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Examining the Skill Development of Pre-Service Primary School Teachers Through Interdisciplinary Approach

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The first step to access information; It is possible to perceive it by hearing, seeing and touching. It is necessary to make sense of this gained knowledge. Therefore, having some basic skills forms the basis of all disciplines. The purpose of this research is to determine skills through activities prepared with an interdisciplinary approach. The research was designed as a case study. Purposeful sampling method was used to determine the study group of the research; The study was conducted with third grade primary school teaching students as the study group. As data collection tools in the study; Skill target list, in-class skill observation form, semi-structured interview form and student products were used. At the end of the research, the students' skills were determined and in terms of science skills; It was revealed that life skills and innovative thinking skills were sufficient, but scientific process skills were not sufficient. In terms of language skills, reading and writing skills were found to be at an intermediate level. However, speaking skills, which are self-expression skills, were found to be at a low level. In terms of mathematical skills, it was observed that their problem solving skills were high, but their level of using basic mathematical skills was low. Technology skills; It has been found that it is sufficient in terms of algorithm creation, but not in the context of science acquisition. In addition, it has been observed that the activities prepared through the task-oriented teaching method make the lesson interesting and are effective in revealing creativity.

Keywords: interdisciplinary approach, skills, pre-service teacher

INTRODUCTION

Scientific, social, cultural and technological developments in our age have eliminated a single disciplinary approach and the sharp boundaries of disciplines. The real problems we encounter in our lives cannot be solved with just one discipline. It is inevitable to use interdisciplinary methods to solve these problems and make our lives easier. (Demir, 2009; Jacobs, 1989; Özkök, 2004; Turna, Bolat ve Keskin, 2012; Yıldırım, 1996; Öztürk, 2019). The term interdisciplinary refers to the use of methods, concepts, knowledge, skills, etc. of more than one discipline to investigate a central theme, context, problem or experience. means to integrate meaningfully and consciously (Jacobs, 1989; Erickson, 1995). Creating a perspective by meaningfully bringing together multiple disciplines and integrating this into teaching is called an interdisciplinary approach. (Diker, 2004; Wilson, Katos & Strevens, 2007; Cone vd., 1998; Fan, 2023). (Wood, 2001; McBroom & Oliver-Hoyo, 2007; Porter, 2007). Avargil, Herscovitz & Dori, 2012). In this context, learners can more easily associate and discover knowledge and skills with daily life. (Humphreys, Post & Ellis, 1981). According to Goldsmith and Kraiger (1996), interdisciplinary learning appears as an internalized framework of perspectives, concepts, ideas and research methods in the process of structuring knowledge. (Ivanitskaya and etc., 2002). The interdisciplinary inquiry process achieved in this way helps students understand the world around them and provides real learning instead of artificial learning (Jolley and Ayala, 2015). An interdisciplinary understanding of science is required to understand science, solve scientific problems and understand complex world problems. (You, 2017). In order to develop this

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understanding and perspective of science, it is essential to provide students with interdisciplinary learning environments at all levels of education, from early childhood to professional career stage. (Boix Mansilla ve Lenoir, 2010; Hubert, 2021).

Interdisciplinary content is an effective way for teachers to provide students with the opportunity to learn and practice 21st century skills and many other skills (Hubert, 2021). One of the most important aims of interdisciplinary teaching is to provide students with a versatile way of thinking, which enables them to develop different skills. Students who have these skills are ready to think critically and solve creative problems (Özkök, 2005). The student will not think of himself with the thinking style of a single and limited discipline and will perceive the skills related to the disciplines as a tool to achieve his own goals or solve the problems he encounters (Yıldırım, 1996). The courses taught by teachers with an interdisciplinary approach generally consist of disciplines that are close to each other, such as physics and chemistry. However, connecting disciplines such as language and chemistry can often lead to easier content creation (Yarker and Park, 2012). Teaching by focusing on students' different skills requires selecting innovative learning models, strategies or approaches according to learner characteristics (Ridwan, et al. 2022). For example, the skills aimed to be revealed in science courses can be easily integrated with language skills and common products/outputs can be obtained. In addition, high-level thinking skills such as problem solving, innovative thinking, creativity and critical thinking can emerge holistically in many disciplines (Karademir, 2020). The interdisciplinary teaching process is a systematic structure carried out to improve some of the skills of students. These are the language skills, problem solving skills, digital skills, curiosity, collaborative working skills and learning to learn. (Grady, 1994). [618098]

Jacobs (1989) proposed a model consisting of the following four stages to prepare a program according to the interdisciplinary approach.

Stage 1: A current topic suitable for the student should be chosen, and the topic should not be too general nor too narrow to limit the elements of the study. The topic can be a concept, theme, event or problem.

Stage 2: After the topic is selected in the first stage, the sub-topics related to the selected topic and the disciplines to which these topics may be related should be determined in the second stage.

Stage 3: The determined topics and disciplines should be associated with each other, that is, a systematic structure should be created.

Stage 4: Efforts should be made to prepare the program according to this structure.

According to Jacobs (1989) it is emphasized that integration should be made based on a four-stage model and a topic, concept, theme or context. In this context, it appears more functional to carry out integration with different skill areas. The skills used in the stages of structuring knowledge and transforming it into a product are scientific process skills. Scientific process skills are an important tool for producing, using scientific knowledge and problem solving activities. These skills should be possessed not only by scientists but also by all segments of society (Aktamış and Şahin Pekmez, 2011). Process skills help children and learners to improve students' abilities (Roslina et al., 2020; Suryanti et al., 2020; Zainuddin et al., 2020; Kamid et al., 2022). Scientific Process Skills; It covers the skills that scientists use during their studies, such as observing, measuring, classifying, recording data, establishing hypotheses, using data and creating models, changing and controlling variables, and conducting experiments. Life skills are the capacity of an individual to cope with the situations, needs and problems he encounters in daily life. Accordingly, sub-skills of life skills; It includes skills such as analytical thinking, decision-making, creativity, entrepreneurship, communication and teamwork (See Table 1).

Table 1
Discipline-specific skills in different disciplines (Source: Karademir, 2017)

Scientific Process Skills	Mathematical Skills	Design Skills	Technology Skills	Language Skills
Observation measuring Classification Saving data Establishing number and space relationships foresight Identifying variables Interpret data Inference. hypothesizing Using data and building models Experimentation Changing and checking variables To decide	Problem solving Communication Reasoning Attribution Affective skills Psychomotor skills Information and communication technologies (ICT)	Innovative Thinking	Computational thinking Critical thinking Algorithmic thinking Mathematical thinking Algorithm design Software development Infer Partnership	Reading Writing Listening Speaking

As seen in Table 1, according to Karademir (2017), there are many skill concepts in different disciplines. Rather than revealing these skills independently, it is necessary to emphasize the relationship between the skills and it is important to reveal these skills interdisciplinary. For this reason, instead of being single-disciplinary in the education system, it is necessary to address disciplines and discipline-related skills in a holistic manner. This reveals the need to consider disciplines holistically rather than separate courses at the same time. Primary school teachers carry out different disciplines / lessons / achievements while providing primary school education. They have the opportunity to handle the student as a whole and reveal their skills together. They are able to easily make plans that will reveal the skills of different disciplines together. For this reason, it is important to reveal holistic skills through interdisciplinary studies with primary school teachers. In this research, two activities that integrated different disciplines under a common theme were carried out with prospective primary school teachers and it was aimed to evaluate the process of the various skills of the prospective teachers.

The main purpose of this study is; to evaluate the different skills of pre-service primary school teachers through activities based on interdisciplinary teaching. For this purpose, skill-based classroom practices were carried out in order to carry out the process effectively and in this context, the answer to the following question was sought.;

"How *do the activities prepared according to the interdisciplinary teaching approach affect the different skills of pre-service teachers?"*

METHOD

This research was conducted with the case study design, which is one of the qualitative research methods. Case study is a methodological approach carried out by collecting multiple data for in-depth information about how a process is carried out (Chmiliar, 2010). Merriam (2015) defines a case study as an in-depth description and examination of an event/situation carried out within a certain framework (Subaşı & Okumuş, 2017). In this research design, it is aimed to examine the situation in depth and describe it in detail in its real process. In case studies, the process, environment and event are not intervened. Therefore, the researcher is not a guide in the process, but only a spectator and observer. (Yin, 2009).

Study Group

Purposive sampling method was used to determine the study group of the research. The study group of this research consists of 40 preservice primary school teachers (fourth grade students) studying in the Primary School Teaching Program of a state university. The main reason why the group was chosen as the primary school teaching program is that primary school teachers take courses that include different disciplines (mathematics, science, social studies, linguistics, life sciences, etc.) and they are one of the most suitable fields for carrying out interdisciplinary activities. In the research, participants were allowed to carry out the activities in groups, and for this reason, a total of eight different groups were formed, including different numbers of students (Table 2).

Table 2
Characteristics of the study group

	Male	Feamale	Total
Group 1	2	4	6
Group 2	1	3	4
Group 3	1	4	5
Group 4	0	5	5
Group 5	2	3	5
Group 6	1	3	4
Group 7	1	5	6
Group 8	1	4	5
Total	9	31	40

Data collection tools

As data collection tools in the study; Skill target list, in-class skill observation form, semi-structured interview form and student products were used. Skill target lists; It was created by the researcher to determine the process by which the sub-skills that make up the skills can emerge in the activities. In line with expert opinions, the skills and sub-skills expected to be revealed in the process were listed and the situation of emergence was created with the activities and feedback carried out in the process.

The in-class skill observation form was created separately for each of 8 different groups within the scope of the skills included in the skill target lists, and group frequencies were specified. While creating the semi-structured interview form, items were scanned in detail in the relevant literature and expert opinion was sought. It was created as a result of the reviews of four experts in the relevant field, including two faculty members who work in the field of skills training and one faculty member in the field of measurement. Student products are concrete contents that emerge during the activity processes or as a result of the activity.

Procedure

This research was conducted with interdisciplinary activities designed to reveal the different skills of pre-service teachers studying in the final year of the Primary School Teaching Program. By adopting an interdisciplinary teaching approach, prospective teachers' skill use, skill-focused activity development, and skill development during the activities were investigated. Activities were developed and implemented through interdisciplinary teaching, as a result of the activities, it was determined which skills the teacher candidates used and the processes in Table 3 were followed.

Table 3
Processes of activities

Acticvity	Theme / Disciplines	Content, Processes and Application	Target Skills	Data Collection
Design development activity	Theme: Which one is the fastest? Disciplines to be integrated: Science, Mathematics, Language, Engineering, Art	1) Students start the process by reading an original story text given to them. In the story, they are asked to design a vehicle that complies with the process and instructions. 2) The drawing and design process is carried out before creating the product. 3) Students are asked to bring materials based on their inferences from reading and design drawings. 4) Design products are created with the materials brought.	*Scientific Process Skills* measuring Classification foresight Identifying variables Interpret data Make an inference Using data and building models Experimentation Changing and checking variables *Life Skills* Analytical thinking To decide Creativity Team work *Language Skills* Reading	Skills Checklist In-class skill observation form Structured interview form Student group products
Algorithmic thinking activity	Theme: A robot story Disciplines to be integrated: Science, Mathematics, Language, Engineering, Art	1) Choose one of the learning outcomes for the group you will teach and design a project by writing a story about the use of robots in daily life. 2) Create a map and algorithm in line with the story. 3) Describe your projects by making a presentation. 4) Add the necessary program outputs (Word file, video recording, algorithm output ".fch" and map ".map").	*Scientific Process Skills* Establishing number and space relationships Identifying variables Inference Using data and building models Experimentation *Life Skills* Analytical thinking To decide Creativity entrepreneurship Team work *Engineering and design skills* Innovative Thinking *Language Skills* Writing skill *Mathematical Skills* Problem solving Mathematical process skills technology skills Computational thinking algorithmic thinking Algorithm design Infer	

FINDINGS

In this part of the research, combined findings based on data obtained from all instruments (observation, interview and student products) used.

Findings of the design development activity:

Analysis of the results of the design development activity consists of two stages. In the first stage, as seen in Table 4, the goals and behaviors expected to be revealed in the prepared interdisciplinary activities were revealed.

Table 4
"Design development activity" target table

Sub-skills expected/targeted to emerge in the context of scientific process skills	
Sub-skill type	Feature expected/targeted to appear
Measuring Classification foresight Identifying variables Interpret data Make an inference Using data and building models Experimentation Changing and checking variables	Calculating the distances and locations of the parts of the car during the construction phase Classifying the vehicle according to its different features Estimating how to make a project from materials Depending on the material usage, the speed of the car, its weight, etc. determine the characteristics Interpretation depending on the movement characteristics of the car Ability to create and move a car from a certain material group Creating a product by making a working vehicle Testing the vehicle's operating status Calculating the speed of the vehicle depending on different distances
Sub-skills expected/targeted to emerge in the context of life skills	
Sub-skill type	Feature expected/targeted to appear
Analytical thinking To decide Creativity Team work	Separating necessary and unnecessary materials from the bill of materials Deciding step by step all the processes that will reveal the tool Ability to produce original ideas for the movement features of the vehicle Ability to make joint decisions with group members

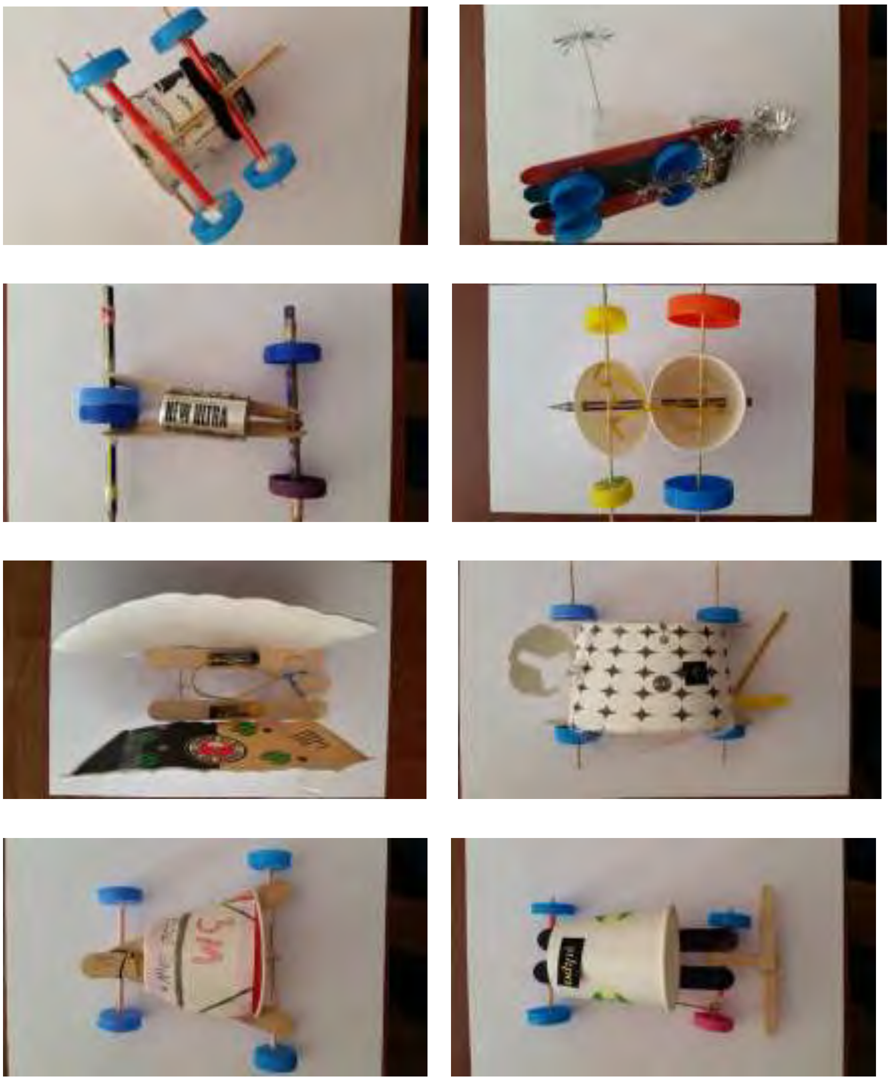
In the first part of the analysis phase, the goals and behaviors of the students as a result of the activity were evaluated and presented in Table 4. The obtained data were brought together and a frequency table was created in Table 5.

Table 5
Findings of the design development activity ın-class skills observation form

Skills	Sub-skills	Activity Process/Post Occurs Frequency		
		Yes	Partially	No
Scientific Process Skills	*Measurement skill*	1	3	4
	Classification	-	1	7
	foresight	5	2	1
	Identifying variables	2	4	2
	Interpret data	4	-	4
	Make an inference	3	3	2
	Using data and building models	7	1	-
	Experimentation	7	-	1
	Changing and checking variables	4	1	3
Life skills	*Analytical thinking*	-	1	7
	To decide	7	-	-
	Creativity	7	-	1
	Team work	6	2	-

For the design development activity, combined findings based on observation, interviews and student products are shown in Table 5. According to Table 5; When we look at the expected/targeted sub-skills in terms of scientific skills:

The behavior of calculating the aerodynamic properties of the car required for the measurement skill was observed completely in 1 group, partially in 3 groups, and was not observed in 4 groups. Completely observed group reasons; "*The reason why we used the cardboard cup was to prevent the plastic cup from remaining light and causing imbalance.", "The reason why we chose small plastic bottle caps as wheels was to ensure that the car moves comfortably and quickly, as they have less area touching the base and are less affected by friction*." He stated more than one reason. In partially observed groups; "*We thought that using plastic bottle caps would be more suitable than other materials to apply the friction force. Because when the serrated surfaces come into contact with the ground, an opposing force will appear and in this case, friction force will occur*." They stated justification in only one area. The behavior of classifying the materials required for the classification skill according to their place of use was partially observed only in 1 group. "*The reason we use the tongue stick is that it is flat and it is the most suitable material*." The answer has been given. Here, it can be seen that a material was classified and used, at least partially, before starting to make cars. Apart from this, the materials of other groups are for the wheel, the body, etc. It has not been observed that they use them by classifying them according to their characteristics. In the behavior of predicting how to make a project from the materials required for the prediction skill, answers such as cars and toy cars came from 5 groups of individuals, while science-related answers such as magnetization and electricity came from 3 groups. Another group gave answers such as making ornaments, necklaces, bracelets, and flowers with straws and lids. Depending on the use of materials for the ability to determine variables such as the speed of the car, its weight, etc. behavior of determining characteristics; It was observed completely in 2 groups, partially in 4 groups, and was not observed in 2 groups. In fully observed groups; "*When choosing materials, we paid attention to the car's robustness and useful aesthetics. We used plastic bottle caps to make the car move when we pulled it. "The purpose of this is to be an aesthetic and lightweight material.*" "*We used light materials such as paper cups, toothpicks, plastic lids and tires in the construction of the car. "The reason for this is that when we pull and release the tire, the materials can go faster without the effect of the weight." There were answers that emphasized more than one feature, such as: In partially observed groups; "Keep the front distance wheels short. "The reason for this was to make the car go fast." "We used plastic cups because they are light in use*." Answers such as these were given. For the ability to interpret the data, the behavior of interpreting the situation of the car tipping over during movement depending on the materials was observed in 4 groups, but was not observed in 4 groups. In the observed groups; "*Since the car is light, we placed thick batteries on it to prevent it from being thrown around." "When the car gained strength, it was skidding. "In order to eliminate this, we ensured equal load balance of the car with weights.*" Answers such as these were given. In the behavior of creating and moving a car from a certain group of materials for the ability to draw conclusions; While 3 groups were able to move their cars, 3 groups were able to move them partially. Two groups could not move at all. For the ability to use data and create models, to use the materials at hand in the most appropriate way and to create a product after car design; While 7 groups created a car using the materials they had, one group was able to create a partial car. For the ability to experiment, in the behavior of testing the suitability of the vehicle to the expected features; While 7 groups had the opportunity to test their cars by experimenting, one group could not produce a car that could do the experiment. In the behavior of determining the effects of different types of materials for the ability to change and control variables; While 4 groups observed different effects by changing different variables such as batteries, tires and magnets in the car making process, one group changed the single material by changing only the tire. Three groups did not perform variable control.



Visual 1
Products of the groups' design activity

When we look at the expected/targeted sub-skills in terms of life skills:

In the behavior of separating necessary and unnecessary materials from the material list for analytical thinking skills; 1 group "*We chose our materials among many materials.*" With this sentence, he partially demonstrated analytical thinking skills. Other groups did not show analytical thinking skills by separating necessary and unnecessary materials at the beginning of the activity. For decision-making skills, in the behavior of deciding which materials to use and how; Only one group could not demonstrate decision-making skills at the first stage and could not choose the materials. As the activity progressed, they showed decision-making behavior. The other 7 groups had no difficulty in choosing the materials. In the creativity skill, the ability to produce original ideas for the visual features of the vehicle; Except for one group, all groups produced original creative car designs. For teamwork skills; While 2 groups partially showed teamwork, all groups participated in teamwork by working harmoniously/coordinated with their other group friends.

Findings of the algorithmic thinking activity:

To measure technology and informatics skills, a Robotics applied science activity was implemented based on algorithm skills. Analysis of the results consists of two stages. The first stage is the evaluation of effectiveness for the target table in Table 6.

Table 6
"Algorithmic thinking activity" target table

Sub-skills expected/targeted to emerge in the context of scientific process skills	
Sub-skill type	Feature or behavior that is expected/targeted to occur
Establishing number and space relationships	Ability to think in 3 dimensions when creating an algorithm map for robot application
Identifying variables	Determining the robot's features to use
Inference	Making robotic applications suitable for science achievements
Using data and building models	Creating an algorithm map showing the relevant achievement to run on the robot
Experimentation	Testing the algorithm sequence of the created robot
Sub-skills expected/targeted to emerge in the context of life skills	
Analytical thinking	Thinking of technology-based methods for the acquisition of a discipline
To decide	Deciding which features of the robot to use
Creativity	Creating an original story and robot application for a discipline acquisition
entrepreneurship	Convincing relevant people by explaining the project created to them
Team work	Working harmoniously/coordinated with other group members
Sub-skills expected/targeted to emerge in the context of engineering and design skills	
Innovative Thinking	Developing a robotic application for a discipline content
Sub-skills expected/targeted to emerge in the context of language skills	
Writing skill	Writing a story with scientific content regarding the achievements of a science discipline
Speaking skill	Explaining the features of the resulting product to the relevant people
Sub-skills expected/targeted to emerge in the context of mathematical skills	
Problem solving	Providing solutions to problems encountered in daily life using robots
Mathematical process skills	Using basic math skills when creating algorithm map for robotic application
Sub-skills expected/targeted to emerge in the context of technology skills	
Computational thinking	Creating robotic applications for problems or situations encountered
Algorithmic thinking	Thinking of a solution using an algorithm for the problem or situation encountered
Algorithm design	Designing an algorithm for the decided solution path
Make an inference	Making inferences about the use of robotics applications in science achievements

In the first part of the analysis phase, the goals and behaviors of the students as a result of the activity were evaluated and presented in Table 6. The obtained data were brought together and a frequency table was created in Table 7.

Table 7
"Algorithmic thinking activity" frequency table

Sklls	Sub-skills	Activity Process/Post Occurs Frequency		
		Yes	Partially	No
Scientific process skills	*Establishing number and space relationships*	5	2	1
	Identifying variables	7	1	-
	Inference	7	-	1
	Using data and building models	7	1	-
	Experimentation	8	-	-
Life skills	*Analytical thinking*	6	2	-
	To decide	7	1	-
	Creativity	5	3	-
	Entrepreneurship	3	4	1
	Team work	8	-	-
Engineering and design skills	*Innovative Thinking*	7	-	1
Language skills	*Writing skill*	3	3	2
	Speaking skills	3	4	1
Math skills	*Problem solving*	7	-	1
	Mathematical process skills	3	2	3
Technology Skills	*Computational thinking*	8	-	-
	Algorithmic thinking	5	3	-
	Algorithm design	6	1	1
	Make an inference	8	-	-

For the algorithmic thinking activity, the combined findings based on observation, interview and student products are shown in Table 3. According to Table 3; When we look at the expected/targeted sub-skills in terms of scientific skills:

When we look at the 3-dimensional thinking behavior while creating an algorithm map in the robot application for the ability to establish number and space relations, it was seen that 5 groups could think in 3 dimensions, 2 groups could think partially in 3 dimensions, and one group did not have 3-dimensional thinking skills. It was observed that the group that did not have 3-dimensional thinking skills could not make the necessary calculations, taking the robot out of the map. While one group determined a single robot feature for the behavior of determining the features of the robot to be used for the ability to determine variables, the other groups benefited from various features of the robot.

In the behavior of making a robotic application in accordance with the science achievements for the skill of drawing conclusions, 1 group made a robot application that indicates direction outside the acquisition, instead of a robot application for the content of the science achievement. 7 groups applied robotics for science achievements. When we look at the behavior of creating an algorithm map showing the relevant achievement to run on the robot for the ability to use data and create a model, it is seen that he did not write an algorithm map for a group of relevant achievements, but wrote algorithms other than the achievement. 7 groups applied robots for science achievements. All groups tested robotic applications for the behavior of testing the algorithm sequence of the robot created for experimentation skills.

When we look at the expected/targeted sub-skills in terms of life skills:

When we look at the behavior of finding technological methods for science achievements for analytical thinking skills, it is seen that 6 groups show analytical thinking skills. In two groups, it was observed that they could use the technology in which the behavior partially emerged as an alternative method, but it was insufficient in terms of science acquisition. When we look at the behavior of deciding which features of the robot will be used for decision-making skills, 7 groups showed decision-making skills in terms of using features. However, it has been observed that a guru partially demonstrates his decision-making skills. Creating original stories and robot applications for science for creativity skills. It was observed that 5 groups produced creative content. While 1 group produced only creative stories, the other 2 groups were insufficient in terms of creativity with creative stories and robot applications. In the behavior of persuading the relevant people by explaining the project created for entrepreneurship skills, 3 groups were able to explain and persuade the project, while 4 groups were insufficient in persuading. One group could not demonstrate persuasion skills regarding the project content. It was observed that all groups showed harmonious/coordinated working behavior with other group members for teamwork skills.

When we look at the expected/targeted sub-skills in terms of engineering and design skills:

When we look at the behavior of developing robotic applications for the science content for the Innovative Thinking skill, it was seen that all groups were innovative, but one group did not develop an application for the Science content.

When we look at the expected/targeted sub-skills in terms of language skills:

For writing skills, in the behavior of writing scientific stories for science achievements; It was observed that 3 groups wrote science-related stories, and 3 groups were inadequate in story writing skills. Two groups did not show story writing behavior. In the behavior of explaining the features of the resulting product to the relevant people for speaking skills; While 3 groups were unable to explain the project content, 4 groups were inadequate in speaking skills. One group did not show the ability to explain the project content.

When we look at the expected/targeted sub-skills in terms of mathematics skills:

When we look at the behavior of providing solutions to problems encountered in daily life using robots for problem solving skills, 7 groups presented solutions to problems encountered in daily life using robots. It was observed that 1 group did not perform the solution-providing behavior with the robot application. In the behavior of using basic mathematical skills while creating an algorithm map for robotic application for mathematical process skills; It was observed that the 3 groups produced balanced results while creating the algorithm map. As a result of the 2 groups, it was seen that they could not make mathematical calculations while assigning the variables that were insufficient. Mathematics skills were not observed in 3 groups.

When we look at the expected/targeted sub-skills in terms of technology skills:

All groups can perform the behavior of creating robotic applications for problems or situations encountered for computational thinking skills and have computational thinking skills.

CONCLUSION, DISCUSSION AND SUGGESTIONS

This study aimed to evaluate the skills of pre-service primary school teachers through interdisciplinary activities. With the changing science curriculum in recent years, the importance of the concept of skill has increased. Moreover, in addition to teaching skills alone, they should also be addressed in the context of interdisciplinary teaching. This study was conducted in line with the importance of the concept of skill. At the end of the research, the students' skills were determined and among the science skills; It was revealed that life skills and innovative thinking skills were sufficient, but scientific process skills were not sufficient. It was revealed that their science skills were low as a result of their difficulties in doing science-based activities. In addition, it was observed that they could not distinguish scientific process skills among the activities and did not use their scientific process skills when they should have used them. A similar result emerged in the study conducted by Türkmen and Kandemir (2011); It was observed that teachers did not have knowledge about scientific process skills and did not carry out activities regarding scientific process skills. In their study by Demir and Baştürk (2016); They stated that some teachers had difficulties in teaching integrated skills and basic scientific process skills. The result of the communication skills research conducted by Dilekmen et al. (2008) on preservice primary school teachers; It supports working in terms of life skills. Technology skills; It is sufficient in terms of robotic application and algorithm creation; However, it has been seen that it is not sufficient in the context of science acquisition. They can develop science content using technology; However, they were found to be inadequate in their ability to integrate scientific process skills with technology. The results of the study conducted by Yıldırım and Türk (2018) with preservice primary school teachers on stem, which was included in the program as innovative skills, support the results. In terms of mathematical skills, it was observed that their problem solving skills were high, but their level of using basic mathematical skills was low. It was often observed that they produced solutions to a problem posed, but they were not able to reach a conclusion. It has been observed that their level of use of basic mathematical operations such as four operations and measurement for mathematics is low. Additionally, it was observed that there was a difference in mathematics skills between activities. Gürbüz et al. (2013) and Hacıömeroğlu (2013) revealed similar results in their studies on mathematics skills. In addition, it has been observed that science activities prepared through interdisciplinary teaching method make the lesson interesting and contribute to revealing creativity. Interdisciplinary teaching method Turkish, English etc. apart from teaching areas, it is also used in Mathematics education (Akbal, 2008; Yorulmaz, 2009; Aydın Aşk, 2016; Koçyiğit, 2011). It is thought that using it as an alternative method or technique for science teaching can contribute to science education.

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