Online Local Workshop for the Integration of Algorithmic Thinking Skills into Preschool Education

Reporting Partner Institution:
Report Date: D/M/Y

Objectives of the Local Workshops

The partners of ALGOLITTLE determined the objectives of the local workshops as follows.

1- To provide reliable information related to the integration of algorithmic thinking into preschool education by making benefit from the experiences and creative ideas of the workshop participants,
2- To compile the collected data with the information provided in the knowledge paper which all partners prepared through a joint work before the organisation of the local workshops.
3- To use the data collected during the preparation of the knowledge paper and the organisation of the online local workshops to prepare the higher education curriculum as the first intellectual output of ALGOLITTLE.
4- To assist preschool teacher candidates, preschool teachers and other interested educators to learn how to integrate algorithmic thinking into preschool education by sharing the collected activity examples with them

Expected Outcomes

The following outcomes were expected from the workshop:

1- The separate reports of the five countries that have organised and carried out the online local workshops
2- A summary of the reports giving a brief information about the processes
3- Quality evaluation of the online local workshop organisations
4- Activity examples to the integration of algorithmic thinking skills into different learning areas provided in preschool education
5- Grounding the base for the creation of the titles of the curriculum

Workshop Organiser/s (optional)

Presenters:

Prof. Dr. İlke Evin GENCEL, İzmir Democracy University

Elif ANDA, Educloud

Moderator:

PhD Student Büşra AKYÜZ

Participants

Partners decided to invite at least 20 participants to the online local workshops. If possible, the number of the participants and the workshops could be increased. Participants consisted of preschool teachers, ICT teachers, and experts on computer programming.

In Turkey, the online workshop has been carried out in three sessions on different dates. The session dates were respectively 16th, 17^{th,} and 30th January 2021. 463 educators subscribed to the online workshop and 231 educators and ICT experts participated in the sessions in total. The lists of the participants were shared on the archiving platform with the project consortium.

Methodology

All online local workshops included plenary sessions to present how to integrate algorithmic thinking skills into preschool teaching and a brief presentation about the project practice, to provide example activities and to share experiences.

The workshop organisation

- **During**

1- Opening
2- An introductory presentation on the project practice
3- A presentation on how to integrate algorithmic thinking skills into preschool education
4- Discussions about algorithms, algorithmic thinking skills, learning areas and integration activities
5- Closing

- **After**

1- Creating an activity pool (on a cloud service) for participants enabling them to upload their activity examples to the platform (optional)
2- Creating an email group for further exchanges (optional)
3- Sharing an online form to gather their opinions and activity examples in writing.
4- Sharing an online form to inquire about the quality of the local workshop organisation
5- Preparing a booklet including the activity examples shared at the workshop (optional)

Workshop Process

Workshop 1 – 16th January 2021

Presenters: İlke Evin Gencel, Elif Anda

Moderator: Büşra Akyüz

Participants: 97 teachers who applied to participate in 'The Workshop on Integrating Algorithmic Thinking Skills into Early Childhood Education'

Process:

At 20:00, the participants were ready for the session. İlke Evin Gencel opened the session and made an informative presentation about the general purpose of the project. Following this, the session continued with the presentation of Elif Anda. This presentation consisted of four sections. The first section was the informative part of the concept of an algorithm in which the types (linear-sequences, selective-logical, and iterations-loops) were mentioned. The second section was pursued with the definition of the algorithmic thinking skills together with the explanations and examples to signify to what extent it was beneficial in our lives. In this section, the ways to develop algorithmic thinking skills -either computerized or non-computerized- were emphasized. Besides, the significance of developing algorithmic thinking skills was explained. In the third section, the issue of how to integrate algorithmic thinking skills into early childhood education was discussed. Herein, Elif Anda gave examples within the scopes of learning domains in early childhood education.

In the fourth (last) section, reflections were provided by means of a question-and-answer session. It was started with the questions of the teachers about the project. An important issue emphasized in this section was that the algorithm existed in nature and in our daily lives. The teachers stated that they implicitly applied algorithms and algorithmic thinking in their classes. After these reflections, the question of how we could teach to distinguish a real problem from a situation perceived as a problem was addressed under the guidance of the moderator. At this point, teachers offered solutions to this situation by encouraging cooperation, such as establishing a cause-effect relationship, trial-and-error, group discussion among options, Quatro method, and class voting. Within the context of teaching how to create a solution to a problem, their opinions were taken since they generated solutions by giving responsibility and conducting group work. In addition, teachers emphasized the need to arouse curiosity and appeal to multiple senses to enable children to recognize concepts. Moreover, it was stated that puppets, dramas, story cards, and case studies could be effective in utilizing the simulation method for children to make comparisons. Examining that some steps/ways/sequences should be followed to accomplish the desired goal, teachers emphasized that activities that required them to follow a certain order could be used through hierarchical games, coding, recipes, and simple experiments.

Teachers stated that trial and error could be used to teach and discuss the solutions they found, enabling them to choose a better or the best solution among a variety of options. The importance of giving them the opportunity to do what was most suitable for them was expressed in providing an environment for them to reflect on whether the result was working, or not. In addition, it was emphasized that one could teach previously planned steps to reach the determined goal by using orienteering practices, case studies, experiments, questions, and answers. At the point of evaluating (debugging) whether these plans and process steps worked or not, suggestions such as experiments, some recommendations, such as elimination among options with group discussion, Quatro method, and class voting were developed. Teachers emphasized the importance of integrating algorithmic thinking skills into early childhood education through game-based learning, which was basically the main objective of the workshop, through the utilization of games with simple algorithms, simple experiments, shopping lists, simple recipes, dance choreographies, plays, gamification, trial and error, animation, narration, role changing, maze solving exercises, Legos, and concrete objects that children could encounter in their daily lives. It was also scrutinized that teachers could integrate algorithmic thinking skills into all domains of learning in early childhood education as a result of the discussions made on the best learning domain to apply algorithmic thinking skills. In this vein, it was stated that there should be comprehensible, enjoyable, and concrete activities designed for children.

Workshop 2 – 17th January 2021

Presenters: İlke Evin Gencel, Elif Anda

Moderator: Büşra Akyüz

Participants: 97 teachers willing to share their views on the integration of algorithmic thinking skills into preschool education.

Process:

The session was opened by the moderator. İlke Evin Gencel gave information about the general aims and activities of the ALGOLITTLE project and stated that the goal of the workshop was to collect data to form the content of the curriculum to be prepared within the scope of the project. She stated that in the project, which aims to integrate algorithmic thinking skills into various learning areas through game-based learning in the preschool period, studies are carried out on learning activities that can be organized to achieve this goal. She stated that the activities can be planned with or without a computer. She mentioned that the information collected from the field is important for the correct planning and implementation of the activities.

In his presentation, İlke Evin Gencel explained that the project was carried out within the scope of Erasmus + Key Action 203 Higher Education Strategic Partnerships Program. She made statements on the development of the project idea, shaping the project and analysing its components and gave brief information about the project's duration, logo, project partners, activities and outputs.

Elif Anda introduced herself and made a presentation on algorithmic thinking. During the presentation, she stated that the algorithms are small steps taken in solving a problem or achieving a goal, and in fact, they are applications that are used and known by everyone. She stated that learning algorithms and algorithmic thinking is necessary for future generations to adapt more easily to emerging professions. She touched on the root of the word algorithm and the properties of algorithms. Accordingly, the properties of the algorithms are explained as follows.

1- certainty

2- Sequencing

3-being in finite number

Then, she dwelled on the types of algorithms that can be taught in preschool and said that these algorithm types are linear, logical (branching), and cyclic algorithms. Then a video about these algorithms was watched. She then gave examples of how these algorithm types can be taught with activities in the preschool period. She stated that since the stories flow linearly, they can be used effectively in creating linear algorithms and stated that daily activities such as tooth brushing can also be taught this way. She said that some questions were asked in logical algorithms and the steps were branched according to the answers given. Some videos were watched as examples of these algorithms. While giving examples of cyclic algorithms, she stated that children who constantly jump during music exhibit a cyclic algorithm. She gave examples of cake making process, plate washing, repetitive movements, and repetitive dance figures.

Explanations continued with that algorithmic thinking skills could be classified as understanding the problem, planning, determining the steps, applying the steps, and checking the accuracy of the steps. Then a short video about understanding the problem was watched.

In the rest of the presentation, she gave examples of how algorithmic thinking skills can be used in some learning domains. She talked about the use of bee-bot while teaching geometric shapes and the activities in which algorithms were activated during mathematics teaching. She focused on games that could be designed during physical development activities and explained how narrative could be used with algorithmic thinking skills.

After the presentation, İlke Evin Gencel started the question and answer session to get the opinions of the participants. Moderator Büşra Akyüz directed the question and answer session. The examples that the teachers wrote in the chat section were also shared.

The teacher who took the floor first stated that he had a coding carpet that he prepared with tapes. She mentioned that these studies were very effective in teaching the concepts of number and direction. She said she saw that in this way the students' rapid thinking and attention skills improved. She also stated that she saw that the concepts of right and left were quickly learned. She said they're attending Code Week. She stated that she also integrated some activities into game activities.

Another teacher who took the floor said that they were doing learning activities by doing and experiencing. She described cake making projects as examples of these. She stated that they enabled the students to follow the process by asking different questions during the activity. She stated that they also used the coding carpet themselves. She stated that they used different materials such as stone instead of arrow symbols and work with instant drawings. She said that they followed some of the events on the Code.org website and attended the code week. She mentioned that during these activities, children tried to organize activities where they could use their creativity. Another teacher stated that the orienteering was a good activity for gaining algorithmic thinking skills.

Another teacher who took the floor stated that they learned the code week with an official letter they received. She said that this subject was very new, and they have just learned everything about it. She explained that they used coding books. She stated that coding cards with stories were very effective and talked about a bee story stating that what happened to the bee on the road on which it was traveling was explained with picture cards. She talked about the activities with the robot Tosbaa and explained that some activities carried out on the coding carpet blindfolded to empathize with the visually impaired.

Another teacher who took the floor explained that they taught algorithms with storytelling. She said that during the games, children pretended to be robots and code each other. In another activity, she stated that they asked children riddles and the children determined how to take their steps to reach the riddle answers on the coding mat. She explained that they prepared a coding game for each concept learned and reinforced the learned concept through these games.

An informatics lesson teacher who took the floor stated that they first performed the coding games without a computer and then they started coding activities with robots. He stated that it would be more effective to include children in these coding activities in small groups. He stated that he also programmed games for pre-schoolers. He explained that the games on Code.org motivated children. He stated that coding activities were effective in learning the concepts of place and direction, improved their ability to calculate more steps at the same time and increased their attention span.

Another teacher who took the floor stated that completely different stories could be created on coding rugs, and that many different activities could be designed by placing toys and various items on them. She stated that thanks to this workshop, she realized that she had already been doing linear algorithms in her class. She stated that most of the Montessori activities could be constructed with linear algorithms. She explained that in drawing activities, for example, a picture of a bear or a rabbit was drawn one by one in turn, and how these animals were shaped by stories. She said that the children drew according to the definitions in the stories and that they made many different drawings by activating their imaginations. She stated that cyclic algorithms could also be used in Orff and percussion activities.

Another teacher mentioned that they combined forest projects with robotic coding. She explained that the ants use robotic coding to find their nests. For example, Ali's house is very messy, how does Ali tidy his house? She explained that they designed the answer to this question with robotic coding activity.

İlke Evin Gencel asked the teachers to share the activities they mentioned during the workshop in the online activity pool and in the form to be sent.

A teacher who took the floor stated that according to what she learned from the STEM education and experiences she received; children were more motivated on digital platforms. She stated that digital media (such as tablet maker, kits) could also be used in these activities.

Elif Anda stated that both computerized and non-computerized activities could be developed to gain algorithmic thinking skills, but the important issue here was that children could **plan their steps themselves linearly, logically, and cyclically.**

A teacher who took the floor invited the project coordinators to her class and stated that she could voluntarily apply the organized learning activities in her classroom.

Another teacher stated that she prepared her achievements and program for the needs of her class. She stated that she attached importance to opportunity education.

Another teacher who took the floor emphasized that activities should have been designed in accordance with the developmental characteristics of children, by providing equal opportunities and by giving them the opportunity to learn by doing.

Another teacher said it was important to see the real problem and to determine the next steps stating that to gain the skill of listening comprehension, it should be checked whether the child understands the instructions or not. She said that the pre-school period was the most important education step and what was learned in this period facilitated learning in other periods. She stated that the project activities could also be implemented in her classroom and she was ready for any kind of support.

İlke Evin Gencel said that with the education received in preschool period, a serious foundation has been laid especially in terms of behaviour development and this should have been transferred to other education levels.

A teacher who took the floor stated that the algorithm was a philosophy of life itself. She said that she noticed that these steps were taken more slowly in students with special needs stating that an algorithm should have been created to reach the child.

İlke Evin Gencel asked teachers to share photos and videos of classroom activities, if any.

A teacher said that Cubetto and Matatalab robots could also be used to gain algorithmic skills. She stated that robots were presented to schools in Yüksekova and they used these robots in their classrooms. She even explained that one of her students started piano thanks to the robot Matatalab.

An elementary school teacher who took the floor stated that they were designing activities using waste materials to develop algorithmic thinking. She emphasized that they employed these skills during the learning activities.

Workshop coordinators thanked to the participants and the session was ended with good wishes.

Workshop 3 – 30th January 2021

Presenters: İlke Evin Gencel, Elif Anda,

Moderator: Büşra Akyüz

Participants: 27 teachers who participated in the first and second workshops, and were voluntary to share their opinions on teaching how to develop algorithmic thinking skills in early childhood education

Process:

The session was opened by the moderator. Elif Anda summarized the topics covered in the previous workshops, such as what algorithmic thinking skills were, and how to develop algorithmic thinking skills in early childhood education through activities and applications. It was reminded in terms of the types of algorithmic thinking skills in early childhood education, labeled as linear-sequences, selective-logical, and iterations-loops. The general objective of the project was restated. It was reminded that the project did not target at teaching coding, albeit at integrating algorithmic thinking skills into all domains of learning. The main objective of the third workshop was summarized by İlke Evin Gencel. It was expressed that it was expected to discuss activities to develop algorithmic thinking skills in all domains of learning through different examples and activities.

The discussions are maintained under the guidance of the moderator:

It was discussed to develop an algorithm to explore a problem, or a target situation, and to solve a problem. Teachers emphasized that children should experience the situation to feel the problem. It was stated that this could also be accomplished by means of teachers’ direct storytelling or narration. For instance, a teacher could explain the algorithms to avoid rain by telling a story on catching by the rain on the way and getting very wet. Primarily, it was emphasized that conversations with children could make them feel the situation and draw their attention to the problem.

Activities to develop an understanding of traffic rules and rules in social life were mentioned. For instance, it was recommended that learners could be provided with the materials to create traffic conditions so that they could set the required environment in the classroom. Herein, it was stated that this could be a problem-solving activity integrated in the field of Social Studies. Similarly, this situation could be adapted to related fields of Science. The teacher, who held the floor, emphasized that a parkour could be set beforehand with some problematic situations on it. For instance, a turtle upside down, a dried flower, or a damaged tree could be placed on the parkour. Then, learners were made aware of these problematic situations. It was stated that if these practices were conducted in the garden, there would be a plenty of opportunities in Natural and Applied Sciences. It was also remarked that what happened during these activities could be expressed by speech, or pictures.

Another teacher emphasized that drawing step-by-step activities were suitable for developing algorithmic thinking skills. For instance, it was effective to give the steps to pursue to draw a clown. It was stated that it was of critical importance for children to understand verbal instructions. This example could be used in the field of Arts. Another teacher stated that s/he asked students to design a solid house based on the story of Three Little Pigs. When they used a hairdryer as a wolf once the houses were finished, it was observed that some houses were destroyed. Then, the reasons of this destruction and the materials in use were discussed together in the classroom environment. In that way, children could notice the problems. At first, they choose laced and colorful materials; however, once they realized, they gave priority to more durable ones. In this vein, they learnt more about home design, and developed their creativity and problem-solving skills. Another teacher expressed that using waste materials to design new toys was effective in developing children’s creativity. For instance, an animal image could be shown, and the materials could be given to them. Afterwards, they were expected to redesign this animal by using these materials. Another teacher emphasized that origami practices were suitable as an example for an algorithm in which the sequence had no change. Another teacher stated that algorithmic thinking was rather limited in the fields of Arts, so s/he could not reconcile algorithm with the concepts of originality in arts and creativity. But s/he further added that s/he might think in that way because s/he was not well-aware of the concept of algorithm. Upon this, a video in which arts, music, and rhythm were given through an algorithmic activity of iterations-loops was shown to the participants. Because when the Arts were concerned, it was not only drawing but also music, dance, rhythm, and other related fields. Following this example, a teacher mentioned that they conducted a similar round-table activity in which music, drawing and dance were embedded. It was stated that it was also like that of in the video; however, this one was different in terms of completing the unfinished material by the other learner just like in the station technique.

Another teacher stated that during the pandemic process, students treated it as a problem as it did not snow in Izmir. Thus, the teacher made an artificial snow from baking soda, starch, and shampoo in the art activities, and then they played with snow all together through an online platform on which courses were conducted. This was like a creative solution to the problem of not snowing in Izmir, and learners followed the steps to make an artificial snow. The same teacher expressed that they made a New Year cake together with the learners. Even online, teaching through games should be regarded as a key tenet, and be used at all education levels, albeit not only in early childhood education.

Regarding the field of Mathematics, Logical Thinking, it was expressed that the multiplication table and other topics could be taught by means of music or songs. It was mentioned that mazes were important in developing logical thinking skills in that they were composed of conditional algorithms. It was expressed that figures could be used to teach arithmetic and time perception. It was discussed that there were examples of algorithm studies by integrating geometric shapes with colors. A teacher stated that pattern studies were the examples of algorithmic thinking. It was stated that the patterns could also be composed with shapes and materials. It was specified as an example of an algorithm of iterations-loops. An example was given that addition and subtraction were also taught by play-based activities. It was explained that some learners formed the numbers 1, 2, 3 etc. with their bodies while some others formed the signs of +, -, and = with their bodies, and mathematical operations were done in this way.

Regarding self-care skills, it was suggested that tables could be created for folding clothes, wearing ourselves, brushing teeth, cleaning the working place (first, the mess should be removed; then, the cleaning should be done; and then, the napkin should be thrown away), and ticks could be used as a sign for each step followed. Different folding styles could be used with different clothes, and children could create their own folding styles. It was stated that hanging clothes game could be an example of play-based algorithmic thinking. It was expressed that pictures of clothes could be pasted on the papers, or games on hanging with pegs could be played in order to associate mathematics with physical development-physical training, such as hanging clothes according to the numbers previously learned. Socks matching was another way to improve self-care through play-based learning. To tidy up the room, it was possible to take the toy basket as a hungry monster, and to feed it by the objects scattered around the room. A teacher stated that they tidied up the room thanks to a rap song named ‘tidy up’ by means of dance and play. It was also discussed that preparing meal tables during feeding time could be an example of self-care and algorithm practice.

Another teacher suggested that reinforcement should be used to foster learners’ engagement and motivation. This could be an example of emotional development, and social-emotional learning. Leadership, self-confidence, and cooperation were exemplified in this area, as well.

For physical development-physical education, activities such as designing a parkour and survivor competition were given as examples. Teachers who associated these parkours with the teaching of numbers gave examples.

After the experiment on the formation of rain in the fields of Natural and Applied Sciences and raising awareness about the environment, the step-by-step visuals of the rain experiment were given as play cards in a mixed order, and ordering these cards according to the stages of the experiment was presented as an example of algorithmic thinking. It was emphasized that similar activities could be used to explain other natural events or be animated with drama and play. For states of matter, role-playing could be used as an alternative.

It was stated that drawing lines in a certain order to create certain patterns was an example of an algorithm. It was also stated that observations in nature could be done within this process. The example for this could be asking how to sequence the patterns of a leaf, or a tree. Another example was that the patterns of a cat, or a dog could be asked, and redesigned by different materials or fabrics. In this example, it was emphasized that mathematics, science, and manual skills could be developed. It was stated that iterations-loops were needed as algorithms for some specific patterns. Gamification with drama was proposed for environmental cleaning. Animations composed of different creatures and children who were polluting the environment were depicted. Negative situations in the environment were exemplified through pantomime.

Regarding language, communication, preparation for literacy, and foreign language education, teacher stated that they taught especially foreign languages through videos, dance, and cards. However, it was noted that foreign language education at public schools most generally depended upon the teacher as there was no branch teacher. Another teacher expressed that for teaching Turkish, s/he prepared two trees with boxes underneath so that learners could stick points on the trees, and the activities were held through games. Besides, for teaching numbers, these trees could also be used in the fields of Science, Mathematics and Logical Thinking.

Results

Results of Workshop 1:

- In this workshop, the concept of algorithm and its types were learned. It was stated that the algorithms were already placed in nature.
- Reflections were made that teachers unconsciously applied algorithmic thinking skills in their classes.
- The number of participants did not fall below 100 until the end of the session which lasted 120 minutes. This was the reflection of the teachers' enthusiasm and positive attitudes towards the project.
- Mutual interaction and awareness were established as a result of the examples, experiences, and discussions on how to integrate algorithmic thinking skills into early childhood education.
- It was observed that the teaching of algorithmic thinking through games was suitable for young and/or very young learners.
- It was concluded by researchers and teachers that it was suitable to apply algorithmic thinking skills in all learning domains.

Results of Workshop 2:

- In the workshop, teachers shared their experiences related to learning activities which could be considered as examples to the practices improving algorithmic thinking skills.
- The examples mainly included the activities serving the development of linear algorithmic thinking skills. However, there were good examples of employing branching and cyclic algorithms.
- Some outstanding examples of activities have been summarized in the above summary, but detailed activity examples will be prepared as booklet / e-book.
- The teachers mostly dwelled on the importance of play and the power of pretending while learning a concept.

Results of Workshop 3:

- In this workshop, concrete examples, and ideas for the development of algorithmic thinking skills in different learning domains were discussed. It was observed that teachers had already conducted a myriad of applications in their classes; however, they were not aware of the fact that the applications served for algorithmic thinking.
- It was observed that participants found the project beneficial, and they were willing to participate in the project. It was noted that they suggested many activities for each learning domain in a short time regarding their own experiences in the classroom environment. Play-based learning was emphasized.
- It was realized that an interdisciplinary perspective was as important as examining algorithmic thinking and combining it with games related to the

domains of learning. While designing an activity, it was understood that different learning domains should be considered for holistic learning and development.

- Some activity examples were given above; however, activity examples will be prepared as a booklet, or an e-book.
- The workshop was productive in terms of providing interactive sessions through which concrete examples were presented, and ideas for the development of new examples were shaped. It was observed that a variety of games and applications in which algorithmic thinking was bolstered could be made for each learning domain.

The frequencies of the participants' answers to the questions:
https://docs.google.com/spreadsheets/d/1o1YxmXG8oMNTB2HXsxKpa41g6sVvQZmCxrUmgZZ_T8E/edit#gid=0

1- According to this, the first question was about teaching children how to differ a perceived problem from the real problem. Mostly proposed techniques were observation, trial & error, play & role play, and conversation (asking questions, drawing the attention to a situation, discussing, and letting children talk about it)
2- Question 2 was about how to teach children to create a plan to solve a problem or to reach an objective (or to complete a task). Mainly focused strategy was about creating a teaching process including "guiding children and asking questions using visuals to make children think about the solution ways, choosing from different solution ways, applying the solution steps and observing the results and process steps. Mostly indicated techniques were trial & error, storytelling, simulation, and different plays.
3- Question 3 was about how to enable children to realise the concepts. One of the most proposed strategy was "giving examples to the experienced situations, asking questions and associating the concepts with daily life" since concretization complied with children's cognitive development levels. Repetition and play were also emphasized mostly.
4- Question 4 was about how to teach children to compare situations or objects. Teachers mostly mentioned creative drama and simulation together with group activities, experiments, experiencing, visuals, and worksheets. Some teachers had a common idea to create a pattern while teaching such as concretization, giving examples to daily life situations/objects and asking children to associate between different situations/objects. Another group of teachers proposed attracting attention (e.g. puppet use) to similar and different concepts during the conversations, asking questions and letting children imagine and brainstorm.
5- Question 5 was about how to teach children to create and follow some steps/routes/sequences to reach a target situation. This was a critical question because it is the root of algorithmic thinking skills. Mostly agreed technique was play-based activities. Letting children to create their own steps, to determine the rules of the games, and to follow the steps themselves. Teachers proposed staggered activities, dealing with play cubes, orienting each

other with direction arrows and different clues to reach a destination or a target. Since many daily activities are the natural examples of algorithms teachers also suggested to include children in daily life situations, giving examples and models related to daily life and letting them experience.

6- Question 6 was about how to enable children to choose the most effective solution among several solutions. This was also a critical question. If someone has little time to complete a task, dealing with details too much wouldn't be a good path to follow. Teachers declared that creating different stories, manipulating the learning environment, and presenting various parameters would lead children to think out of the box and look for different solutions. Teachers mostly focused on trial & error, drama, and simulation activities.

7- Question 7 was about how to teach children to follow a previously created path. This is easier than creating a path and finding a way to solve a problem. Teachers' answers were varied in this respect and included play-based activities such as maze, treasure hunt, orienteering, with rewards and positive feedback to motivate them; using materials, art, visuals, images, photos, symbols, numbers, pictures, cards, and videos; coding and algorithm games; simulating and dramatizing daily activities; presenting, modelling, giving examples, letting children experience and then reflect on what happened.

8- Question 8 was about how to teach children to evaluate the process steps whether they work or not. Among many suggestions, trial & error was the most indicated technique. Teachers proposed that children should have been allowed to talk about what they did after they tried to reach a destination or solve a problem.

9- Question 9 was about how to integrate algorithmic thinking skills in preschool education with play-based learning. Sports games, mathematics games, coding games, science games, and many more examples were given to this question. We compiled a booklet including example activities by benefiting from the answers given to this question and other following 5 questions requesting teachers to give examples to the learning activities.

Proposed Curriculum Modules

As aforementioned, examples given for different learning domains have guided our way to create titles for each module in the curriculum. When these workshops and knowledge paper titles are considered together, the following modules are proposed for the curriculum:

- **Module 1: Algorithmic Thinking. (The importance of algorithmic thinking, types of algorithmic thinking, examples from real-life experiences)**
- **Module 2: The Importance of Algorithmic Thinking in Early Childhood Education. (Methods and Strategies to Teach Algorithmic Thinking Skills)**
- **Module 3: Developing Algorithmic Thinking Skills in Different Learning Domains *(Cognitive Development- a) Mathematics b) Reasoning)***

- **Module 4: Developing Algorithmic Thinking Skills in Different Learning Domains** ***(Language Development – a) Native Language Development b) First Foreign Language Development)***
- **Module 5: Developing Algorithmic Thinking Skills in Different Learning Domains** ***(Social Emotional Development a) Social Emotional Learning b) Social Life Skills)***
- **Module 6: Developing Algorithmic Thinking Skills in Different Learning Domains** ***(Motor Development – a) Sports and Play b) Art and Handcraft c) Music and Dance)***
- **Module 7: Developing Algorithmic Thinking Skills in Different Learning Domains** ***(Self-Help Skill Development a) Health b) Daily Life Skills)***

Annexes

1- Participant List

https://drive.google.com/drive/u/1/folders/13TwX1O8i9IOrjqtMQycjq80TB9xyfotM

2- Presentation/s

https://drive.google.com/file/d/1jS4oIK6l_WCpTQTC0DPbAGxbaHfzyM0-/view?usp=sharing

3- If possible, video records of the workshop

https://drive.google.com/drive/u/1/folders/13TwX1O8i9IOrjqtMQycjq80TB9xyfotM

4- Screenshots from the workshop

https://drive.google.com/drive/u/1/folders/13TwX1O8i9IOrjqtMQycjq80TB9xyfotM

5- A brief press news about the workshop (both in English and in your native language)

http://egitim.idu.edu.tr/educat/dosya/Bas%C4%B1n%20Bu%CC%88lteni%202.pdf

6- Example Activities (if a booklet was prepared.)

https://drive.google.com/drive/u/1/folders/13TwX1O8i9IOrjqtMQycjq80TB9xyfotM

7- Quality Evaluation Results

https://drive.google.com/drive/u/1/folders/1dn90cxNeA5pKjqqdRuoRGZO5r5tVAIKL