Research Article

The REACT Strategy in Early Childhood Education: Teaching Geometric Shapes by "Pastry Kuki"

Eser ÜLTAY[1], Neslihan ÜLTAY[2]

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Abstract

The REACT strategy is a strategy that enables the context-based approach to be used in learning environments and consists of Relating, Experiencing, Applying, Cooperating, and Transferring stages. In this study, it was aimed to present a teaching experience of geometric shapes via the REACT strategy by "Pastry Kuki" in early childhood. The research was carried out in a public kindergarten with twenty 48-60-month old children on Turkey's northern east coast during the spring semester of 2019-2020. The implementation lasted for 90 minutes (in three separate parts). During all the stages of the REACT strategy, the children seemed interested, and they liked the context of "Pastry Kuki." The REACT strategy is frequently used in secondary school and upper grades and in scientific topics. Therefore, this study is important and valuable because it is implemented in early childhood education and in geometry. It is suggested that more studies be carried out with children.

Keywords: Early childhood education, geometric shapes, REACT strategy

[1] ORCID: 0000-0001-6839-6361, Giresun University, Faculty of Education, eserultay@gmail.com

[2] ORCID: 0000-0002-9783-0486, Corresponding author, Giresun University, Faculty of Education, neslihanultay@gmail.com

Introduction

It can be said that the foundation of the learning theories and approaches that have emerged in recent years is the establishment of the relationship between the learned information and daily life, because students have the most difficulty in establishing this relationship (Schreiner & Sjøberg, 2007). The common point of all theories and approaches from the constructivist approach to STEM is that they try to establish a relationship between the content and the information to be taught and daily life. The constructivist approach, while establishing a relationship from the known to the unknown, aims to establish a strong relationship by presenting relationships and examples from daily life that are familiar to the student (Rieber, 1992).

The context-based approach is a learning approach that was put forward on the basis of the constructivist approach, and it aims to give the student the familiar relationships and examples presented to them in a context (Ingram, 2003). When the context-based studies are considered it is seen that the context-based approach was not preferred in early childhood education. There is only one study which was carried out with preschool teacher candidates (Can & Ültay, 2020). The purpose of this study is to determine the effect of preschool teacher candidates on alternative concepts on substance and properties using a context-based learning approach enriched with different conceptual change strategies (Can & Ültay, 2020). It has been discovered that context-based learning approach course materials that are enriched with various conceptual change strategies outperform traditional learning approach course materials in terms of eliminating alternative concepts about matter and properties in preschool teacher candidates. Therefore, it would be a good idea to use the context-based learning approach in early childhood education.

The REACT strategy, on the other hand, is a strategy that enables the context-based approach to be used in learning environments and consists of five stages (Crawford, 2001). These stages consist of Relating, Experiencing, Applying, Cooperating, and Transferring stages and are referred to by the acronym consisting of their first letters. According to Ingram (2003), the REACT strategy is based on constructivism and involves students in critical thinking and problem solving activities to improve their understanding of concepts.

Students are associated with their existing knowledge in the Relating stage, which is the first stage of the REACT strategy, and this association is made through familiar contexts. Contexts are introduced and presented to the student at this stage. Students have the opportunity to apply what they have learned in the second stage, Experiencing. These can be realized through various experiments or applications, or they can be realized as concretizations of abstract concepts. Students apply concepts and information in a useful context through projects, activities, labs, text, and video in the Applying stage. The Cooperating stage emphasizes learning through sharing, responding, and communicating with other students. This can be realized through group activities such as projects, labs, problem-solving exercises, and realistic

scenarios. Students transfer skills and knowledge from one setting to another at the Transferring stage (CORD, 1999).

The REACT strategy is generally preferred for teaching science subjects (Bilgin, Yürükel, & Yiğit, 2017; Günter, 2018; Ültay, Durukan, & Ültay, 2015; Ültay, Ültay, & Dönmez Usta, 2018), and it is seen in the literature that it is used in mathematics and geometry education, albeit to a lesser extent than science (Jelatu, Sariyasa, & Ardana, 2018; Sari & Darhim, 2020; Widada et al., 2019).

Mathematics is frequently thought as a difficult subject for children (Kesicioğlu, 2015; Widada et al., 2019). Geometry, on the other hand, can be more enjoyable for children because it is about shapes. Geometry, because it deals with shapes, objects, and the relationships between them in real life, helps children understand the real world by comparing them (Gunhan, 2014). Geometry can be a fun way for a child to begin his or her journey into the world of mathematics (Jelatu, Sariyasa, & Ardana, 2018). Geometry can also help with logical and deductive reasoning about spatial objects and relationships (Alqahtani & Powell, 2016). As a result, understanding geometric concepts is important in learning mathematics, and therefore geometric concepts should be developed effectively.

Children show a lot of interest in what is going on around them in their early childhood (Ültay & Ültay, 2022). Their attention is drawn to the sky and celestial bodies in the sky in particular (Kallery, 2011). Celestial body shapes can be a good way to introduce geometric shapes. Because geometric shapes are shapes that children can easily notice in their surroundings, there are numerous ways to connect them to everyday life. Children who can recognize geometric shapes can now tell which objects they see around them resemble which of these shapes. At this point, the context in which geometric shapes are taught to children becomes critical. Any person, fictional hero, puppet, subject, object, story, problem situation, or event that children find interesting can be used as the context. The important thing is to maintain children's interest in the subject and to increase their motivation for the subject while teaching it to them. "Pastry Kuki," a puppet, was chosen as the context for teaching geometric shapes in this study. The goal of this study is to present a teaching experience of the REACT strategy to teach geometric shapes to children aged 48-60 months in early childhood. Children attend a public kindergarten, and a total of 20 children, ten girls and ten boys, took part in the event.

Implementation of REACT strategy in early childhood: Geometric shapes

Age: 48-60-month old children

Number of children: 20

Duration of the activity: 90 minutes (in 3 separate parts)

Relating: Presenting the context and introduction to the course

The teacher comes to the classroom and surprised the children with a puppet named “Pastry Kuki” (see Figure 1).

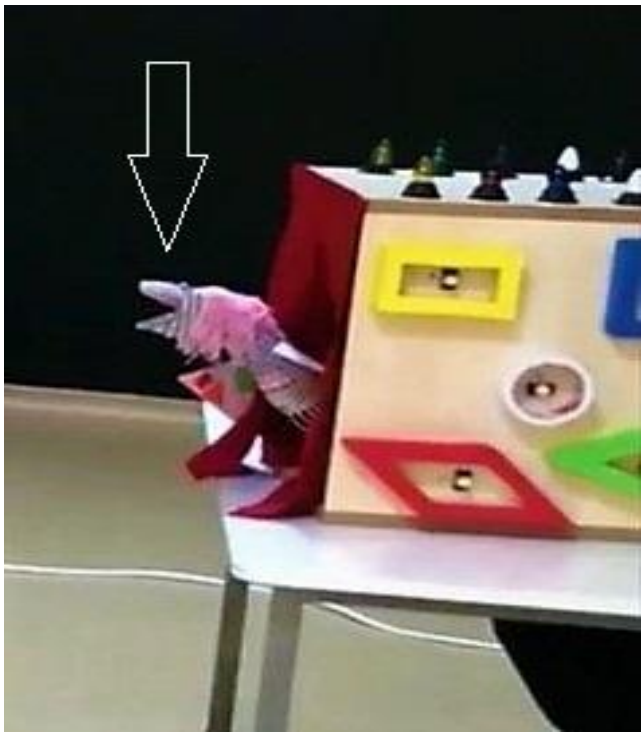

Figure 1. Pastry Kuki

The teacher tried the children to pay attention to the puppet (see Figure 2). Kuki talks to himself and says “I can't decide in which shape to make a cake.” Then he asks children “In which shape should I make a cake, children? Look, there are many shapes on my wings, see? Do you know these shapes?” After listening to the answers, Kuki introduces the shapes on its wings. After children meet the puppet and make some conversation, then a video is started (see Figure 3).

Figure 2. Introducing the puppet of "Pastry Kuki"

The video is about the geometrical shapes (URL-1, 2019). In the video, geometrical shapes are introduced one by one (circle, rectangle, square, triangle, etc.), their characteristics are explained in short, and some examples which look familiar in daily life are given. Children try to give examples from their own environment.

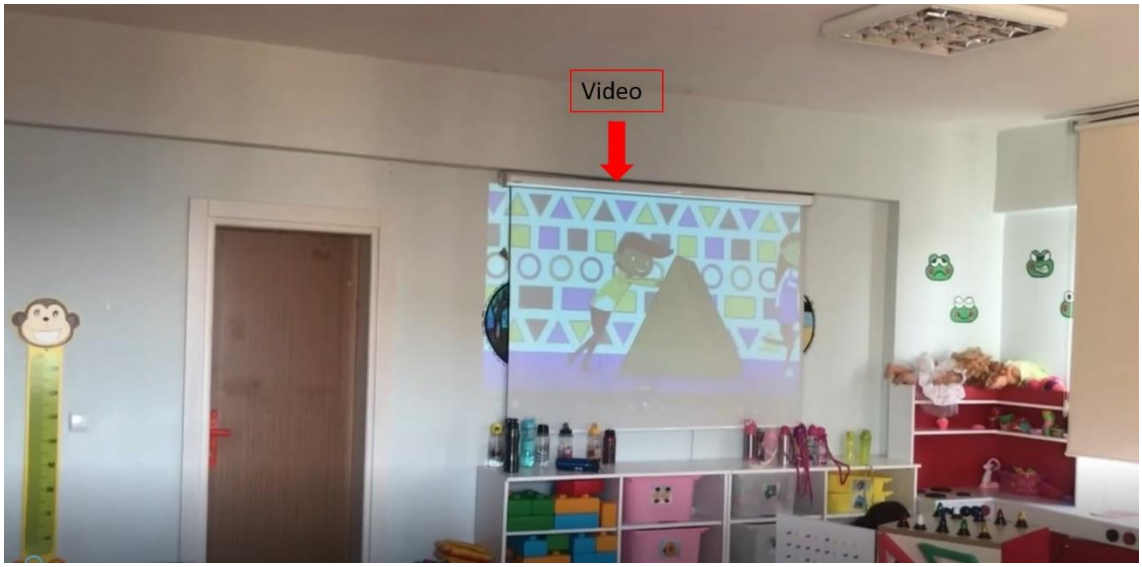

Figure 3. Geometrical shapes video (URL-1, 2019)

Experiencing: Experiencing of learned knowledge by worksheets

In this step, the worksheets prepared by the teacher beforehand are distributed to the children. There is a patisserie on the worksheets and there are cakes in different geometrical shapes. The children seat in in groups of five person but do the worksheets by individually (see Figure 4). The children are asked to circle the triangular cakes in green, the square ones in blue, the rectangular ones in red, the disc ones in yellow, and the circle ones in purple. If children make a mistake, hints are given to guide them to the correct answer.

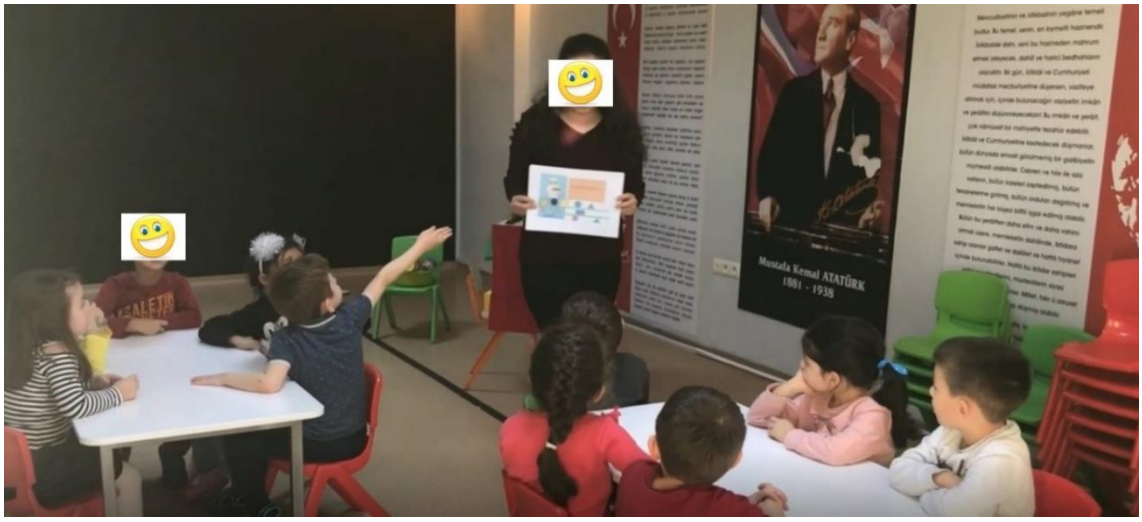

Figure 4. The visual of Kuki's patisserie in experiencing stage

Applying: Applying concepts and information in a context through projects, activities, labs, text

The Pastry Kuki tells the children that there is no cake left in the patisserie and asks the children to help them make a cake with him. The teacher prepares flour, baking powder, eggs, sugar, etc. and puts them on the tables. The Pastry Kuki wants children mix the cake materials and all children make their own cake dough (see Figure 5).

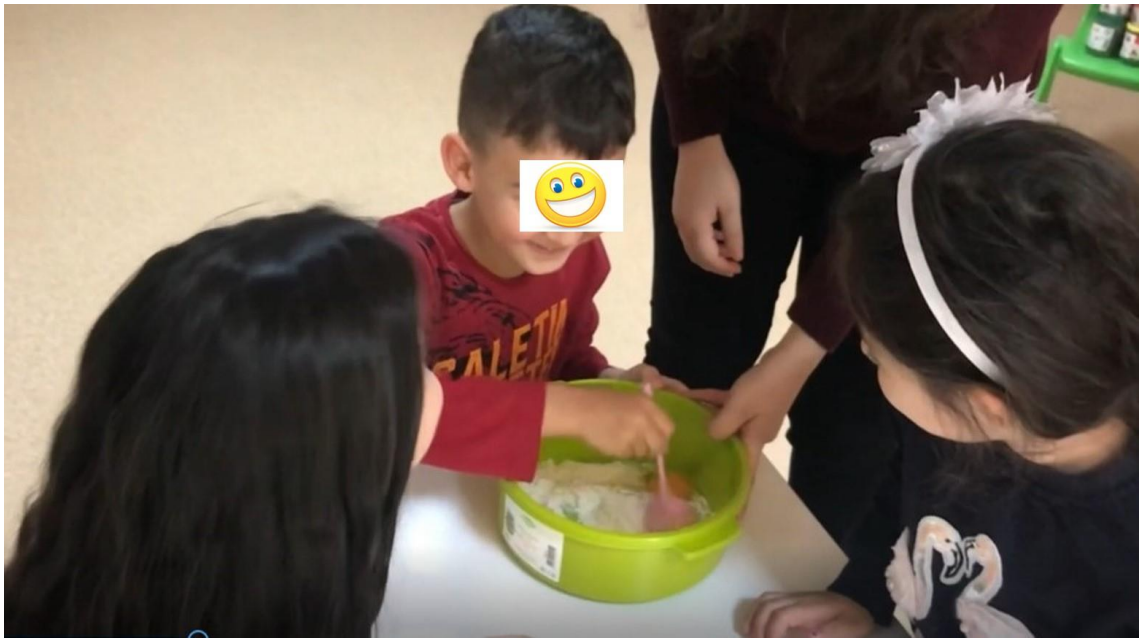

Figure 5. A child is mixing the cake materials

After children form their own cake dough, teacher distributes play doughs and cake molds for children form smoother geometric shapes. Children play doughs and form different geometric shapes with cake molds (see Figure 6).

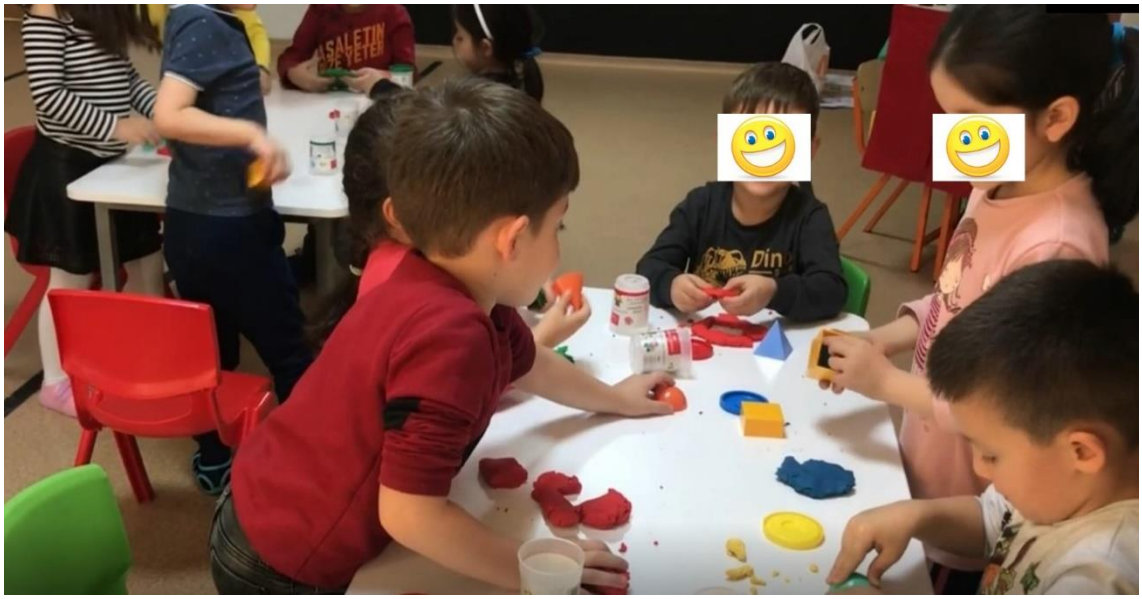

Figure 6. Children form geometric shapes with play dough and cake molds

Children form their geometric shapes and then tell what they have done in the classroom. They explain how they form their cakes with geometric shapes.

Cooperating: Learning through sharing, responding, and communicating with others

In this stage, Pastry Kuki says he will cook the cakes children make with cake molds. After cooking the cakes with geometric shapes, Kuki gives them to the children. Children examine shapes. Pastry Kuki says that "I used to put these cakes on the shelves by myself. When I placed the right cake in the right place, my bakery would shine brightly. But I'm too old now. Children, I can't place the cakes. Can you help me?" Because there are too many cakes, he divides the children into two groups, and the children, accompanied by music, place the pieces of cake in geometric shapes one by one. As they attach shapes, the light turns on (see Figure 7). When the music stops, the shapes are checked to see which shape illuminated which light. In fact, cooperation is used cyclically in all phases of the REACT strategy (Navarra, 2006), and it is included here as well via an activity.

Figure 7. Children are putting the geometric shapes on the box and light is on

Transferring: Transferring skills and knowledge from one setting to another

At this stage, children are provided to transfer the knowledge they have learned to real life. Pastry Kuki asks the children to decorate a corner of the patisserie, but tells them to do it with a rubber band, not a pencil. He asks each child where they see the geometric shapes they have created in daily life and asks them to picture it with a rubber band. In this way, each child draws a picture using rubber bands (see Figure 8) and then the children explain what they try to create.

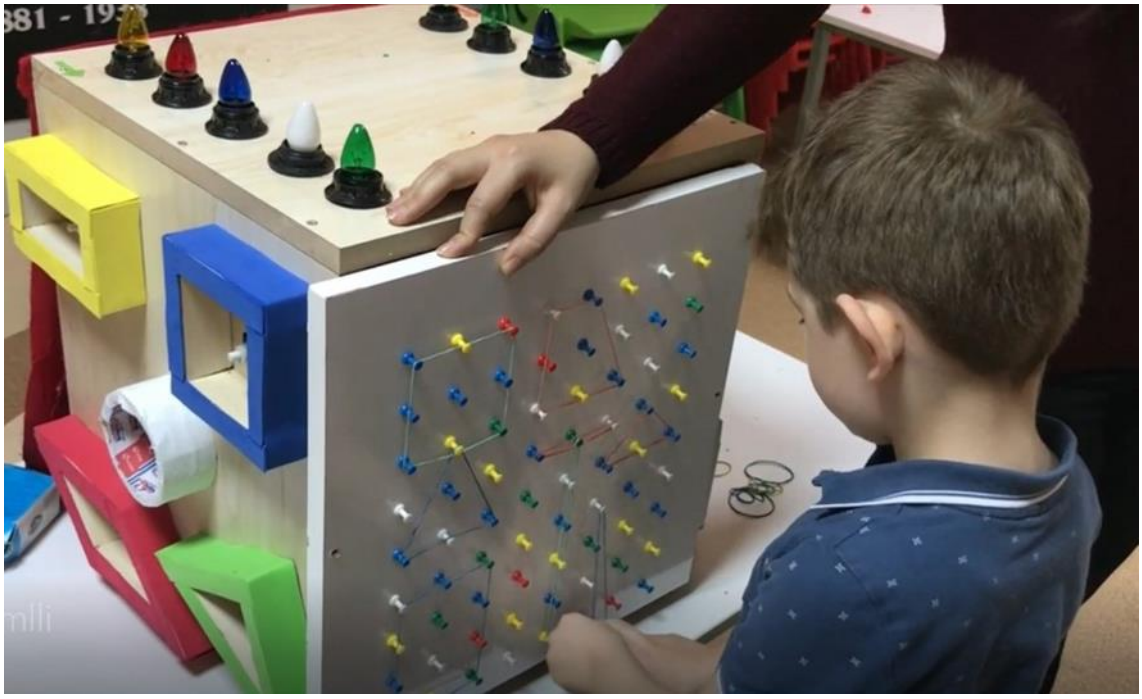

Figure 8. A child is creating geometric shapes with rubber bands

After the implementation, a general evaluation is made. For this purpose some questions are asked to the children such as "Have you ever had difficulty while creating geometric shapes with rubber bands?", "Which geometric shape is your favourite?", "Could you give examples for geometric shapes in the classroom or in your environment?", etc.

Conclusion

This experience was quite exciting as the context-based approach and REACT strategy is a topic that has not been studied before with pre-schoolers. The children surprisingly showed interest and participation in the subject. Pastry Kuki, chosen as the context, was very familiar and sincere to them. One of the most important cornerstones of the REACT strategy is the choice of context (Gül, 2016; Keskin & Çam, 2019). At this point, Pastry Kuki can be considered as a very appropriate context.

In the relating stage, the children were introduced to the context and it was tried to draw their attention to the subject. Pastry Kuki is a puppet and talked to the children about geometric shapes. Thus, the motivation of the children towards the lesson was tried to be increased. In the experiencing stage, the children tried to recognize the shapes on a worksheet with Kuki's patisserie. Thus, it can be said that the learned knowledge is applied. In the application phase, the children first kneaded the cake dough and then tried to create geometric shapes with the dough using cake molds. The cooperating stage can be used in all phases of the REACT strategy as well as in some phases, and it has a cyclical feature (Navarra, 2006). As cooperation was used in more than one stage in this application, the children were also divided into groups

at this stage, and by attaching geometric shapes on the box, they both helped Pastry Kuki and illuminated Kuki's shop. In the transferring stage, Kuki asked the children to decorate the patisserie and gave them rubber bands and asked them to create various geometric shapes. Thus, at all stages of the REACT strategy, activities were carried out in cooperation by establishing relations with daily life, without leaving the context of Pastry Kuki. It was observed that the children had fun and participated during the activities. They also stated that they found it amusing to the questions about the activities. Thus, Stolk et al. (2009) pointed out in their studies that because students are more actively involved in their own learning process, they are more willing to learn. Furthermore, there are many studies in the literature in which the REACT strategy is used and the students stated that they enjoyed it (Gül, 2016; Keskin & Çam, 2016; Saka, 2011, Ültay, 2012). Based on this, it can be said that the REACT strategy is a suitable strategy for the early childhood children. For other subjects, it is recommended to apply the REACT strategy in the early childhood period.

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