



**Emotional Empathic Proximal Learning Educational Environment**  
**PEARL**  
**2018-1-IT02-KA201-048515**

# **O4- Assessment tools and validation**

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## **Presentation of the assessing tool and description of the experimental design**

PEARL project aims to develop a replicable educational learning environment, which is appropriate, innovative, high quality and in European level for the development of emotional and empathic skills of children aged 0-6, and to reveal the behaviours of children in this environment by supporting their zone of proximal development. In order to reach the goal of the project; an experimental design is planned and an assessment tool is developed by the researchers.

### **Development of PEARL Child Observation Forms**

PEARL education model has been developed based on Piaget's approach for learning and empathy development, Vygotsky's zone of proximal development, Montessori's use of materials and active learning, knowledge construction concepts of the constructivist approach. It was necessary to develop assessment tools in order to assess the behaviours of the children in the learning environment created in this project. While preparing a tool for project assessment, the philosophy of the learning environment that is tried to be created in this project, the theories it is based on and the development levels of the children were taken into consideration. Thus, Pearl Child Observation Forms, developed specifically for the Pearl education model, were developed. The Pearl Child Observation Forms were developed for the children aged 0-2 years, 3-4 years and 5-6 years to assess emotional-empathic skills and proximal development of the participating children.

Before the development of Pearl Child Observation Forms, a detailed literature search was carried out on the basic theories of this project and some approaches. Based on these, the categories were specified related to the items to be included in the Pearl Child Observation Form. These categories are as follows:

- communication,
- group communication,
- cooperation,
- expression of emotions,
- self-expression,
- helping each other,
- coping with difficulties
- creating a strategy
- following instructions,
- achieving an objective,
- understanding and managing positive and negative emotions.

Next, the items appropriate for 0-2, 3-4 and 5-6 age groups were written, and an item pool was created. The observation forms were shared with project partners, and their views were taken regarding content validity, construct validity and face validity.

The project partners provided feedback on adding items related to educational emotions (well-being, motivation, expression of emotions and prosocial behaviors) in the observation forms, and the observation forms were revised in accordance with this feedback, and the items were finalized. In addition, the forms were revised regarding the notes for the collection of information on children's ages and countries based on the views of project partners.

For the age of 0-2;



- PEARL Child Observation Form for the single child with nature
- PEARL Child Observation Form for group of children with nature

For the age of 3-4;

- PEARL Child Observation Form for the single child with educational robotics
- PEARL Child Observation Form for the single child without educational robotics
- PEARL Child Observation Form for group of children with educational robotics
- PEARL Child Observation Form for group of children without educational robotics

For the age of 5-6;

- PEARL Child Observation Form for the single child with educational robotics
- PEARL Child Observation Form for the single child without educational robotics
- PEARL Child Observation Form for group of children with educational robotics
- PEARL Child Observation Form for group of children without educational robotics

Thus, a total of 10 observation forms were developed, two for 0-2 years old and four for 3-4 years old and four for 5-6 years old. Some of the items in the form have positive-desired and some negative-undesirable content. In each form, all items were rated by Likert type between “0” and “10”. While the absence of a behaviour was rated with “0”, the maximum level of a behaviour was assigned “10”. For example, if the item “Invites his/her teacher to join a game.” is rated with 0, this means that a child did not invite his/her teacher for game, while it is assigned 10 points, a child always invited his/her teacher.

## The experimental design

Experimental applications in the development of the PEARL Education Model were carried out in two stages. These stages are; 1. Pilot Application, 2. Secondary Applications.

### Pilot Application

In the pilot application, a separate experiment and three control groups were created for the 0-2 age group, 3-4 and 5-6 age groups. Experimental group in 3-4 and 5-6 age groups, are children that were involved in activities with the robot. Children who were involved in the single child with robot, single child without robot and a group of children without robot constituted the control groups. The robot did not take part in the activities of children in the age group of 0-2 years. In this age group, children who participated in group events with materials with nature content created the experimental group, and children who participated in individual events created the control group. The experimental and control groups created at this stage are listed below:

For 3-4 and 5-6 age group:

- Application of the activity to a group of 5 children with a robot (Experimental Group)
- Application of the activity to a single child with a robot (Control Group)
- Application of the activity to a single child without a robot (Control Group)
- Application of the activity to a group of 5 children without a robot (Control Group)



For 0-2 age group:

- Application of the activity to a group of 5 children with natural materials (Experimental Group)
- Application of the activity to a child with natural materials (Control Group)

During the pilot application phase, the activities were applied twice a day apart.

## Second Application

In the second application phase after the pilot application is completed, experimental and control groups were established in the countries of the project partners for the 0-2, 3-4 and 5-6 age groups. These groups are:

For 3-4 and 5-6 age group:

- Application of the activity to a group of 5 children with a robot (Experimental Group)
- Application of the activity to a group of 5 children without a robot (Control Group)

For 0-2 age group:

- Application of the event to a group of 5 children with natural materials.

In the second application phase, unlike the pilot application, activities were applied to children in the experimental and control group once, with intra-group role assignments.

## Application of the Activities

The activities prepared under the PEARL Education Model are first translated into each country's own language. In the first phase, Robot Doc was provided to the schools where the pilot application would be applied and the practitioner teachers at the schools were given an online training and informed about the activities and the implementations. Then the teachers applied the activities with the children. While the activities were being applied, video recordings were taken. In each of the partner countries, two field experts have been identified to fill out the observation forms. The field experts then watched video recordings of the activities applied in their country and filled out observation forms.

The second phase also took place with schools volunteering to participate in the project. Activities suitable for the experimental groups of the second phase were again explained to the teachers with an online training meetings.

## Analysis of the Findings

### Pilot Study Findings

In this section, the results of the Project's pilot implementation for the 0-2 year old single child, 0-2 year old children in group, 3-4 year old single child, 3-4 year old children in group, 5-6 year old single child and 5-6 year old children in group are presented, respectively.

### 0-2 Year Old Single Child

This section includes the table related to the child observation form item scores obtained by the single children aged 0-2 in the first administration carried out under the project named PEARL "Emotional Empathic Proximal Learning-Educational Environment, coded 2018-1-IT02-KA201-048515. In addition, the graphics related to the distribution of the scores obtained by the single children aged 0-2 from each of the



child observation form items by countries are presented. In the pilot study, the same activity was watched by two different observers from the video recording, and Child Observation Forms were filled in. Mean score was obtained by averaging out the observation form scores filled in by each observer and is provided in tables and graphics as the mean score.

	Italy	Lithuania	Total
	Mean	Mean	Mean
<b>He/she asks the teacher's help when having difficulty during the activity</b>	1,00	0,00	,50
<b>He/she gets angry when failed</b>	0,00	0,00	0,00
<b>He/she loses interest in the activity when failed</b>	6,00	0,00	3,00
<b>He/she gets excited when confronting a new thing during the activity</b>	3,00	0,00	1,50
<b>He/she shows that he/she enjoys the activity</b>	4,00	5,00	4,50
<b>He/she invites teacher to participate in the game</b>	10,00	0,00	5,00
<b>He/she imitates the teacher during the activity</b>	7,50	3,50	5,50
<b>He/she finishes the activity happily</b>	4,50	8,50	6,50
<b>He/she cries when having difficulty during the activity</b>	0,00	0,00	0,00
<b>He/she expresses positive/negative feelings about nature and living creatures with a gesture, facial expression, and tone of voice</b>	3,50	9,00	6,25
<b>He/she focuses on nature's materials used in the activity</b>	4,00	10,00	7,00
<b>He/she enjoys using nature's material used in the activity</b>	5,00	10,00	7,50
<b>He/she gets excited towards nature's materials used in the activity</b>	3,50	0,00	1,75
<b>He/she creates new games with nature's materials used in the activity (mud houses, bird's nests from a tree branch)</b>	5,00	0,00	2,50
<b>He/she is interested in the materials used in the activity</b>	3,50	10,00	6,75
<b>He/she enjoys playing with the materials used in the activity</b>	4,50	10,00	7,25
<b>Item total mean scores</b>	4,06	4,13	4,09

**Table 1 - Distribution of the child observation form item mean scores of the single children aged 0-2 by countries**

## 0-2 Year Old Children in Group

This section includes the table related to the child observation form item scores obtained by the children aged 0-2 in the first administration carried out under the project named *PEARL "Emotional Empathic Proximal Learning-Educational Environment, coded 2018-1-IT02-KA201-048515*. In addition, the graphics related to the distribution of scores obtained by the children aged 0-2 from each of the child observation form items by countries are presented. In the pilot study, the same activity was watched by two different observers from the video recording, and Child Observation Forms were filled in. Mean score was obtained by averaging out the observation form scores filled in by each observer and is provided in tables and graphics as the mean score.



	Italy	Lithuania	Total
	Mean	Mean	Mean
<b>He/she asks the teacher's help when having difficulty during the activity</b>	,40	0,00	,20
<b>He/she gets angry when failed</b>	,30	0,00	,15
<b>He/she loses interest in the activity when failed</b>	1,00	0,00	,50
<b>He/she gets excited when confronting a new thing during the activity</b>	4,90	,90	2,90
<b>He/she is happy in group work</b>	2,40	3,50	2,95
<b>He/she shows that he/she enjoys the activity</b>	5,30	7,40	6,35
<b>He/she invites teacher to participate in the game</b>	,60	0,00	,30
<b>He/she imitates the teacher during the activity</b>	2,80	6,10	4,45
<b>He/she finishes the activity happily</b>	5,30	2,80	4,05
<b>He/she cries when having difficulty during the activity</b>	0,00	0,00	0,00
<b>He/she expresses positive/negative feelings about nature and living creatures with a gesture, facial expression, and tone of voice</b>	5,10	5,30	5,20
<b>He/she focuses on nature's materials used in the activity</b>	6,30	7,00	6,65
<b>He/she enjoys using nature's material used in the activity</b>	6,80	5,90	6,35
<b>He/she gets excited towards nature's materials used in the activity</b>	6,10	3,60	4,85
<b>He/she creates new games with nature's materials used in the activity (mud houses, bird's nests from a tree branch)</b>	5,30	6,10	5,70
<b>He/she is interested in the materials used in the activity</b>	6,60	5,90	6,25
<b>He/she enjoys playing with the materials used in the activity</b>	6,70	7,00	6,85
<b>He/she expresses others' positive/negative feelings with a gesture, facial expression, and tone of voice</b>	5,90	4,50	5,20
<b>He/she performs his/her role in group work</b>	,50	3,10	1,80
<b>He/she gets angry when he/she cannot fulfill his role in the group</b>	0,00	0,00	0,00
<b>He/she has difficulty communicating with the children in the group at the activity</b>	6,80	0,00	3,40
<b>He/she angers his friends because of his misbehavior in the group</b>	2,50	,50	1,50
<b>He/she plays together with classmates</b>	1,60	2,10	1,85
<b>He/she observes classmates during the activity</b>	2,30	6,70	4,50
<b>He/she communicates positively with the children in the group at the activity</b>	2,50	,90	1,70
<b>He/she shares toys during the activity</b>	1,80	2,00	1,90
<b>He/she collaborates with friends in the group</b>	2,10	2,20	2,15
<b>Total mean score of the items</b>	3,40	3,09	3,25

Table 2 - Distribution of the child observation form item mean scores of the children aged 0-2 by countries





### 3-4 Year Old Single Child

This section includes a table that contains the item score averages of the child observation forms of single children aged 3-4 years in the first application conducted as part of the PEARL “Emotional Empathic Proximal Learning-Educational Environment project and coded 2018-1-IT02-KA201-048515. Graphs were also shown presenting the country distribution of average scores obtained by 3–4-year-old single children from each of the Child Observation Form items. In the Pilot application, applications were performed on different days with the same activities and were monitored by two separate observers using video recording and Child Observation forms. An average score was calculated by averaging the scores of two (four) observation forms completed by each observer for two separate applications, and it was presented in tables and graphs as a single child score.

	Italy		Lithuania		Spain		Turkey		Total	
	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she is willing to participate in the activities</b>	8,50	1,50	9,50	10,00	6,50	8,00	8,00	7,00	8,33	7,25
<b>He/she is anxious when starting the activity</b>	6,00	10,00	4,50	0,00	2,00	4,50	2,25	2,25	3,58	3,17
<b>He/she does not lose interest during the activity</b>	10,00	4,00	10,00	10,00	7,50	9,00	8,75	7,00	9,17	7,83
<b>He/she has difficulties to follow teacher’s directions</b>	4,50	10,00	1,25	4,00	1,50	,50	,50	,50	1,58	3,25
<b>He/she endeavors to carry on the activity</b>	5,50	1,00	8,25	8,25	8,00	9,00	8,75	8,00	7,92	7,08
<b>He/she wants to quit the activity when confronts a difficulty during the activity</b>	,50	5,00	0,00	0,00	1,50	,50	,50	,50	,50	1,08
<b>He/she is willing to deal with the difficulty confronting during the activity</b>	3,50	0,00	5,00	7,00	4,00	8,50	6,25	5,75	5,00	5,67
<b>He/she becomes upset when having difficulty during the activity</b>	3,00	0,00	0,00	,75	2,00	3,50	2,00	1,75	1,50	1,42
<b>He/she becomes happy when dealt with difficulty during the activity</b>	5,00	0,00	8,75	9,00	2,00	8,00	2,75	,75	5,00	4,58
<b>He/she expresses negative feelings with a gesture, facial expression, and tone of voice when confronts a difficulty during the activity</b>	5,50	9,00	8,75	0,00	5,00	1,00	3,00	2,25	5,67	2,42
<b>He/she gets angry when having difficulty during the activity</b>	3,50	0,00	0,00	0,00	1,00	,50	0,00	,25	,75	,17
<b>He/she becomes happy after completing the activity</b>	5,50	0,00	8,50	8,50	4,00	9,50	5,00	2,25	6,08	5,17
<b>He/she expresses positive feelings with a gesture, facial expression, and tone of voice when feels happy during the activity</b>	6,50	0,00	8,75	8,50	4,00	5,00	3,75	5,25	5,92	5,42
<b>He/she asks for others’ help when having difficulty during the activity</b>	5,50	10,00	9,00	0,00	1,50	3,00	4,50	3,50	5,67	3,33
<b>He/she is willing to experience</b>	8,00	0,00	5,00	3,75	6,00	9,50	8,25	4,00	6,75	4,17





<b>new activities</b>										
<b>He/she shows willingness to complete the activity</b>	9,00	0,00	8,75	9,50	7,00	9,50	8,75	6,50	8,50	6,92
<b>He/she gets angry when making a mistake</b>	3,50	0,00	0,00	0,00	,50	,50	0,00	,25	,67	,17
<b>He/she smiles often during the activity</b>	2,00	0,00	5,75	5,25	1,50	8,50	2,00	2,75	3,17	4,08
<b>He/she gets excited when produces new ideas or things during the activity</b>	4,50	0,00	6,00	5,50	1,50	7,50	3,50	,25	4,17	3,17
<b>He/she shows sadness when making a mistake</b>	2,00	2,50	1,75	0,00	1,50	2,00	2,00	,25	1,83	,83
<b>He/she leaves the game when gets angry</b>	0,00	0,00	0,00	0,00	,50	0,00	0,00	,25	,08	,08
<b>He/she shows courage when starting a new activity</b>	7,00	5,00	5,75	7,00	7,50	9,00	5,00	7,00	6,00	7,00
<b>He/she practices willingly the roles given during the activity</b>	5,00	0,00	0,00	0,00	0,00	0,00	9,00	8,75	3,83	2,92
<b>He/she tries different ways to solve the issue when having difficulty during the activity</b>	10,00	0,00	8,25	6,00	7,00	8,50	6,00	1,75	7,58	4,00

	Italy		Lithuania		Spain		Turkey		Total	
	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she becomes anxious when confronts a difficulty</b>	5,00	10,00	3,00	0,00	7,50	4,00	2,00	1,25	3,75	2,75
<b>He/she focuses on the materials (robot) used in the activity</b>	10,00		8,25		8,00		9,25		8,83	
<b>He/she enjoys using materials (robot) used in the activity.</b>	8,00		7,25		6,50		9,25		7,92	
<b>He/she gets excited with the material (robot) used in the activity</b>	6,50		5,25		3,00		7,75		5,92	
<b>He/she creates new games with the material (robot) used in the activity</b>	3,00		0,00		1,00		2,50		1,50	
<b>He/she excitedly shares with the teacher experiences he/she had with the robot</b>	3,00		7,75		4,50		2,50		4,67	
<b>Total score average of the items</b>	5,32	2,72	5,17	4,12	3,80	5,18	4,46	3,20	4,73	3,76

**Table 3- Distribution of average child observation form item scores of 3-4 year old single children by country**

### 3-4 Year Old Children in Group

This section includes a table that contains the item point averages of the child observation forms of children in 3-4 age group in the first application conducted as part of the PEARL “Emotional Empathic Proximal Learning-Educational Environment project and coded 2018-1-IT02-KA201-048515. Graphs were also shown presenting the country distribution of average scores obtained by 3-4-year-old age group children from each of the Child Observation Form items. In the Pilot application, applications were performed on different days with the same activities and were monitored by two



separate observers using video recording and Child Observation Forms. An average score was calculated by averaging the scores of two (four) observation forms completed by each observer for two separate applications, and it was presented in tables and graphs as group child scores.

	Italy		Lithuania		Spain		Turkey		Total	
	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group with Robot	Group Without Robot	Group with Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she is willing to participate in the activities</b>	7,35	2,85	9,50	8,60	8,50	8,05	9,00	6,35	8,59	6,46
<b>He/she is anxious when starting the activity</b>	3,55	2,80	0,00	,50	5,90	6,30	1,35	,55	2,70	2,54
<b>He/she does not lose interest during the activity</b>	5,90	1,25	9,55	7,35	8,85	8,45	8,75	7,40	8,26	6,11
<b>He/she has difficulties to follow teacher's directions</b>	6,55	6,65	,90	2,70	1,45	2,30	2,45	1,50	2,84	3,29
<b>He/she endeavors to carry on the activity</b>	7,75	2,70	9,30	6,80	7,75	8,40	9,05	7,40	8,46	6,33
<b>He/she wants to quit the activity when confronts a difficulty during the activity</b>	3,35	4,00	0,00	,50	,70	,95	1,60	,40	1,41	1,46
<b>He/she is willing to deal with the difficulty confronting during the activity</b>	4,80	,90	8,95	4,95	6,80	5,95	6,70	2,35	6,81	3,54
<b>He/she becomes upset when having difficulty during the activity</b>	2,40	,35	,25	,55	2,95	2,15	,40	,25	1,50	,83
<b>He/she becomes happy when dealt with difficulty during the activity</b>	3,50	1,40	9,95	7,90	7,00	5,00	7,10	2,40	6,89	4,18
<b>He/she expresses negative feelings with a gesture, facial expression, and tone of voice when confronts a difficulty during the activity</b>	5,30	1,20	2,00	1,45	1,75	2,35	2,35	,75	2,85	1,44
<b>He/she gets angry when having difficulty during the activity</b>	2,10	,25	0,00	,50	2,50	2,65	,30	,05	1,23	,86
<b>He/she becomes happy after completing the activity</b>	5,15	2,65	9,50	7,30	8,65	8,40	7,75	4,90	7,76	5,81
<b>. He/she expresses positive feelings with a gesture, facial expression, and tone of voice when feels happy during the activity</b>	4,25	2,75	9,80	7,65	8,20	7,00	8,35	5,45	7,65	5,71
<b>He/she asks for others' help when having difficulty during the activity</b>	3,75	1,15	1,00	,25	4,50	3,50	4,60	,90	3,46	1,45
<b>He/she is willing to experience new activities</b>	6,75	1,35	9,35	7,50	9,25	9,00	8,85	1,90	8,55	4,94
<b>He/she shows willingness to complete the activity</b>	8,65	2,65	9,35	7,10	8,45	7,45	6,95	5,35	8,35	5,64
<b>He/she gets angry when making a mistake</b>	,60	,25	0,00	,25	2,10	2,05	,35	,10	,76	,66
<b>He/she smiles often during the activity</b>	2,20	2,00	7,85	4,15	8,55	5,25	5,80	5,00	6,10	4,10
<b>He/she gets excited when produces new ideas or things during the activity</b>	2,35	1,10	7,35	5,65	4,85	3,40	7,05	,15	5,40	2,58
<b>He/she shows sadness when making a mistake</b>	,80	,40	,55	,25	,60	,60	,25	0,00	,55	,31



<b>He/she leaves the game when gets angry</b>	1,90	2,25	0,00	,40	,35	,75	,40	,15	,66	,89
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	Italy		Lithuania		Spain		Turkey		Total	
	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she shows courage when starting a new activity</b>	4,50	1,40	8,85	7,55	8,15	6,75	9,20	2,00	7,68	4,43
<b>He/she practices willingly the roles given during the activity</b>	3,40	2,45	5,00	6,35	8,95	8,35	9,30	7,20	6,66	6,09
<b>He/she tries different ways to solve the issue when having difficulty during the activity</b>	2,55	1,40	6,35	5,40	6,50	6,70	7,25	,10	5,66	3,40
<b>He/she becomes anxious when confronts a difficulty</b>	1,55	2,95	0,00	0,00	4,25	4,50	,85	,50	1,66	1,99
<b>He/she is happy in group work</b>	2,50	2,10	9,65	6,85	9,10	7,75	7,30	5,00	7,14	5,43
<b>He/she gets angry when he/she cannot fulfill his role in the group</b>	3,85	,25	,20	0,00	3,75	2,65	,70	,05	2,13	,74
<b>He/she angers his friends because of his misbehavior in the group</b>	4,00	,35	,25	,50	,40	1,10	1,75	0,00	1,60	,49
<b>He/she focuses on the materials (robot) used in the activity</b>	8,25		9,30		8,30		9,40		8,81	
<b>He/she enjoys using materials (robot) used in the activity</b>	8,85		9,30		9,50		9,45		9,28	
<b>He/she gets excited with the material (robot) used in the activity</b>	6,90		7,75		8,75		9,35		8,19	
<b>He/she creates new games with the material (robot) used in the activity</b>	2,70		3,15		3,25		6,55		3,91	
<b>He/she excitedly shares with the teacher experiences he/she had with the robot</b>	,65		8,95		6,30		,65		4,14	

**Table 4- Distribution of Child Observation Form item score averages of children in 3-4 age group by Country**

### 5-6 Year Old Single Child

This section includes the table related to the child observation form item mean scores obtained single children aged 5-6 obtained in the first administration carried out under the project named PEARL “Emotional Empathic Proximal Learning-Educational Environment, coded 2018-1-IT02-KA201-048515. In addition, the graphics related to the distribution of mean scores obtained by the single children aged 5-6 from each of the child observation form items by countries are presented. In pilot study, the administrations conducted by same activities but in different days were watched by two different observers from the video recording, and Child Observation Forms were filled in. Mean score was obtained by averaging out the scores of two observation



forms (a total of four forms), filled in by each observer, for two administrations and is provided in tables and graphics as the mean score.

	Italy		Lithuania		Spain		Turkey		Total	
	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she is willing to participate in the activities</b>	5,50	4,00	10,00	10,00	9,00	5,50	7,25	7,00	8,17	7,25
<b>He/she is anxious when starting the activity</b>	4,00	8,00	0,00	0,00	4,00	6,50	,25	3,50	1,42	3,58
<b>He/she does not lose interest during the activity</b>	10,00	5,00	10,00	10,00	9,00	4,50	10,00	4,75	9,83	6,50
<b>He/she has difficulties to follow teacher's directions</b>	5,00	9,00	0,00	0,00	,50	8,50	2,75	1,75	1,83	3,50
<b>He/she endeavors to carry on the activity</b>	2,50	9,50	10,00	10,00	8,00	9,00	9,25	8,50	8,17	9,25
<b>He/she wants to quit the activity when confronts a difficulty during the activity</b>	0,00	5,50	0,00	0,00	,50	1,50	0,00	,75	,08	1,42
<b>He/she is willing to deal with the difficulty confronting during the activity</b>	9,00	7,00	10,00	9,50	7,50	1,00	6,50	5,00	8,25	6,17
<b>He/she becomes upset when having difficulty during the activity</b>	0,00	4,00	0,00	0,00	,50	7,00	0,00	4,00	,08	3,17
<b>He/she becomes happy when dealt with difficulty during the activity</b>	7,00	0,00	8,25	9,75	3,50	1,00	4,50	1,50	6,00	3,92
<b>He/she expresses negative feelings with a gesture, facial expression, and tone of voice when confronts a difficulty during the activity</b>	0,00	9,50	0,00	0,00	3,50	7,00	,50	5,75	,75	4,67
<b>He/she gets angry when having difficulty during the activity</b>	0,00	1,50	0,00	0,00	4,00	1,00	0,00	,50	,67	,58
<b>He/she becomes happy after completing the activity</b>	6,00	0,00	9,00	10,00	5,50	4,00	2,50	1,25	5,75	4,42
<b>He/she expresses positive feelings with a gesture, facial expression, and tone of voice when feels happy during the activity</b>	6,00	2,50	8,25	10,00	7,50	1,50	3,75	4,50	6,25	5,50
<b>He/she asks for others' help when having difficulty during the activity</b>	0,00	10,00	4,50	3,75	7,50	6,50	5,75	,50	4,67	4,17
<b>He/she is willing to experience new activities</b>	6,50	2,50	9,50	9,50	4,50	1,50	7,75	3,50	7,58	5,00
<b>He/she shows willingness to complete the activity</b>	10,00	8,50	10,00	10,00	6,50	3,00	5,25	2,50	7,83	6,08
<b>He/she gets angry when making a mistake</b>	0,00	1,00	5,00	0,00	4,00	,50	0,00	0,00	2,33	,25
<b>He/she smiles often during the activity</b>	3,00	0,00	5,75	6,75	3,00	,50	5,25	4,00	4,67	3,67
<b>He/she gets excited when produces new ideas or things during the activity</b>	1,00	0,00	6,50	6,50	2,00	1,00	3,25	0,00	3,75	2,33
<b>He/she shows sadness when making a mistake</b>	0,00	4,00	0,00	0,00	5,00	3,50	,50	3,00	1,00	2,25
<b>He/she leaves the game when gets angry</b>	0,00	0,00	0,00	0,00	,50	1,00	0,00	0,00	,08	,17



	Italy		Lithuania		Spain		Turkey		Total	
	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot	Single Child With Robot	Single Child Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she shows courage when starting a new activity</b>	6,00	3,50	10,00	9,25	8,50	7,00	4,50	4,00	7,25	6,17
<b>He/she practices willingly the roles given during the activity</b>	9,50	6,00	0,00	0,00	3,00	0,00	8,50	7,75	4,92	3,58
<b>He/she tries different ways to solve the issue when having difficulty during the activity</b>	9,00	6,50	9,75	9,25	8,50	6,50	6,00	7,75	8,17	7,83
<b>He/she becomes anxious when confronts a difficulty</b>	0,00	8,50	0,00	0,00	8,00	9,00	,50	3,50	1,50	4,08
<b>He/she focuses on the materials (robot) used in the activity</b>	10,00		10,00		8,50		4,75		8,00	
<b>He/she enjoys using materials (robot) used in the activity</b>	8,50		10,00		9,50		8,75		9,25	
<b>He/she gets excited with the material (robot) used in the activity</b>	5,50		7,25		8,50		8,25		7,50	
<b>He/she creates new games with the material (robot) used in the activity</b>	0,00		4,25		7,00		0,00		2,58	
<b>He/she excitedly shares with the teacher experiences he/she had with the robot</b>	0,00		9,25		7,00		2,50		5,08	
<b>Total mean score of the items</b>	4,13	4,64	5,58	4,97	5,48	3,92	3,96	3,41	4,78	4,22

**Table 5- Distribution of the child observation form item mean scores of the single children aged 5-6 group by countries**

## 5-6 Old Children in Group

This section includes the table related to the child observation form item mean scores obtained by the children aged 5-6 in the first administration carried out under the project named PEARL “Emotional Empathic Proximal Learning-Educational Environment, coded 2018-1-IT02-KA201-048515. In addition, the graphics related to the distribution of mean scores obtained by the children aged 5-6 from each of the child observation form items by countries are presented. In the pilot study, the administrations conducted by same activities but in different days were watched by two different observers from the video recording, and Child Observation Forms were filled in. Mean score was obtained by averaging out the scores of two observation forms (a total of four forms), filled in by each observer, for two administrations and is provided in tables and graphics as the mean score.

Italy	Lithuania	Spain	Turkey	Total
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	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she is willing to participate in the activities</b>	6,85	6,73	9,70	10,00	7,60	7,45	8,40	7,45	8,14	7,99
<b>He/she is anxious when starting the activity</b>	3,65	2,67	0,00	0,00	5,15	5,65	,70	,45	2,38	2,16
<b>He/she does not lose interest during the activity</b>	6,70	7,67	9,25	8,75	7,45	7,85	7,45	7,75	7,71	8,03
<b>He/she has difficulties to follow teacher's directions</b>	3,60	3,93	,45	1,00	2,55	1,55	2,45	2,50	2,26	2,13
<b>He/she endeavors to carry on the activity</b>	5,30	5,33	7,95	9,25	7,40	6,40	7,65	7,70	7,08	7,29
<b>He/she wants to quit the activity when confronts a difficulty during the activity</b>	1,65	1,87	1,85	0,00	,95	1,50	,05	,75	1,13	,97
<b>He/she is willing to deal with the difficulty confronting during the activity</b>	4,40	5,33	6,75	8,60	5,10	5,15	4,40	4,80	5,16	6,01
<b>He/she becomes upset when having difficulty during the activity</b>	1,70	,60	,80	0,00	2,75	1,15	,05	,70	1,33	,61
<b>He/she becomes happy when dealt with difficulty during the activity</b>	4,15	5,00	8,10	8,05	4,85	5,35	4,70	4,45	5,45	5,76
<b>He/she expresses negative feelings with a gesture, facial expression, and tone of voice when confronts a difficulty during the activity</b>	4,40	,93	2,90	2,10	1,50	1,30	0,00	2,70	2,20	1,81
<b>He/she gets angry when having difficulty during the activity</b>	1,75	,47	1,25	0,00	1,35	,45	0,00	0,00	1,09	,21
<b>He/she becomes happy after completing the activity</b>	6,50	6,27	8,70	9,25	7,45	7,50	5,35	4,75	7,00	6,99
<b>He/she expresses positive feelings with a gesture, facial expression, and tone of voice when feels happy during the activity</b>	6,40	5,87	8,30	9,30	6,50	5,05	6,10	5,75	6,83	6,53
<b>He/she asks for others' help when having difficulty during the activity</b>	,85	2,73	1,95	1,60	2,50	3,15	0,00	3,65	1,33	2,79
<b>He/she is willing to experience new activities</b>	6,90	5,80	7,70	9,55	8,20	8,65	7,25	5,65	7,51	7,52
<b>He/she shows willingness to complete the activity</b>	6,70	6,73	7,80	9,80	6,90	6,85	6,70	6,55	7,03	7,53
<b>He/she gets angry when making a mistake</b>	1,00	,60	0,00	1,00	1,00	,10	0,00	,35	,50	,51
<b>He/she smiles often during the activity</b>	5,50	5,87	5,90	5,80	4,45	3,75	5,25	5,25	5,28	5,12
<b>He/she gets excited when produces new ideas or things during the activity</b>	3,80	5,40	5,60	7,60	4,85	2,15	4,75	,05	4,75	3,69
<b>He/she shows sadness when making a mistake</b>	1,10	,47	0,00	0,00	,60	,35	0,00	0,00	,43	,19
<b>He/she leaves the game when gets angry</b>	,30	,53	0,00	0,00	,10	,35	0,00	,20	,10	,25
<b>He/she shows courage when starting a new activity</b>	4,45	5,20	6,95	9,60	6,70	6,70	6,85	1,95	6,24	5,91

Italy	Lithuania	Spain	Turkey	Total
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	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she practices willingly the roles given during the activity</b>	6,20	5,87	5,00	4,90	7,90	7,70	7,65	6,40	6,69	6,24
<b>He/she tries different ways to solve the issue when having difficulty during the activity</b>	4,60	4,53	5,30	8,45	6,60	5,20	4,25	,25	5,19	4,61
<b>He/she becomes anxious when confronts a difficulty</b>	2,85	2,33	0,00	0,00	6,85	3,55	,05	0,00	2,44	1,41
<b>He/she is happy in group work</b>	4,80	6,73	8,40	9,30	6,70	6,80	6,60	5,00	6,63	6,97
<b>He/she gets angry when he/she cannot fulfill his role in the group</b>	2,50	,87	0,00	0,00	1,35	1,40	,05	0,00	,98	,55
<b>He/she angers his friends because of his misbehavior in the group</b>	2,25	,33	0,00	0,00	,05	,40	0,00	,35	,58	,27
<b>He/she focuses on the materials (robot) used in the activity</b>	8,10		7,80		6,50		8,85		7,81	
<b>He/she enjoys using materials (robot) used in the activity</b>	7,20		7,80		8,25		8,65		7,98	
<b>He/she gets excited with the material (robot) used in the activity</b>	7,40		5,55		7,50		8,45		7,23	
<b>He/she creates new games with the material (robot) used in the activity</b>	1,95		0,00		2,40		5,10		2,36	
<b>He/she excitedly shares with the teacher experiences he/she had with the robot</b>	3,60		7,00		3,95		0,00		3,64	
<b>He/she communicates positively with the children in the group at the activity</b>	4,95	5,20	10,00	9,80	4,20	4,65	2,50	,75	5,41	5,09
<b>He/she has difficulty communicating with the children in the group at the activity</b>	3,80	3,07	,60	0,00	4,35	3,35	,55	1,00	2,33	1,77
<b>He/she expresses others' positive/negative feelings</b>	4,30	3,07	0,00	,75	4,70	4,60	,45	0,00	2,36	2,04
<b>He/she displays behaviors that disturbs the flow of the activity</b>	2,80	1,00	,60	0,00	,55	,75	,20	,50	1,04	,53
<b>He/she complains about classmates during the activity</b>	2,25	0,00	0,00	0,00	,25	1,20	,10	,80	,65	,53
<b>He/she cooperates with classmates</b>	3,50	5,93	7,50	8,55	6,55	6,35	5,45	4,60	5,75	6,39
<b>He/she collaborates with friends in the group</b>	4,25	5,87	7,50	5,30	6,25	6,50	5,45	6,60	5,86	6,08
<b>He/she enjoys helping classmates during the activity</b>	3,90	4,53	7,10	8,25	6,60	5,80	4,20	4,40	5,45	5,83
<b>He/she stays calm when solving issues with others</b>	5,10	4,47	9,75	10,00	5,80	6,45	0,00	0,00	5,16	5,28
<b>He/she cares about classmates who are upset</b>	2,15	1,13	0,00	,45	,25	,90	0,00	0,00	,60	,59
<b>He/she holds responsible a classmate when making a mistake during the activity</b>	1,05	,20	6,55	6,20	,90	1,15	0,00	0,00	2,13	2,00
<b>He/she gets warned by the teacher due to inappropriate behavior during the activity</b>	2,35	,20	,25	0,00	0,00	0,00	,05	,75	,66	,24





**Table 6- Distribution of the child observation form item mean scores of the children aged 5-6 group by countries**

## **Pilot Study Findings Summary**

The findings obtained in the pilot scheme of the project carried out by Italy, Spain, Lithuania and Turkey under the title of PEARL “Emotional, Empathic and Proximal Learning Educational Environment” are summarized below. Further details on the findings are described in the attached files.

The PEARL Education model was applied to children aged 0-6 in Italy, Turkey, Spain and Lithuania. In Italy and Lithuania, activities enriched with nature materials were applied to a child aged 0-2. The same activity was applied to a different child without nature material. In Italy, Turkey, Spain and Lithuania, the application was carried out with children aged 3-4 and 5-6 years old. The robot was integrated into the activities developed within the scope of the PEARL Education Model in the experimental groups, and the without robot version of the same activities was used in the control groups in the countries where the application was made. Applications with and without robots were applied to different children individually, as well as to children in groups.

Each child was evaluated with the Child Observation Forms developed within the scope of the project after the implementations were completed. The forms contain a minimum of 9 (for children aged 0-2) and a maximum of 51 items. All items in each form were rated likert type between “0” and “10”. Absence of a behavior is evaluated as “0” and performing it at the highest level is evaluated as “10”.

In the pilot scheme, the same activity was watched by two different observers and the Child Observation Forms were filled. The average score was obtained by taking the average of the observation form scores filled by each observer and presented as the average score in the tables for children aged 0-2, 3-4 and 5-6. In addition, the scores obtained from each of the items of the Child Observation Form for children aged 0-2, 3-4 and 5-6 years, by countries, are reflected with graphics.

It has been determined that the child in Lithuania has a higher score (4,12) when the total score average of the items of the Child Observation Form for the 0-2-year-old single child is analyzed by country. It has been determined that the children in Italy have a higher average (3.40) when the total average score of the children in the 0-2 age group is examined.

In the "without robot" application, it was determined that the child in Spain had the highest average and the child in Italy had the lowest average when the total score average from the items of the Child Observation Form of 3-4-years-old single children by country are examined. In the "with robot" application, it was found that the child in Italy had the highest average and the child in Spain had the lowest average. The total score average difference of the items between single children with and without robots is the highest in Italy in favor of with robots, and the highest in Spain in favor of without robots. In general, it was determined that the total score averages of the children with robots in the countries were 4.73, higher than the averages of the groups without robots (3.76).

In the "without robot" application, it was determined that the children in Spain had the highest average and the children in Italy had the lowest average when the total average scores of children aged 3-4 years from the items of the Child Observation Form are examined by countries. In the "with robot" application, it was determined that the children in Spain had the highest average and the children in Italy had the lowest average. In favor of groups with robots, the average score difference between groups with and without robots is highest in Italy and the least in Spain. It was found that the average of the group with the robot was higher than the average of the group without robot when the total scores of the children in all countries were examined.

In the "no robot" application, it was determined that the child in Lithuania had the highest average and the child in Turkey had the lowest average when the total



average scores of 5–6-years-old single children from the items of the Child Observation Form by country. In the "with robot" application, it was determined that the child in Lithuania had the highest average and the child in Turkey had the lowest average. The total average score difference of the items between single children with and without robot is the highest in Spain in favor of with robots and the least in Turkey. It was determined that the average of those with robots was higher than the average of those without robots when the total scores of the children in all countries.

In the "no robot" application, it was determined that children in Lithuania had the highest average and children in Turkey had the lowest average when the total average scores of 5–6-years-old children from the Child Observation Form items are examined by country. In the "with robot" application, it was determined that the children in Lithuania had the highest average and the children in Turkey had the lowest average. The average score difference between groups with and without robots is the highest in Turkey in favor of groups with robots, and the least in Italy. It was found that the average of the group with robot was higher than the average of the group without robot when the total scores of the children in all countries were examined.

## Second Phase Findings

### 3-4 Aged Children

This section includes the table related to the child observation form item mean scores obtained by the children aged 3-4 in the second administration carried out under the project named PEARL "Emotional Empathic Proximal Learning-Educational Environment, coded 2018-1-IT02-KA201-048515. Moreover, the graphics related to the distribution of mean scores obtained by the children aged 3-4 from each of the child observation form items by countries are provided. In the second administration, the administrations were watched by teachers from the video recording, and the Child Observation Forms were then filled in.

3-4 Age										
	Country									
	Italy		Turkey		Spain		Lithuania		Total	
	With Robot	Group Without Robot	With Robot	Group Without Robot	With Robot	Group Without Robot	With Robot	Group Without Robot	With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she is willing to participate in the activities</b>	8,0	7,6	8,9	8,4	9	8,9	8,2	8,2	8,6	8,3
<b>He/she is anxious when starting the activity</b>	1,4	2,6	2,5	2,3	8,6	8,4	4,0	3,9	4,4	4,4
<b>He/she does not lose interest during the activity</b>	6,5	4,6	6,6	6,8	7,6	8,1	7,0	7,2	7,0	7,0
<b>He/she has difficulties to follow teacher's directions</b>	4,3	3,3	2,6	2,4	3,2	4,4	4,2	4,6	3,6	3,8
<b>He/she endeavours to carry on the activity</b>	6,1	6,7	7,6	7,8	8,3	8,4	7,5	7,3	7,6	7,6
<b>He/she wants to quit the activity when confronts a difficulty during the activity</b>	2,1	2,8	2,7	3,2	2,2	2,4	3,4	3,9	2,8	3,2
<b>He/she is willing to deal with the difficulty confronting during the activity</b>	6,6	6,7	6,5	6,1	7,4	7,1	6,6	6,3	6,8	6,5
<b>He/she becomes upset when having difficulty</b>	3,4	3,0	4,4	3,9	2,4	2,7	4,1	4,6	3,7	3,7



<b>during the activity</b>											
<b>He/she becomes happy when dealt with difficulty during the activity</b>	6,0	4,6	8,5	7,9	7,3	7,7	3,2	2,1	5,9	5,3	
<b>He/she expresses negative feelings with a gesture, facial expression, and tone of voice when</b>	5,3	6,0	6,6	6,7	3,8	3,7	5,4	6,4	5,3	5,8	
<b>He/she gets angry when having difficulty during the activity</b>	3,1	3,3	2	1,8	2,2	2,2	3,6	4,9	2,8	3,2	
<b>He/she becomes happy after completing the activity</b>	8,3	8,0	9,3	8,3	9,2	8,7	7,6	7,5	8,5	8,0	
<b>He/she expresses positive feelings with a gesture, facial expression, and tone of voice when feels happy during the activity</b>	7,9	7,7	8,7	8,2	8,3	8	7,8	8,4	8,2	8,2	
<b>He/she asks for others' help when having difficulty during the activity</b>	5,3	4,7	6,5	5,8	3,5	3,2	4,4	3,4	4,9	4,2	
<b>He/she is willing to experience new activities</b>	7,5	7,3	7,9	6,6	8,8	8,6	7,8	8,3	8,0	7,8	
<b>He/she shows willingness to complete the activity</b>	7,7	7,2	8,1	6,8	8,4	8,3	5,0	6,8	7,0	7,2	
<b>He/she gets angry when making a mistake</b>	2,7	3,2	1,7	1,5	1,8	2,3	3,0	4,3	2,3	3,0	
<b>He/she smiles often during the activity</b>	6,8	5,1	7,3	6,2	7,3	6,8	6,5	7,1	6,9	6,5	
<b>He/she gets excited when produces new ideas or things during the activity</b>	6,3	6,6	7,9	7,5	7,6	7,4	5,5	7,3	6,7	7,3	
<b>He/she shows sadness when making a mistake</b>	5,1	6,1	5,5	4	2,4	3,4	4,4	4,8	4,3	4,4	
<b>He/she leaves the game when gets angry</b>	2,5	2,2	3,2	2,5	1,2	1,5	1,9	2,7	2,1	2,3	
<b>He/she shows courage when starting a new activity</b>	6,9	6,4	7,9	7	7,9	7,5	7,1	7,7	7,5	7,3	
<b>He/she practices willingly the roles given during the activity</b>	7,5	7,2	8,4	7,9	8,9	8,3	7,2	7,2	8,0	7,7	
<b>He/she tries different ways to solve the issue when having difficulty during the activity</b>	6,2	4,9	7,3	6,6	5,5	6,3	6,0	6,6	6,2	6,3	
<b>He/she becomes anxious when confronts a difficulty</b>	2,4	4,0	3,5	3,1	4,5	4,9	4,6	6,3	4,0	4,8	
<b>He/she is happy in group work.</b>	7,3	7,1	8,3	7,7	8,5	8	7,1	7,6	7,8	7,7	
<b>He/she gets angry when he/she cannot fulfill his role in the group.</b>	3,4	3,4	2,6	1,7	2,2	2,5	3,2	5,3	2,8	3,4	
<b>He/she angers his friends because of his misbehavior in the group.</b>	1,3	2,8	2	2	1,8	1,7	2,3	3,4	1,9	2,5	
<b>He/she focuses on the materials (robot) used in the activity</b>	7,4		8,7		8,7		7,7		8,2		
<b>He/she enjoys using</b>	7,6		9,1		9,2		7,8		8,5		



materials (robot) used in the activity										
He/she gets excited with the material (robot) used in the activity	7,2		9,4		9		7,5		8,3	
He/she creates new games with the material (robot) used in the activity	5,0		7,1		4,5		5,7		5,7	
He/she excitedly shares with the teacher experiences he/she had with the robot	5,9		8,9		7,3		6,7		7,3	
He/she expresses others' positive/negative feelings	6,7	5,7	7,4	7,1	7,4	7,2	7,6	8,0	7,4	7,3
He/she displays behaviors that disturbs the flow of the activity	3,0	2,4	2,4	1,8	3	3,4	3,1	4,5	2,9	3,2
He/she complains about classmates during the activity	2,8	3,3	7,7	5,6	6,4	5,2	5,6	5,8	6,1	5,3
He/she communicates positively with the children in the group at the activity.	1,5	3,5	1,5	1,1	1,8	1,4	2,2	4,0	1,8	2,5
He/she has difficulty communicating with the children in the group at the activity.	1,6	2,3	1,8	2	2,1	2	3,0	4,0	2,3	2,8
He/she collaborates with friends in the group	6,7	5,8	7,6	7,1	8,1	7,3	6,2	6,5	7,1	6,8
He/she cooperates with classmates	6,5	6,2	7,9	7,8	8,4	7	6,6	6,1	7,4	6,8
He/she enjoys helping classmates during the activity	6,1	5,7	7,9	7,3	7,7	7,1	6,9	6,3	7,3	6,7
He/she stays calm when solving issues with others	6,8	6,9	6,8	7,1	8	7,6	6,5	5,4	7,0	6,6
He/she cares about classmates who are upset	4,4	4,8	6,2	4,4	5,3	6	5,4	5,9	5,5	5,4
He/she displays reluctance in participating in the group work.	1,6	2,6	1,8	1,2	1,6	2,5	2,2	2,2	1,8	2,1
He/she provides support to other children while they perform their role in the group work	5,6	5,6	7,4	5,8	6,8	6,7	6,1	5,9	6,5	6,0
<b>Total points average</b>	<b>5,2</b>	<b>5</b>	<b>6,1</b>	<b>5,2</b>	<b>5,9</b>	<b>5,6</b>	<b>5,5</b>	<b>5,7</b>	<b>5,7</b>	<b>5,5</b>

**Table 7- Distribution of Child Observation Form item score averages of children in 3-4 age group by Country**

## 5-6 Aged Children

This section includes the table related to the child observation form item mean scores obtained by the children aged 5-6 in the second administration carried out under the project named PEARL “Emotional Empathic Proximal Learning-Educational Environment, coded 2018-1-IT02-KA201-048515. Moreover, the graphics related to the distribution of mean scores obtained by the children aged 5-6 from each of the child observation form items by countries are provided. In the second administration, the



administrations were watched by teachers from the video recording, and the Child Observation Forms were then filled in.

5-6 Age										
Country										
	Italy		Turkey		Spain		Lithuania		Total	
	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot	Group With Robot	Group Without Robot
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
<b>He/she is willing to participate in the activities</b>	10,0	9,9	9,2	9,3	8,8	8,5	8,8	8,4	9,0	8,9
<b>He/she is anxious when starting the activity</b>	4,7	3,3	3,4	3,0	7,9	7,4	3,8	4,4	4,7	4,5
<b>He/she does not lose interest during the activity</b>	7,3	6,1	7,6	6,9	7,9	7,5	8,0	6,9	7,7	6,9
<b>He/she has difficulties to follow teacher's directions</b>	2,4	3,6	3,3	2,7	4,4	3,7	3,3	4,0	3,4	3,5
<b>He/she endeavors to carry on the activity</b>	7,3	8,1	8,1	7,8	8,5	7,5	8,1	7,6	8,1	7,7
<b>He/she wants to quit the activity when confronts a difficulty during the activity</b>	1,5	1,9	2,5	3,0	1,7	1,6	1,9	2,4	2,0	2,3
<b>He/she is willing to deal with the difficulty confronting during the activity</b>	8,4	7,9	7,0	7,0	7,1	6,6	8,0	6,8	7,5	6,9
<b>He/she becomes upset when having difficulty during the activity</b>	2,4	1,0	4,9	4,9	2,7	2,9	3,4	4,4	3,6	3,8
<b>He/she becomes happy when dealt with difficulty during the activity</b>	8,1	6,2	7,8	9,4	6,1	5,7	4,0	3,1	6,2	6,0
<b>He/she expresses negative feelings with a gesture, facial expression, and tone of voice when confronts a difficulty during the activity</b>	5,0	4,8	6,4	7,0	3,2	3,1	5,1	4,5	5,1	5,0
<b>He/she gets angry when having difficulty during the activity</b>	1,3	1,2	1,9	2,8	2,1	2,5	2,7	2,7	2,2	2,5
<b>He/she becomes happy after completing the activity</b>	9,4	7,2	9,1	9,3	8,5	8,4	8,4	7,2	8,8	8,1
<b>He/she expresses positive feelings with a gesture, facial expression, and tone of voice when feels happy during the activity</b>	9,3	6,8	8,3	8,6	8,4	7,4	8,0	7,6	8,3	7,8
<b>He/she asks for others' help when having difficulty during the</b>	6,4	4,8	4,8	4,7	5,0	5,3	3,7	4,9	4,7	4,9



<b>activity</b>											
<b>He/she is willing to experience new activities</b>	9,2	7,5	7,3	7,8	7,5	8,0	8,5	7,8	8,0	7,8	
<b>He/she shows willingness to complete the activity</b>	8,8	7,6	8,2	7,8	7,8	7,4	5,3	6,3	7,2	7,2	
<b>He/she gets angry when making a mistake</b>	2,3	1,2	2,0	2,9	2,3	3,0	1,5	3,2	2,0	2,8	
<b>He/she smiles often during the activity</b>	8,9	5,5	7,5	7,2	7,9	7,3	7,6	6,3	7,8	6,7	
<b>He/she gets excited when produces new ideas or things during the activity</b>	8,2	6,4	6,7	8,5	7,7	6,9	6,6	6,2	7,1	7,1	
<b>He/she shows sadness when making a mistake</b>	3,6	4,3	5,0	5,2	3,1	2,7	3,0	4,0	3,8	4,1	
<b>He/she leaves the game when gets angry</b>	,1	,8	2,5	3,2	1,2	2,0	,9	1,7	1,4	2,2	
<b>He/she shows courage when starting a new activity</b>	7,3	6,5	8,2	7,8	8,0	7,4	8,1	7,3	8,0	7,4	
<b>He/she practices willingly the roles given during the activity</b>	8,6	7,4	8,4	8,6	8,6	7,8	8,5	7,5	8,5	7,9	
<b>He/she tries different ways to solve the issue when having difficulty during the activity</b>	8,4	7,3	6,6	7,1	6,5	6,8	7,4	6,2	7,1	6,8	
<b>He/she becomes anxious when confronts a difficulty</b>	3,9	2,8	4,4	4,5	4,2	4,3	4,5	5,6	4,3	4,6	
<b>He/she is happy in group work.</b>	9,5	6,9	8,5	8,4	8,3	8,3	8,7	8,1	8,6	8,1	
<b>He/she gets angry when he/she cannot fulfill his role in the group.</b>	2,2	1,0	1,8	2,9	1,9	2,4	2,1	3,6	2,0	2,8	
<b>He/she angers his friends because of his misbehavior in the group.</b>	2,0	,4	2,0	2,3	1,6	1,0	1,7	1,8	1,8	1,6	
<b>He/she focuses on the materials (robot) used in the activity</b>	8,8		9,5		8,5		8,1		8,7		
<b>He/she enjoys using materials (robot) used in the activity</b>	9,6		9,7		8,9		7,4		8,7		
<b>He/she gets excited with the material (robot) used in the activity</b>	9,5		9,3		8,8		8,5		9,0		
<b>He/she creates new games with the material (robot) used in the activity</b>	4,1		5,6		3,3		5,6		4,9		
<b>He/she excitedly shares with the teacher experiences he/she had with the robot</b>	8,9		6,6		6,6		6,7		6,9		
<b>He/she communicates positively with the children in the group at the activity.</b>	7,5	7,1	8,2	7,5	7,9	7,8	8,3	8,1	8,1	7,7	
<b>He/she has difficulty communicating with the children in the group at the activity</b>	2,4	3,8	2,3	1,8	1,4	1,7	2,9	2,9	2,3	2,3	
<b>He/she expresses others' positive/negative</b>	3,1	1,8	4,6	5,8	6,3	6,3	5,0	4,1	4,9	4,9	



<b>feelings</b>											
He/she displays behaviors that disturbs the flow of the activity	1,2	2,0	1,7	2,5	1,8	1,2	2,7	2,3	2,0	2,1	
He/she complains about classmates during the activity	1,1	,6	1,9	3,3	1,5	2,2	2,7	2,0	2,0	2,3	
He/she cooperates with classmates	7,8	6,5	8,3	8,2	7,7	7,8	7,6	7,4	7,9	7,7	
He/she collaborates with friends in the group	8,1	7,7	8,4	8,9	7,5	7,7	6,6	7,6	7,6	8,0	
He/she enjoys helping classmates during the activity	7,4	7,5	7,0	8,7	7,8	7,8	7,9	6,9	7,5	7,7	
He/she stays calm when solving issues with others	8,0	7,0	6,3	6,1	7,4	7,7	7,2	6,8	7,0	6,8	
He/she cares about classmates who are upset	3,5	4,4	3,7	4,5	4,7	4,4	4,8	4,8	4,3	4,6	
He/she holds responsible a classmate when making a mistake during the activity	,5	1,2	2,7	2,4	1,5	2,1	5,8	5,2	3,2	3,1	
He/she gets warned by the teacher due to inappropriate behavior during the activity	1,1	2,0	2,0	2,8	2,3	1,1	1,3	2,1	1,7	2,1	
He/she cooperates happily with playmates	7,9	6,7	8,0	8,3	8,3	8,0	8,1	7,6	8,1	7,8	
He/she shows enthusiasm towards classmates' success	9,5	6,1	7,2	8,0	7,4	7,6	7,8	6,8	7,7	7,3	
He/she shares happily with the classmates/teacher the experiences he/she had during the activity	9,1	6,6	6,1	7,9	6,7	6,5	7,9	6,8	7,2	7,1	
He/she gets angry when his/her suggestion about the activity is declined	2,8	1,2	2,0	2,7	1,7	1,6	2,3	3,8	2,1	2,6	
He/she displays reluctance in participating in the group work	,5	1,0	2,0	2,9	1,4	1,5	1,5	1,8	1,5	2,0	
He/she provides support to other children while they perform their role in the group wor	7,3	6,1	6,6	7,6	6,6	7,2	5,9	6,4	6,5	6,9	
<b>Total points average</b>	5,8	4,7	5,7	5,9	5,6	5,3	5,6	5,3	5,7	5,4	

**Table 8- Distribution of Child Observation Form item score averages of children in 5-6 age group by Country**

## Second Phase Findings Summary

The findings obtained in the second phase of the Project, which is named PEARL “Emotional Empathic Proximal Learning-Educational Environment” and was carried out in Italy, Spain, Lithuania and Turkey, are summarized below.

The second phase of the PEARL Education modal was conducted with the children aged 3-6 in Italy, Turkey, Spain and Lithuania. The children in both 3-4 and 5-6 age groups were included in the study in Italy, Turkey, Spain and Lithuania. In the countries





where the administration was conducted, a robot was integrated into the activities developed under the PEARL Education Model in the experimental groups, while without robot version of the same activities was used in the control groups.

Before the phase , the teachers at the schools of administration in Italy, Turkey, Spain and Lithuania, which were project partner countries, were trained online about the goal and process of project, observation forms, activities to be implemented, filling out the observation forms. Following the training, the activities and materials (robot, etc.) to be used in the administration were shared with the teachers.

The teachers, who received activities and materials, carried out administrations with robot by some of the groups of five that they established at their schools and without robot with some of these groups of five. In the activities with robot, 49 children in Italy, 121 children in Turkey, 97 children in Spain and 140 children in Lithuania took part. In the activities without robot, 98 children in Italy, 122 children in Turkey, 98 children in Spain and 145 children in Lithuania participated in. In all countries, whereas activities with robots were carried out with a total of 407 children, activities without robots were conducted with a total of 415 children.

After completing the administrations, each child was evaluated with the Child Observation Forms, developed under the project, by their teacher after watching their video recording. In the form, there are 45 items for children aged three to six years and 51 items for children aged five-six. In the form in which children conducting activities with robots were evaluated, there were items that would reveal the skills developed by activities with robots in addition to the items of the evaluation form of children making activities without robots. In the forms developed for children aged both 3-4 and 5-6, there are items reflecting positive and negative characteristics. All items in each form were rated by the Likert type between "0" and "10". While lack of a behavior is evaluated as "0", performing it at the highest level is evaluated as "10". In the administration and evaluation process, the researchers in the project team contacted teachers by mail and phone. Teachers' questions were answered, and their experiences were shared with a permanent communication. The child observation forms filled in by the teachers were received by hand by the researchers. SPSS was used in the assessment of the data.

In the first section of the findings, there is a table regarding the child observation form item mean scores of children aged 3-4. In addition, the graphs are presented regarding the distribution of the mean scores of the children aged 3-4 from each of the Child Observation Form items by country.

When examining the total mean scores obtained by the children aged 3-4 from the items of Child Observation Form by countries, it is seen that while the children in Lithuania have the highest mean score in the administration "Without Robot", the children in Italy have the lowest mean score. In the administration "With Robot", it is observed that whereas the children in Turkey have the highest mean score, the children in Italy have the lowest mean score.

The mean score difference between the group with robot and the group without robot is determined to be the highest in Turkey and the least in Italy in favor of the group with robot. When examining the total scores of all children in all countries, the mean score of the ones with robot is higher than the mean score of those without robot.

In the second section of the findings, there is a table regarding the child observation form item mean scores of children aged 5-6. In addition, the graphs are presented regarding the distribution of the mean scores of the children aged 5-6 from each of the Child Observation Form items by country.



When examining the total mean scores obtained by the children aged 5-6 from the items of Child Observation Form by countries, it is seen that while the children in Turkey have the highest mean score in the administration “Without Robot”, the children in Italy have the lowest mean score. In the administration “With Robot”, it is observed that whereas the children in Italy have the highest mean score, the children in Spain and Lithuania have the lowest mean score.

The mean score difference between the group with robot and the group without robot is determined to be the highest in Italy and the least in Spain and Lithuania in favor of the group with robot. When examining the total scores of all children in all countries, the mean score of the ones with robot is higher than the mean score of those without robot.

