed both by students, through their needs and interests, and by society, through the requirements they launch daily. These directions are also established by the management of the educational systems, be they local, national or international, through the policies they operate with and the novelties they introduce in the curricula. These translate into concrete learning activities that are offered to learners directly, through the contents and practices with which they operate. Educators and teachers are the bridge between educators and society, and they must facilitate and streamline the educational process by knowing the class of students, traditional and modern working methods, adapting them to the needs of the group and constantly updating knowledge and their own training policies and styles. (Roman, 2014)

In order to be able to make the most of the knowledge about the curriculum and its components, it is proposed to analyze the school curriculum at the level of the fundamental acquisitions cycle. This is necessary because there must be a clear picture of expectations, so that later the outdoor activities can be integrated, closely respecting the curricular principles. (Herlo, 2016)

The preparatory class is a period designed to accommodate school life, a time that allows students a good adaptation to the program, community and specific requirements of this diverse environment, in order to develop socio-emotional, intellectual and physical. From a socio-emotional point of view, the preparatory class supports the child to receive confidence in their own strengths, to increase their self-esteem, initiative and desire for success. The preparatory class is part of the general compulsory education having the role of preparing the student for the specific learning first of all in the first grade, but also in the following years of school. The accommodation with the school environment is done in a friendly way, the main learning method being the game, as a predominant activity for the age of six.

The curricular areas around which the contents are developed are: language and communication, mathematics and natural sciences, man and society, physical education, sports and health, arts, technologies and counseling and guidance. These are designated on the basis of epistemological and psychopedagogical principles and criteria. In each of the curricular areas presented, the contents will be made with resources as varied as possible and in different types of activities, as attractive as possible for children. For

example, the activity can be organized in simultaneous workshops, so that there is variety, that those with a higher degree of difficulty can be better followed and supervised. Outdoor education finds its place in the organization of activities in the preparatory class, the school curriculum encouraging educational practices beneficial to learners, individually, but also as a group. (Cerghit, 2006)

Analyzing the competencies described at this level, it can be seen that cooperation, socialization, going out and participating in activities in as many and varied contexts as possible is desirable at this level. In the document presented by the specialists from the Ministry of National Education, it appears that in each of the areas, the emphasis is on the use of natural materials, the most familiar and open environments, self-discovery and belonging to various social groups, discovery of national identity and belonging to the city or village environment, manifestation of curiosity for phenomena, relationships, regularities in the immediate environment, manifestation of concern for a clean and friendly environment, etc. Problem solving, critical thinking, making observations or comparisons, are required to be carried out in an environment as natural and friendly as possible, which offers countless natural resources. Discovering sensations or emotions can be done in the natural setting close to the group room. Sensing the beauty of everyday life, participating in various racing games, identifying simple ways to maintain good health in the family environment, are skills that need to be developed at this age, using activities in outdoor education, and adapting the contents presented to the natural environment, so that the familiarization of the students with this educational level is easier and more efficient. (Bocoş, 2002)

The elements presented above indicate the openness and motivation to use outdoor education with all its components, in order to form key competences and transversal competences at the level of the preparatory class. The basic idea of interdisciplinarity is that, on the one hand, the conceptual and methodological apparatus of several disciplines are used in interconnection, to examine a topic or a problem but, above all, to develop integrated, transversal, key competencies. and interdisciplinary.

The second level of the fundamental acquisition cycle is class I. At this level, students take part in school programs that capitalize on the learning experience gained up to the age of seven, including that of the preparatory class. For children who have not graduated from the preparatory class, there is no obstacle in the accumulation of knowledge, and then the development of skills. This is due to the fact that the evaluation is carried out concentrically and the contents are always repeated. It was stated above that the first level of the cycle of fundamental acquisitions is intended for accommodation and socialization, in the first grade, it can be seen according

to the curricular analysis that it is the year of effective integration in the educational environment. As a novelty, the introduction of qualifiers as scoring conventions is observed.

The contents are introduced gradually, as in the preparatory class, using counting and intuitive support, in contexts of exploring the environment close and known to the student. The didactic game predominates, ensuring the active participation of the students. It encourages exploring the immediate environment, asking questions, verbal interventions, expressing one's own ideas and feelings about what one learns and proposing solutions to solve problems. It is preferable, whenever possible, to organize didactic sequences of observation, experimentation, measurement, data collection on various plants and animals, in the natural environment. Such a holistic learning, close to the child's knowledge universe, has the advantage of being more interesting, in order to ensure a deeper understanding of the concepts. (Roman & Coşarbă, 2020)

The current school programs promote experiential learning, through the direct involvement of the student in the studied reality. The emphasis is on capitalizing in real contexts on the knowledge, skills and values acquired, by increasing the share of practical-applicative activities within each school subject. Competence training depends to a large extent on how the teacher designs and organizes learning and the degree to which it emphasizes the applicative dimension of knowledge.

By analyzing the skills required of a student who has completed primary school, we can see the need for a dynamic, natural, open education, an education that is in constant contact with society and its members, but especially an education constantly concerned with the environment, natural areas, harmonious physical and cognitive development in the natural environment. We also notice the encouragement of self-discovery and relationships that are based on communication, sharing, discovery, experience, learning being holistic and especially interdisciplinary. The purpose of this level of education is to provide the conceptual, mental and behavioral bases that allow the child to adapt effectively to the next stage of schooling, but especially the social integration of each individual as quickly as possible. Competences can be acquired more easily and quickly if each teacher prepares the necessary space and resources for modern learning, starting from the needs and interests of each child. This can be achieved especially through the use of outdoor education activities.

Curriculum analysis at primary school level in terms of math and natural sciences

Curriculum, in the educational sense, represents the values that a certain society or group believes in. The educational ideal, which underlies the

curriculum, indicates an orientation towards a set of values. This ideal is the expression of the personality project that the society wants for its members, becoming a fundamental attribution of the educational institutions. Currently, the concept of curriculum, the one used in the sciences of education, has various meanings. As a program of school activities, it includes all components of the educational process, namely curriculum, school curricula, curricular products, learning and assessment strategies, etc. The curriculum should respond to the educational ideal by aligning with the socio-economic reality of a given moment. In a world whose main characteristic is change, the curriculum can conflict with the requirements of society. In earlier times, progress was much slower, and cultural values seemed to last forever. Today the future is easy to approximate, so the curriculum must anticipate the future for which it prepares members of society.

Recent studies in the field of primary education have drawn the attention of specialists to the improvement of teaching methods and strategies, as well as the activities carried out in the classroom. Recently, we want to renew pedagogical methods, so that learning becomes one aimed at developing new skills. Thus, teachers must organize their educational approach taking into account: curricular provisions, organizational strategies and teaching methodology.

There are certain methods that are used in primary education in order to achieve a teaching-learning activity as efficient as possible. The method is a set of operations that is constituted as an instrument of human action, in general, through which the knowledgeable subject approaches the revelation of the essence of the objective world. The didactic methodology means the set of methods and procedures used in the training process based on a unitary conception regarding the teaching-learning-evaluation process, the principles and the laws according to which it is guided. Modern education no longer distinguishes between the importance of some methods and the placement of others in inferior positions. Education is currently pursuing how these methods are used to achieve the goals.

Mathematics and natural sciences teaching models

Every student needs to develop a deep understanding of mathematical concepts and numerical skills, so they must engage in value contexts in which these abstract concepts can be applied to real life situations. In order for this approach to take place, it is recommended to use outdoor education in this curricular area as well. Numbers serve to make people's lives easier, and this must be understood even from an early age. Mathematics or science should not be difficult, nor should it scare students. Children can benefit from learning mathematics using outdoor strategies through the access that nature or the outdoor environment offers to various resources. Practical work

as well as teamwork help students to develop communication situations through which they independently develop their mathematical language.

There are many activities in this regard, which can be used at any age. Especially at the level of the fundamental acquisition cycle, when students are eager to learn and curious to experiment, the mathematical and scientific activities carried out outside the classroom are more than beneficial, streamlining learning and the pace of accumulation of educational experiences leading to learning. Distances, measurements, comparisons with different objects collected from nature, calculations or the use of mathematical or physical formulas are much easier in nature, when students have the opportunity to experiment in a practical, direct, and not abstract. For some students this is a real help, because abstract concepts are harder to understand. At the preschool level, as they are used to learning through the use of different tools, it is more difficult for them to adapt to school age, where the use of these educational resources is increasingly rare. (Roman & Balaş, 2014)

Teaching math outdoors

1. A useful exercise in calculations is that in which the students sit in a single row, one behind the other, and at the organizer's whistle, they run one by one, over a distance of 400 meters. At the end of the race, each student will hear a simple operation with two terms, addition or subtraction, and will choose the result from a lot of posters that will be placed in front of him on the ground. The strong points of this exercise are: spending time in nature, physical exercise, a minimum of competitiveness, enough time to think about the exercise, fun, learning through play, etc. If such an exercise were done in the classroom, there would not be enough time for each child to go to the blackboard, on top of that there would be embarrassment and fear that he has to answer correctly or he will be laughed at in front of colleagues. During this exercise, each child has the opportunity to come forward, even several times in 15 minutes allocated to the exercise, and teachers have the opportunity to add other exercises at that time and capitalize on other content.

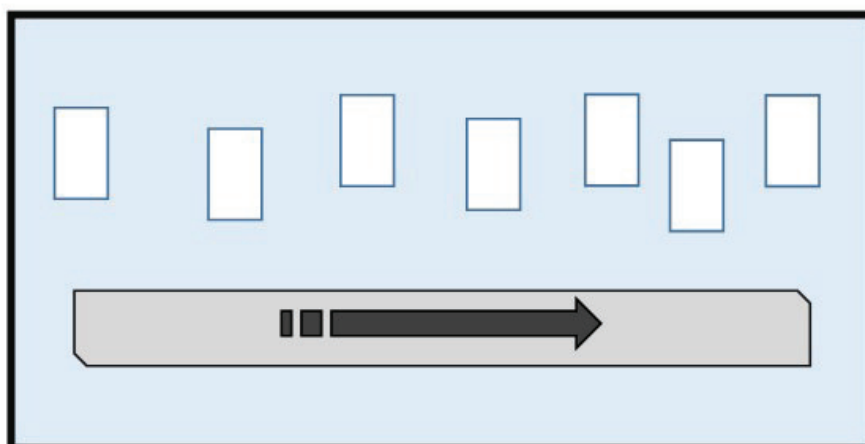


Image nb. 1. Exercise model

2. Another exercise designed to ensure the practice of mathematics is that in which each student stands with his feet apart in front of a tree and moves his gaze from the top of the tree to the base. When the student can clearly see the top of the tree, he will ask a colleague to measure the distance between the child and the tree. Then, to this distance is added the number that represents the length of the first student's leg. The end result is actually the height of the tree.
3. Choose a place on the school grounds and mark it with chalk. Students spread all over the field and choose different ways to get to the marked place. Beforehand, they estimate how many of the chosen moves will be needed to reach the marked place. The estimate is tested by putting the movements into practice. The exercise can be repeated by choosing other movements during the time allotted to the activity.
4. Introductory exercises in mathematical activities, with short duration, can be the choice of stones of different sizes and the choice of a partner. It will be calculated who has more and who has fewer elements. With a chalk, draw the representative signs ($<$, $>$ or $=$) to measure the quantities or sizes of the objects found. The activity can continue with changing partners and performing other measurements using the same representative signs.

Usually, the mathematical exercises performed in the outdoor environment start from the students' curiosities and questions: How tall is the biggest building belonging to the school? How can we measure it? Each student can come up with answers and ideas, and even choose the most appropriate ones and test them. All the exercises are discussed in the classroom, and even some of them are noted on the notebooks and the educational process is continued, the two spaces complementing each other.

Teaching natural sciences outdoors

Within the natural sciences, a discipline belonging to the same curricular area, as many outdoor activities can be performed. It has been proven that all disciplines that are based on science are studied much more easily in practice, outside the classroom, where each student can experiment at his own pace. Natural sciences connect biology with physics and chemistry, and studied in the natural environment and leaving the usual classroom, students have unique learning experiences. In addition to these aspects, the natural sciences studied in the external environment, encourage children's correct thinking about the correct use of resources and about the human impact on the environment. Moreover, students have the opportunity to interact with the natural environment and its elements, learning freely about plants and animals, climate, cardinal points, etc. The effects of these outdoor activities do not take long to appear, because the respect for the environment and for all those around it increases in this way. Observation, experience, scoring and drawing conclusions are the steps that usually take place during science classes at the level of the fundamental acquisition cycle. Many principles can be observed, understood and applied even on a simple outing in nature or even on a simple walk around the school or on green spaces.

1. Suggested activities in this regard include experiences started right in class, when students can germinate some wheat seeds in a jar and can wait for the plant to grow in a jar, this exercise being beneficial in the sense that it is desired to explain the components of a plant. The exercise can continue with planting small trees, plants or flowers around the school or in the school garden. The activity can continue in the classroom, where students can come up with ideas about how to best care for these plants, how they grow or how people can intervene in their growth process.
2. More complex activities can be done by sending students to the school yard and encouraging them to find and photograph different plants or insects, to discuss identified differences, to motivate their choice, to make an exhibition with all the photos and specially to write down the multitude of questions. which can be born related to everything they observe, hear or feel in the external environment. Together with a partner, or in a small group, you can discuss questions and select those that are connected to the area, discipline, or topic of science. This exercise can continue if the organizer asks students to choose those questions that can be researched, and together or in small groups to try to find answers.
3. Students can make short outings in the four seasons and observe the changes that take place in nature. Orientation, or orientation with map and compass is a very good example of this. In order to have a clearer picture of the orientation activities, we want to present the steps

necessary for such an activity. Each orientation lesson begins with a plan. As leaders of the orientation activity, we need to know exactly the number of students we will work with. We also need to choose an area, taking into account some of the following aspects: size, placement, age of children involved in the orientation activity and the difficulty of the terrain. The next step is the map. If there is no map of the desired area and the leader cannot borrow or print it, he must create it himself. There are several applications that can be useful in this case, but if there is no other possibility, the leader can adapt an existing map to the needs of the group. The leader can also present different maps to the students, so that they can get a more obvious picture of the types of maps they can work with. Explanatory discussions should be made about the elements that can be found on a map, for example the colors of the relief forms, how they are represented, what each means, the measures on the map versus their meaning in reality, where the dangerous areas are, where there are areas slippery or damp, what areas should be avoided, etc. All maps should include the following: ladder, north arrow, legend and title. For starters, you can make maps of the classroom, of the school, of smaller areas, and you can study with the class before the longer outings.

4. Orienteering. There are certain steps that should be taken into account when planning guidance activities, with regard to safety and risk. Students should have a general knowledge of the plants and wildlife they may encounter along the way. They should know what they can touch, what they can pick and what they can eat. They should be aware of poisonous plants and animals and all the dangers involved. They should have first aid equipment on them and should know how to use it in case of accidents. Clothing is another important aspect of this type of activity. Each student should be responsible for dressing appropriately and bringing their own watch. The participant in well-equipped orientation activities must have a whistle, a long-sleeved shirt, a wristwatch; wrist compass, durable and comfortable boots or sneakers, tear-resistant old trousers. They should also have a back-up plan in the event of sudden changes in the weather, and the group must remain together at all times and act responsibly at all times during the activity.

Perhaps the most important aspect is the experience during these activities, because observation and living are the main aspects of orientation activities. You can analyze plants, animals, geographical areas, spaces and land. All these experiences are rich in learning situations, which can only take place in the external environment. (Torkos, 2020)

Integrated activity example for first grade

Activity title: "Indication of time - sundial"
First grade
Competence selection criteria: level of knowledge, level of skills, level of attitude
Areas / disciplines: Mathematics and natural sciences-Mathematics and environmental exploration
Arts and technologies-Visual arts and handicrafts
How to achieve: Outdoor education
Instruments: dowel or wooden pole with a length of at least 50 cm (one for the whole class), shadow markers (rocks, sticks, etc.), meter, plasticine, pencil, pebbles or other markers objects of nature, chalk, clock, chalk, compass
Competences pursued:
a) At the level of knowledge
List the components of a watch Listing several types of watch (wall, electronic, handheld, solar) The order of the numbers on the dial of a circular clock
b) At the level of skills
Drawing the position of the Sun in the morning and at noon, at the same time and in relation to the same landmark, for a week Making a watch with natural materials Positioning of the clock hands based on a given requirement Recording the observations made during the experiments by drawing / marking with various symbols the moment when a certain change took place Reading time using the sundial
c) The attitudinal level
Involvement Initiative in fulfilling the given task Consistency in the performance of the given task

Table nb.1. Activity plan

In describing this activity, we had to make three models, because the class level varied from those observed in the pre-test stage, so that the model originally thought could not be implemented. So, we thought of two additional models, adapted from the initial one, which can be made more easily and efficiently at the first grade level, and using fewer material resources and tools more accessible to students. At the same time, the acquisitions at the level of knowledge and skills could be assimilated more easily.

1. Select a sunny day with direct natural light for at least seven hours from the start of the school year. Students will go out in the school

yard on a relatively flat ground, which also has shade sources throughout the day. Place a pole in the ground, making sure it is perpendicular to the ground, using a lead grain (a piece of string weighing on it). Measure and record the height from the ground to the top. Students are asked to mark with the number "1" the first object they will use to mark the position of the pole shadow on the ground. Students will place the marker on the ground at the end of the shadow, and note the time shown by the watch. They will then measure the distance from the base of the gnomon to the end of the shadow and record the data in the given table.



Image nb. 2. Example of activity

Students will observe the gnomon at least once an hour throughout the school program. They will measure the length of the shadow or its angle, placing a new marker with the number indicated at the end of the shadow, marking the time of day. Students will also notice which marker is closest to the pole. This will be the time of the shortest shadow and the time close to noon. While waiting for the shadow to change, the children will collect materials from nature and make a watch, using them. In groups of two, students will practice positioning the clock hands according to a given requirement.



Image nb. 3. Example of sundial

2. On a flat field, in a sunny area without shade, each student will make a pole, from a pencil on a plasticine support. Students will place the gnomon on the chosen flat surface in the school yard or the natural environment. Each student will mark with a stone or other natural object the end of the shadow line left by the pencil. At the same time, students will check the indicated time on the watch and will mark with chalk next to the indicated time indicator. At the following markings, students can estimate the time shown by the sundial, checking the veracity of the estimate on the wristwatch. During the activity, students will watch how the shadow moves and the teacher will explain the reason for this phenomenon. With each shadow movement, participants will mark this by placing a marker at the end of the shadow.
3. The third model refers to the creation of a human sundial, with the replacement of the gnomon with a student. On a flat surface within the school grounds, draw a large circle with chalk, mark the middle with an "X". A student sits in the middle of the marked circle, adopting an upright position with his hands outstretched in front, according to the diagram below. The shadow of the outstretched arms falling on the circle will be the first marking, which will be made by contouring the shadow. Students check the time indicated by the clock and mark it on the circle. Another student passes in the middle of the circle and repeats the operation, being placed in the same position, having the same landmark as the one who started the exercise. The activity continues with the students' estimates regarding the time indicated by the human sundial.

This activity is especially important at the level of first grade, because not only can it develop different socio-affective skills, but especially due to the practical side it has, being able to develop students' life skills. Not only do they have the chance to operate with the resources offered by the immediate proximity, but they can develop key acquisitions, necessary for this level. As specified above, in the class I curriculum, the study of nature and its elements has a major role in the development of skills and competencies that can only be activated by exposure to the immediate environment and the elements and resources that it offers. In the Mathematics and Natural Sciences program, the emphasis is on developing skills that are related to observing the environment, noting observed information, making measurements on the length or shape of objects in the immediate environment, observing the position of the sun at different times. of the day and especially activities that help them understand the phenomena that take place in nature. We chose this activity because the skills selected from the curriculum of this level can be best developed through exercise in the natural

environment, using natural resources. It can be seen that the activity is a complex one requiring the selection of several skills for each chosen criterion, so that all areas related to the topic are covered and students can use the acquisitions acquired in all environments and times in which they operate.

Conclusions

In some education systems, the National Curriculum includes directions for the participation of students of all ages in a series of outdoor, planned, progressive and creative learning experiences. These are challenging opportunities that occur throughout and outside of school. In Romania, following the analysis of the National Curriculum, we notice the encouragement of this type of activities and learning experiences even if they are not mentioned in documents as activities belonging to outdoor education. (Dughi & Roman, 2008)

If there are so many motivations and positive directions in this regard, all that remains is to face the challenges of ensuring that outdoor education is strongly anchored in the curriculum, so that it becomes a reality for students in Romania. This approach becomes a responsibility of each teacher, who will have to plan and integrate outdoor education activities in the instructional-educational process, in the form of interdisciplinary projects and in the form of cross-curricular activities. Each curricular area is molded to outdoor education, because each discipline has specific benefits in this regard. When planning outdoor activities, connections with educational activities undertaken in the classroom should be taken into account in the context of using the curriculum as a whole. Instead of offering a week of outdoor learning or a special day of outdoor workshops, it is more desirable that the formal activities that take place in the outdoor environment be part of a holistic approach to teaching-learning that is linked to a process. educational complex in progress. (Torkos, 2021)

References

- Bocoș, D. M., (2002), *Instruirea interactivă. Repere pentru reflectivă și acțiune*, Presa Universitară Clujeană, Cluj-Napoca
- Cerghit, I., (2006), *Metode de învățământ*, E.D.P., București
- Chiș, V., (2002), *Provocările pedagogiei contemporane*, Presa Universitară Clujeană, Cluj-Napoca
- Dughi, T., & Roman, A. F. (2008). *Dimensiuni psihologice ale învățării*. Editura Universității "Aurel Vlaicu".
- Egerau, A., Lile, R., Roman, A., Kelemen, G., Rad, D., Dughi, T., & Balas, E. Perspectives on Early Childhood Education in Romania: a Qualitative

- Research. *Trends and prospects of the education system and educators' professional training development*, 329.
- Herlo, D. (2016). Few new perspectives on teaching. *Journal Plus Education*, 84-95.
- Roman, A. F., & Balaş, E. (2010). *Strategii de instruire și evaluare*. Editura Universității "Aurel Vlaicu".
- Roman, A. F. (2014). Methods of designing integrated learning. *Educația Plus*, 11(2), 31-36.
- Roman, A. F., & Balaş, E. (2014). *Proiectarea situațiilor de învățare școlară*. Eikon.
- Roman, A., F., Cosarbă, E., (2020), Development of educational relations with nonformal activities. *Journal Plus Education*, 26.1: 266-275.
- Torkos, H. (2021). Communication competences development in preschool through language education activities. *Educația Plus*, 28(1), 205-216.
- Torkos, H. (2020). The place of outdoor learning activities in the Romanian core procurement curriculum. *Journal plus education*, 26(1), 276-286.