Contemporary Mathematics and Science Education
2025, 6(2), ep25019
ISSN 2634-4076 (Online)
https://www.conmaths.com/

Research Article

OPEN ACCESS

Spatial learning trajectories in early childhood mathematics education: An example from a small scale intervention study at a Greek kindergarten

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Citation: Panagiotidou, I., & Stamatoglou, M. (2025). Spatial learning trajectories in early childhood mathematics education: An example from a small scale intervention study at a Greek kindergarten. *Contemporary Mathematics and Science Education*, 6(2), ep25019. https://doi.org/10.30935/conmaths/17650

ABSTRACT

This paper focuses on spatial thinking, *place learner*, a developmental process in which the child develops abilities to understand the concept of space. The literature defines spatial thinking as an interdisciplinary form of thinking that includes the understanding of spatial concepts, reasoning processes and the use of representational tools to solve problems related to space (Clements & Sarama, 2023). This paper presents a teaching intervention that was carried out in a Greek kindergarten, with 4 kindergarten students, 2 boys and 2 girls, aged 4 to 6 years. The children were given the opportunity to respond successfully to the tasks that were assigned to them. This paper also provides examples of teaching activities for learning trajectories and suggests that further research suggestions would be to have more time at the researcher's disposal to implement other activities as well as to have access to more materials and a larger number of participants to be involved in the process.

Keywords: special learning, mathematics education, intervention, kindergarten

Received: 03 Aug. 2025 ◆ Accepted: 29 Nov. 2025

INTRODUCTION

Spatial reasoning is increasingly recognized as a foundational component of early mathematics learning. Spatial learning trajectories refer to the progressive development of children's spatial skills and their integration into mathematical understanding. These trajectories are vital for supporting early numeracy, geometry, measurement, and problem-solving skills. A learning trajectory is a sequential learning path of a mathematical concept followed by a student in order to understand a concept. Spatial reasoning encompasses a range of skills including mental rotation, spatial visualization, spatial orientation, and spatial vocabulary (Penteri et al., 2022). Piaget (1967) originally discussed spatial cognition as part of children's cognitive development, suggesting that spatial understanding develops through sensorimotor and preoperational stages.

More recently, the Newcombe and Huttenlocher's (2000) framework distinguishes between egocentric and allocentric spatial coding, both of which are relevant in early math contexts. Researchers like Clements and Sarama (2009) have advanced the concept of learning trajectories, which include a developmental path, learning goals, and instructional tasks. In mathematics, spatial learning trajectories help educators sequence learning activities that support the development of geometric thinking and spatial awareness. A growing body of research links spatial skills to mathematical performance: Mix and Cheng (2012) found that spatial training improved children's performance on mathematical tasks, particularly those involving number line estimation and arithmetic. In the same line, Verdine et al. (2014) reported that spatial assembly tasks in preschool (e.g., block play) predicted later geometry and numeracy skills. Finally, Gunderson et al. (2012) identified a strong correlation between spatial language exposure and math achievement, suggesting that spatial vocabulary mediates spatial and numerical learning. Spatial thinking is particularly relevant to early geometry and measurement, as outlined in standards such as the Common Core State Standards Initiative (2010) and the Common Core Standards Writing Team (2013), which emphasize recognizing shapes, understanding spatial relations, and using geometric vocabulary.

Clements and Sarama (2009) developed learning trajectories for early mathematics, including spatial reasoning. Their "building blocks" curriculum integrates spatial tasks like composing shapes, recognizing transformations, and navigating space, progressing from basic shape recognition to complex spatial reasoning. Earlier, Case et al. (1996) emphasized the central conceptual structures, suggesting that children's spatial-mathematical understanding develops through increasingly abstract mental schemas. Trajectories must therefore align with children's developmental readiness and existing cognitive structures.

However, disparities in early spatial experiences often correlate with gender and socioeconomic factors as the literature suggests. In this regard, Levine et al. (2005) found gender differences in spatial tasks as early as preschool, often associated with differential experiences and encouragement. Verdine et al. (2019) suggested that children from lower-SES backgrounds have less access to spatially-rich environments and materials, which may contribute to early math achievement gaps.

Spatial learning trajectories can help mitigate these inequities by providing structured, accessible pathways for all children. Effective teaching strategies identified in the literature include:

- manipulative-based learning (e.g., tangrams and pattern blocks),
- spatial talk by adults (e.g., "above" and "next to"),
- technology-enhanced activities (e.g., virtual puzzles or spatial games), and
- guided play, which supports exploratory spatial learning within structured tasks (e.g., Ferrara et al., 2011).

This paper examines the role of spatial learning in early childhood mathematics education, with an emphasis on learning trajectories, pedagogical strategies, and implications for curriculum design. It consists of the following 3 parts. The first is a mathematical goal, which constitutes the skills and concepts needed as a basis for learning (Tzekaki, 2015). The second part is the developmental path on which the knowledge and stages that the student develops are developed. Finally, the third part consists of teaching practices or teaching projects, which help to structure and develop the child's thinking at higher levels of understanding of the mathematical concept (Christou, 2025).

Spatial thinking begins to develop from the first year of life, as from a young age children begin to search for objects, based on distance and their position in space. From 2 years old, they begin to represent spatial relationships through drawings and use basic terms, such as "inside", "above", "below", etc. Significant progress in spatial thinking is observed during preschool age, as children move around in the family, school and social environment and interact through motor games with peers and educators (Clements & Sarama, 2023). Spatial thinking is classified as a learning trajectory and in order to be able to say that a child operates at the developmental level of spatial thinking, this means that he or she can create a "mental map", which will include familiar areas and will distinguish and locate distances and landmarks. For example, when passing a nearby landmark, such as a bus stop, a child "uses" the sign "park," indicating that he recognizes that he is going to the park.

For the purposes of this paper, we have chosen to deal with and develop the concept of spatial thinking, as we believe it is a concept that we use and apply daily, without realizing it, and this is something that makes it quite interesting. In addition, it affects how we understand and act in the world around us. When introducing the children to the topic and then to the activity, the four kindergarten students will have to check if they have basic knowledge of spatial concepts and orientation. Therefore, we will have to check through questions whether they know basic concepts, whether they can recognize reference points in space and recognize simple maps. The previous step from the activity to verify knowledge are basic questions, as well as a simple orientation activity, which two activities are mentioned below in detail. During the conduct of the central activity, the children develop skills such as interpreting and reading a map correctly, being able to recognize reference points, such as starting point, route, finish and being able to perform spatial movements. To make the activity accessible for children who have some kind of difficulty, or who have not yet reached the level of spatial thinking, we can make the instructions simpler and more understandable, and provide some kind of visual cues or photos for maximum understanding. While, on the contrary, to make the game more difficult, we would suggest making the route more complicated with elements in between and having some time limit.

The Teaching Intervention

The activity we chose to carry out is hidden treasure, which is part of the spatial thinking learning trajectory and is an activity that I developed on my own, inspired by another activity from learning trajectories. Spatial thinking begins to develop from the first year of a child's life with greater room for development during preschool age, namely 4 to 6 years. Therefore, I believe that with this specific activity, children learn several mathematical and spatial concepts through play. The preparation of this specific activity included two photos from the Internet, the two types of maps, to use in the introductory discussion held with the children. The activity did not have any additional organization, as all the processes would be carried out with the children during its duration. The activity plan B that we have completed during the semester contains a brief description of the activity, the purpose of the activity, and the learning objectives that the children should have after carrying out the activity. The examples of the activity plans are given in **Appendix A**.

Participants

The first participant is A, who is 4 years old. A attends the preschool classes of a public kindergarten in Northern Greece. His native language is Greek and he does not have any disability. A has mentioned many times how much he enjoys the nature trips he takes with his parents and his older brother (7 years old). Therefore, we consider him suitable for this specific activity and we believe he will be able to cope.

The second participant is E, who is 5 years old. E attends the preschool classes of a public kindergarten in Northern Greece. Her native language is Greek and she does not have any kind of disability. E is a child who really likes motor activities and at the same time loves solving puzzles, so for these reasons above we think she will be able to respond to the activity we have prepared for them.

The third participant is K, who is 6 years old. K attends the preschool class of a public kindergarten in Northern Greece. Her native language is Greek and she does not have any kind of disability. K is a child who has a lot of imagination and creativity and likes to find solutions to problems that may arise in a classroom.

The fourth and final participant is M, who is 6 years old. M attends the preschool level of a public kindergarten in Northern Greece. His native language is Greek and he does not have any disability. M has a weakness for pirates and I believe that by creating and reading a map he will be able to cope with the activity.

MATERIALS

During the introduction, I showed the children the following two maps retrieved from the Internet. **Figures 1 & 2** depicts the different types of maps retrieved from the Internet.

A printed paper was given to the children and they were asked a few questions, such as "Who knows what the things you see are called?"

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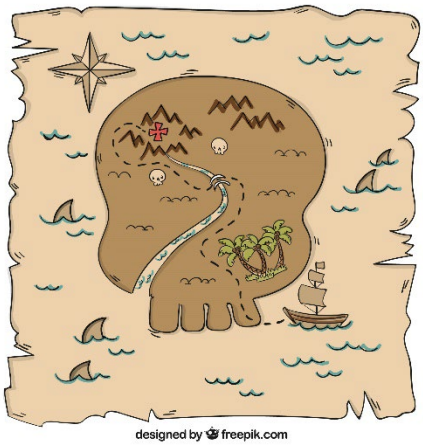

Designed by Freepik

Figures 1 & 2. Different types of maps retrieved from the Internet

with one child responding, "They are maps!" A short introductory discussion with the children followed, with a simple orientation activity, in order to discover the children's pre-existing knowledge. In this way children learn to follow instructions, based on spatial concepts and terms that were mentioned- to them, such as "Walk four steps forward, then turn towards the door". In this way, the children are prepared and at the same time they begin to have a more direct contact with spatial thinking. Then, simple explanations of the activity that would be carried out.

Procedure

The children were involved in this small-scale research in May 2025, at a kindergarten in Northern Greece. All participants were asked for their informed consent and were informed that they could withdraw from the activity at any time. All parents of the participants were informed about the nature of the intervention and provided their written consent. The intervention was part of the requirements of the undergraduate studies of the first author and researcher of this paper. A short introduction to maps was initially given, as mentioned above. The questions asked were "what do maps help us with?", "can we make a map too?", "what materials do we need to make a map?" and a discussion followed. Then, the children were divided into two groups, with each group having a preschooler and a toddler. So, the first group was A with K and E with M the second group. In order for the first group to work without distractions, the other two children were engaged in other out of class activities. E and M chose a small car and started talking. After discussing and reflecting on their part, the children concluded that they would hide it in a drawer under papers. After making sure they hid it well, they informed the kindergarten teacher that they were ready to start creating their map.

Both children were reminded of some of the basic elements that a map should have, as was mentioned in the introductory discussion, namely that they should depict the basic elements of the room, the starting point with a symbol, the ending point which will be the hidden object, etc. The researcher gave them a sheet of paper and they started discussing how they would depict the furniture and basic elements of the room on the map. E told M to draw the map and she would tell him what to draw and where, depending on how they are in the classroom. Then, in a few minutes the two children had prepared a map and when they told the researcher they were ready. The map created by the first

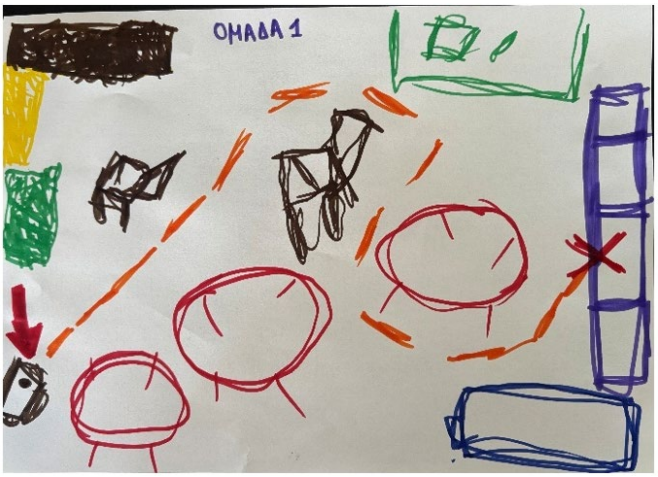

Figure 3. Map created by the first group of kindergarten children (Source: Researchers' own archive)

group, with the red arrow for the start, the route in orange and the red X for the hidden object as shown in **Figure 3**.

Then, the researcher asked K and A to enter the room and explained to the first group what they had hidden and how they would find it. M gave him the map and explained that what they were looking for was a small car. When K and A took the map, they began to turn the paper to see from which side they would be able to read the map. After finding the starting point, they began to follow the route the map showed them. When they arrived in front of the drawers, A began to open them and look inside the drawers. E described, using appropriate vocabulary, spatial concepts (e.g., behind, next to, between, and under) where the hidden object was located, in relation to the other objects in the room. After a few minutes, K and A found the hidden object.

When the first group completed the activity, it was the second group's turn. The same procedure was followed, with the first group going outside of the classroom and M and E started talking about the object they would hide. They decided that what they would hide would be a wooden spinning top and they hid it in the box with the building materials, they informed the researcher that they were finished and we proceeded to create the map. The researcher gave the children the materials and the activity started. K took the initiative and said to A "In order to make the map correctly and for E and M to be able to find the

Figure 4. Map created by the second group of kindergarten children (Source: Researchers' own archive)

treasure, you will draw and I will tell you what to draw". When they finished with the map the researcher went to call the other two children, who entered the room. A gave them the map directly and K told them that they had to find a wooden spinning top. The two children, with the help of the map, correctly arrived at the point of the building material and after a few seconds they successfully found the wooden spinning top. The map created by the second group is as follows, with the red arrow for the start, the black line for the route and the red X for the hidden object as shown in **Figure 4**.

RESULTS

Regarding the intervention presented above, the researcher completed a table consisting of the objectives of the activity along with the responses of the kindergarten students that participated in this activity. Based on this information, it is considered that the teaching intervention was successful. Spatial learning trajectories offer a structured, developmentally appropriate approach to fostering early mathematical understanding. Integrating spatial reasoning into early childhood curricula not only enhances geometry learning but also supports broader mathematical thinking. Future research should continue to refine these trajectories, explore their longitudinal impact, and examine how technology and teacher training can enhance spatial instruction.

During the intervention, it was noticed that the children showed particular interest and participated enthusiastically throughout the activity. In addition, the children expressed their opinions and most of the questions they had were solved when they discussed them with each other, but those that could not be solved by themselves, which the researcher made sure to solve themselves. Throughout the activity, children were supported and whenever they needed help and asked the researcher for it, they were given small details, without revealing the answer, so that they could find the solution themselves. This procedure was considered suitable for children from the age of 4 and up. It is an activity that, although 4-year-old children have difficulty with, does not mean that with a few more explanations and a little more time they will not succeed.

The objectives of the activity are presented in the first column, and the subsequent columns present each child's response to it (**Table 1**). The results from the overall monitoring of the children during the activity were initially recorded by hand as the researcher had printed **Table 1**, so that during the activity the researcher discreetly noted their responses.

DISCUSSION AND CONCLUSION

This paper focused on spatial thinking, or place learner, which is a developmental process in which the child develops abilities to understand and process the concept of space. It is defined as an interdisciplinary form of thinking that consists of understanding concepts of space and reasoning processes to solve problems related to space (Clements & Sarama, 2023). Based on the kindergarten curriculum, it was considered that spatial thinking can be integrated into mathematics, physical education and where children have the opportunity to discover spatial relationships through games and activities that involve orientation, placing objects in space and include the recognition of shapes and paths (Penteri et al., 2022).

As it was mentioned in the theoretical framework, in order to determine whether children have the necessary knowledge, it is important to check basic spatial concepts, the recognition of landmarks in space and whether they can read maps. The previous step before the main activity includes knowledge verification questions and a simple orientation activity. Through the central activity, children develop not only spatial but also mathematical skills. To make the activity easier for children with difficulties or insufficient spatial thinking, it is suggested to simplify the instructions, use visual landmarks or photographs as landmarks and encourage cooperation between children. On the contrary, to increase the difficulty, a more complex route with intermediate points can be added and a time limit can be set. The activity was completed effectively. Some instructions were repeated for the younger children, but this did not affect the results or the whole

Table 1. Objectives of the intervention activities and kindergarten student responses

Goals	A.	E.	Mr.	M.
To be able to create a map.	Yes, with the help of someone else.	Yes, alone.	Yes, alone.	Yes, alone.
To be able to "read" a map correctly.	Yes	Yes	Yes	Yes
To be able to use the map as an orientation tool.	Yes, it was difficult at first, but then he found a way.	Yes, it was difficult at first, but then he found a way.	Yes, without difficulty.	Yes, without difficulty.
To be able to identify and describe the location of objects in space using spatial terms.	At first he had difficulty, but towards the end of the activity he was able to do it.	He could at first, but towards the end he did it with more ease.	At first he was a little hesitant, but in the end he was more confident.	At first he was a little hesitant, but in the end he was more confident.
By the end of the activity, they should be able to express themselves in spatial concepts.	Yes, successfully.	Yes, successfully.	Yes, successfully.	Yes, successfully.

process. Further research suggestions would be to have more time at the researcher's disposal to implement other activities as well as to have access to more materials and a larger number of participants to be involved in the process. Thus, curricula that embed spatial learning within early math activities have been shown to improve outcomes: The Building Blocks curriculum (Clements & Sarama, 2009) is an example of how learning trajectories are applied in classrooms, with proven effectiveness in increasing both spatial and mathematical competencies. Development and research in early math education networks also support research-informed trajectories that integrate spatial thinking into early numeracy development. Assessments aligned with trajectories, such as the early math assessment, can help educators track spatial learning progression and tailor instruction accordingly.

Author contributions: IP: conceptualization, project administration, methodology, investigation, data curation, resources, formal analysis, writing – original draft, validation, visualization; **MS:** writing – review & editing, visualization. Both authors approved the final version of the article.

Funding: The authors received no financial support for the research and/or authorship of this article.

Acknowledgments: The authors would like to thank everyone who helped complete this study.

Ethics declaration: The authors declared that this study was conducted as part fulfillment for the requirements of the undergraduate course during the student's IP practicum. No sensitive personal data was collected, and all information was anonymized.

Declaration of interest: Authors declare no competing interest.

Data availability: Data generated or analyzed during this study are available from the authors on request.

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APPENDIX A

Table A1. Organized activity plan A

Learning path: Spatial thinking/place learner

Brief description of the activity: There are 16 children in the class, aged 4-5 years. The children are outside, divided into pairs and all pairs will have a hoop in front of them. The kindergarten teacher will have a series of cards that will show the hoop and the position that each child should take. So one child will draw a card and do what it shows and the other will ask his/her partner "where are you standing?" Then the roles are reversed.

1. Purpose of activity

- Children to acquire spatial orientation and spatial relationships.

2. Teaching objective(s) (learning objectives)–Aims

1. Children should be able to coordinate their body movements within space, following spatial terms.
2. Children should be able to describe their location or the route they follow using appropriate spatial vocabulary.

3. Teaching process

3.1. Teaching methods (problem-solving, construction, game, discussion, and storytelling): The teaching method followed in this activity is experiential learning, problem-solving and learning through play.

3.2. Materials: You will need 8 wreaths.

3.3. Representations that will be highlighted

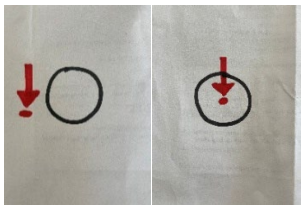
Active: As they move left, right, up, down, in and out of the hoops.

Virtual: There are cards that will depict where the child should stand.

Symbolic: Children give verbal instructions to their pairs.

4. Activity structure–Flow plan

4.1. Description of the start–Kindergarten teacher actions (activation of pre-existing knowledge and self-regulated learning): The kindergarten teacher gathers the children in a circle in the yard and tells them: We will divide into groups and play a game with hoops. The groups that will be created will be predetermined but the kindergarten teacher will make it seem random, in order for the dynamics of each group to be balanced. The groups will be divided with half sticks that will be of different colors and each child will have to find their partner who will have the remaining half colored stick. After they have been divided into groups, the teacher will show the children how to play the activity, that is, divided into pairs, the children will stand in a row and each pair will have a hoop in front of them. The kindergarten teacher will have a series of cards (like the ones below), which will show the hoop and the position that each child should take (red ball) in relation to the hoop. So one child will draw a card and must go and stand where the card points and their partner will ask "where are you standing?" After they have drawn three cards, the roles are reversed. The kindergarten teacher will walk around throughout the activity and observe what answers the children give.



4.2. Questions to be used–Vocabulary: The kindergarten teacher will ask questions of a more difficult level to children who will find the activity with the cards easy, such as "go stand to the right of the hoop, go to the left of the hoop". The children with their pairs will have the opportunity to ask each other questions and their answers must include spatial vocabulary. Then, during the activity, he/she will be above the children in case they need explanatory questions and clarifications, but also to encourage them.

4**.3. Children's actions (individuation, challenge, and collaboration):** The children who will perform what the card shows them should use vocabulary such as "I am standing inside the hoop, I am standing next to the hoop, etc." The children who will be opposite will ask "where are you standing?" and will check if the child performing the card is in the correct position. Enhancing cooperation.

4.4. Ending description: The activity is considered complete when all children have passed through both positions (the child who will perform the movement and the one who will ask the questions) at least 4 times.

5. Evaluation question and framework: After completing the activity and all the children have passed through both positions, the kindergarten teacher will give them a worksheet, which will be a single hoop, like on the cards, and the children will have to complete the worksheet depending on which position their pair was in, but also through questions from the kindergarten teacher, "why did you jump into the hoop, how do you know?"

6. Reflective action–Formalization of knowledge: At this stage, at the end of the activity, they will gather in plenary and there will be a discussion with the kindergarten teacher, who will explain to them that the activity I did was intended to help them have better orientation in a space and start a discussion based on what the children understood and whether they would like to do the activity again.

7. Duration: The duration of the activity is approximately 40 to 50 minutes.

8. Bibliography/sources: Learning trajectories: https://www.learningtrajectories.org/

Table A2. Organized activity plan B

Learning path: Spatial thinking/place learner

Brief description of the activity: There are 16 children in the class, aged 5-6 years. Initially, the kindergarten teacher divides the children into two groups, where one group hides an object in the space and then has to draw a complete map with a starting point in the classroom, a route and an end point at this object. When it is completed, it is given to the other group, which must read the map correctly and find the object. The activity is done at least twice, so that both groups pass through both locations.

1. Purpose of activity

- Children learn to interpret and read symbols on a map.

2. Teaching objective(s) (learning objectives)–Aims

1. Children should be able to "read" a map correctly, using it as a tool for orientation and problem-solving.
2. Children should be able to identify and describe the location of objects in space, using spatial terms.

3. Teaching process

3.1. Teaching methods (problem-solving, construction, game, discussion, and storytelling): In this specific activity, children are asked to collaborate with their classmates through a discussion to construct a map. While the other group of children must solve the problem as a team and reach the finish line.

3.2. Materials: They will need various objects (to hide), paper (A4 sheets of paper), and markers.

3.3. Representations that will be highlighted

Active: The movement of children within the space, from the moment of starting to the finish.

Virtual: The map.

Symbolic: The starting points, the point where the object is hidden and the path.

4. Activity structure–Flow plan

4.1. Description of the start–Kindergarten teacher actions (activation of pre-existing knowledge and self-regulated learning) & Questions to be used–Vocabulary: The kindergarten teacher gathers the children in a comfortable part of the room and introduces the concept of maps, starting by showing them different types of maps and asking them, "what do maps help us with?", "can we make a map too?", "what materials do we need to make a map?". In addition, during the introductory discussion, basic knowledge of spatial concepts and orientation should be checked. Therefore, it should be checked whether they know basic concepts, such as right, left, up, down, whether they can recognize landmarks in space and recognize simple maps. During the activity, they will be above the children in case they need explanatory questions and clarifications, but also to encourage them.

4.3. **Children's actions (individuation, challenge, and collaboration):** The children are put into groups, where one group collaborates and talks to decide where to hide the object and then as a group they must create and design a map that will be easy for the other group to read and find the hidden object. The other group must also work collaboratively in order to read the map correctly and find the object. Then, the two groups switch roles and the process repeats.

4.4. Ending description: We consider the activity to be over when both groups have gone through both roles.

5. Evaluation question and framework: After all the students have finished and both groups have gone through both roles, the students gather in plenary. The kindergarten teacher then asks them to share their maps and find similarities and differences between the two groups. The questions they would ask would be the following: "What did the two groups do differently, which map is more understandable and "easier" to read?". More specifically, I will ask them: "What did you learn about making the maps?", "What was difficult for you, what did you find very easy?"

6. Reflective action–Formalization of knowledge: At this stage, at the end of the activity, they will gather in plenary and there will be a discussion with the kindergarten teacher, who will explain to them that the activity I did was aimed at reading a map correctly and being able to create maps on their own based on the position of objects and themselves in space. On this occasion, they start a discussion based on what the children understood and if they would like to do the activity again and at what level of difficulty.

7. Duration: The duration of the activity is approximately 30 to 40 minutes.

8. Bibliography/sources: Learning trajectories: https://www.learningtrajectories.org/

Table A3. Organized activity plan C

Learning path: Spatial thinking/place learner

Brief description of the activity: There are 16 children in the class, aged 6-7 years. The kindergarten teacher divides the children into pairs to build a model of our room or our yard and we invite the children to build it. Initially, all the children observe either the position of all the furniture and objects inside the interior space, or the toys and objects in the outdoor space and on paper they draw and cut out the furniture, toys or objects respectively. Then, they glue the cut papers onto a larger piece of paper, so that the model of the room or yard is represented. Finally, they draw and comment in spatial terms on the various routes that appear on the paper and what they observe in them.

1. Purpose of activity

- Children should acquire spatial orientation and use spatial vocabulary.

2. Teaching objective(s) (learning objectives)–Aims

1. Children should describe routes during their autonomous movement in space.
2. Children should use spatial relationships in their descriptions.

3. Teaching process

3.1. Teaching methods (problem-solving, construction, game, discussion, and storytelling): The teaching method followed in this activity is experiential learning, problem-solving and learning through play.

3.2. Materials: The materials you will need are A4 sheets, either colored or white, markers and scissors.

3.3. Representations that will be highlighted

Active: The children's tour of the space to study it before implementation.

Virtual: The model of the room.

Symbolic: The papers which will be glued onto the paper and will represent the objects and furniture in the space .

4. Activity structure–Flow plan

4.1. Description of the start–Kindergarten teacher actions (activation of pre-existing knowledge and self-regulated learning) & Questions to be used–Vocabulary: The kindergarten teacher gathers the children in the classroom and starts a discussion by asking them, "what do you think our classroom would look like if we were to create it on a sheet of paper?" During the discussion, the kindergarten teacher can also ask "what are the main elements of our classroom that we will depict on paper?", "how will we determine which furniture and which object will go in and where?" Through the discussion and questions, the children's pre-existing knowledge can be activated and thus the children will be asked if they would like to create our own classroom on a paper model.

4.2. Questions to be used–Vocabulary: The kindergarten teacher's most basic questions will be "what do you think our classroom would look like if we made it on a sheet of paper?", "what will be the main elements of our classroom that we will capture on paper?", "how will we define which furniture and which object will go in and in which place?" Then, during the activity, he/she will be above the children in case they need explanatory questions and clarifications, but also to encourage them. In addition, he/she will encourage them to use spatial concepts when it comes time to show their classmates the model of the classroom they created.

4**.3. Children's actions (individuation, challenge, and collaboration):** In this activity, children will work in groups of two, observing the furniture and objects in the classroom and discussing and deciding which ones they want to put in their model. Collaboration between children can be a challenge for some children, but the kindergarten teacher should be there to support the teamwork. Through discussion and collaboration, the children will eventually produce a model of the classroom, provided they have followed the steps correctly.

4.4. Ending description: The activity is considered complete when all children have completed the classroom or yard model.

5. Evaluation question and framework: After all students have completed a model of their class, they gather in plenary to discuss and share their models with the rest of the class.

6. Reflective action–Formalization of knowledge: At this stage, at the end of the activity, we remain in plenary for discussion and reflection. Specifically, the kindergarten teacher.

7. Duration: The duration of the activity is 40 to 50 minutes.

8. Bibliography/sources: Learning trajectories: https://www.learningtrajectories.org/