The Effect of Philosophy for Children (P4C) Curriculum on Critical Thinking through Philosophical Inquiry and Problem Solving Skills

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Abstract

This study aims to examine the effect of the P4C curriculum on 5-6-year-old children's critical thinking through philosophical inquiry and their problem-solving skills. The study group included a total of 40 children learning in kindergartens at an elementary school in Çanakkale, Turkey. The study used a quasi-experimental model with the pretest-posttest control group. The "Philosophy for Children Curriculum" prepared by interviewing two experts was administered to the children in the experimental group for ten weeks in two sessions per week with an average total duration of 40 minutes. The study deployed the "Critical Thinking Scale through Philosophical Inquiry for Children 5-6 Years Old" and "Problem Solving Skills Scale for Children (PSSS)" as data collection tools. The analysis results showed a significant difference between the pretest and postscores of both groups in terms of the experimental groups' critical thinking skills through philosophical inquiry within-group comparisons. Although the posttest mean score of the experimental group's critical thinking skills through philosophical inquiry was higher than the control group, no statistically significant difference was observed between them. Considering the comparisons of problem solving skills within groups, a significant difference was determined between both groups' pretest and posttest scores. When the problem solving skills were compared between groups post-test results, a significant difference was noted in favor of the experimental group.

Keywords: Philosophy for children (P4C), Philosophy for children curriculum, Critical thinking through philosophical inquiry, Problem solving

Introduction

In recent years, reports on the results of exams (e.g., Pisa exam) that measure high-level skills have found that students have difficulty interpreting and evaluating the information they have learned in various areas such as science and mathematics (Aydın, Selvitopu & Kaya, 2018). Students have difficulty mastering sophisticated thinking skills such as critical thinking and problem solving (ERG, 2008). Contrary to the traditional understanding of education, John Dewey advocated the significance of education systems that teach students "how" to think rather than "what" to think. In other words, an education based on thinking gains prominence in contrast to rote learning based education (Williams, 2017). Many researchers (Akkocaoğlu Çayır, 2015b; Kefeli & Kara, 2008; Lone, 2015; Matthews, 2005; Millett & Tapper, 2012; Mutlu, 2010; Taş, 2017) are of the view that education becomes more efficient when it is conducted through thinking and questioning. Therefore, thinking education approaches that will develop children's thinking and questioning skills have become more and more remarkable over time.

Due to the rapid changes in all areas of life in democratic societies, it is increasingly paramount for the individual to develop thinking skills such as critical thinking and problem solving for better and more effective thinking (Dalğar, 2017). Today's education systems have begun to be restructured to develop critical, creative and problem-solving thinking skills. Studies have been carried out in this direction in Turkey, and curricula have been revised based on learner-centered approaches (TMoNE, 2013; Taş, 2017). The Preschool Curriculum

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published by the Turkish Ministry of National Education (2013) emphasizes the importance of developing thinking skills, learning by discovering, being active in the child's learning process, adapting what they learn to different situations, and problem solving skills. Meanwhile, the curriculum is rested on asking questions about the child's subjects, researching and exploring.

The report titled "21st Century Student Profile" by Ministry of National Education (2011) in Turkey indicated the significance of 21st century thinking skills such as critical, creative, innovative, problem solving and decision making. Acquiring such skills and turning them into character requires many years of hard work. Therefore, it is important to develop critical thinking in the first years of life (Dalğar, 2017). A key component of critical thinking is the ability to evaluate other people's statements. Since information obtained from others is not always accurate, it is important for children to reason about it critically.

By as early as age 3, children understand that people sometimes give inaccurate information and that some individuals are more reliable sources than others (Heyman, 2008). According to UNESCO (2007), preschool and primary school ages are decisive years when children acquire creative and critical thinking skills. Children learn to produce creative solutions, establish cause-effect relationships and predict their consequences during the problem solving process (Kınık, 2018). Because problem-solving skills enable individuals to overcome their problems, the earlier they are introduced to children, the easier they will be able to adapt to daily life. Kant (2006) noted that it is important for children to learn to think. More emphasis should be placed on "how" children should think rather than "what" they think to develop their thinking skills. Various educational approaches are put into practice to improve children's thinking skills. The "Philosophy for Children" (P4C) approach is considered as one of those that adopts the principle of "Learning to Think" on how children should think and how they can develop their thinking processes (Boyraz & Türkcan, 2017; Durmuş, 2008). Preschool period is a critical period in human life. Therefore, it is indispensable for children to be able to think critically and solve problems as well as receiving education. In this context, the problem statement of this study was determined as "What is the effect of the Philosophy for Children Curriculum on 5-6 year-old children's critical thinking and their problem-solving skills through philosophical inquiry?".

Philosophy for Children (P4C)

"Child philosophy" was first used as a concept in the philosophical literature by Karl Jaspers, and it was created with the combination of the words "child" and "philosophy". Those who defended that philosophy is questioned with children used the term "Philosophy with Children-PwC" (Mutlu, 2010). Lipman preferred to call it "Philosophy For Children-P4C".

Although the philosophy for children approach is close to the pragmatic philosophy of George Herbert Mead, Charles Sanders Peirce, Lev Vygotsky and Justus Buchler as its main framework, its foundations are based on John Dewey's student-centered understanding and pragmatic philosophy which asserts that thinking skills should be strengthened as early as possible. John Dewey's views such as encouraging children to think and talk about what, why and how they will do it, children becoming active in the classroom, and the value of what children produce gave direction to the Philosophy for Children approach (Okur, 2008). However, Lipman and Sharp, the founders of the philosophy for children approach, did not see their curricula as completely pragmatist (Erdoğan 2018; Juuso, 2007; Lipman, 1996; Tümkaya & Gülaçtı, 2010; Valitalo, 2018; Vansieleghem & Kennedy, 2011).

P4C education enables children to develop and justify their thinking capacity, reasoning, critical thinking and discussion skills through philosophical dialogue. The desire for P4C education movement in the USA for the first time began with the work of Matthew Lipman (Funston, 2017). What is meant by the philosophy education here is not to convey the views of the philosophers, but an understanding of philosophy peculiar to children, which urges them to think critically and tophilosophers' views, but an understanding of philosophy peculiar to children, which urges them to think critically and reason. P4C education is a way of thinking or questioning that deals with all kinds of issues, questions and concepts in philosophy and is therefore relevant to all disciplines. Therefore, it can be applied in lessons from all areas. Children's literature is closely linked to reading and language skills, as it uses a text, story or a novel appropriate for children as a tool while questioning. P4C education is applied in many countries around the world (Akkocaoğlu Çayır, 2015b; Boyacı, Karadağ & Gülenç, 2018; Erdoğan, 2018; Imany, Ahghar & Seif Naraghi, 2016; Karadağ & Yıldız Demirtaş, 2018).

Philosophy for Children Curriculum (P4CC)

It refers to a thinking education curriculum introduced by Matthew Lipman and Ann Sharp in the 1970s and adopts the "Learning to Think" principle. P4CC aims for children to learn by asking questions, questioning and discussing in dialogues. Children are generally expected to ask questions to be discussed. As a result, active children in this process learn to think better and ask better questions (Taş, 2017). At the same time, P4CC contributes children's critical thinking, problem solving, asking questions, listening, cause and effect skills, and thinking skills about concepts that are important to them, curiosity and desire to explore. Children can develop different perspectives and think more flexibly and effectively.

P4CC attempts to make philosophical inquiry with children under adults' guidance and discuss philosophical concepts such as happiness, love, right, wrong, injustice, and fairness through their daily life experiences or stories. Children define these concepts with reasoning related to the questions, and they try to make connections between their daily lives. This process is closely related to thinking skills (Akkocaoğlu Çayır, 2015b). In general, P4CC sessions start with sharing a short story, poem, picture, object, or some other stimulus by the teacher, and the children then take time to think of their questions. Therefore, various materials regarding different Philosophy for Children methods have evolved over time, and stimulants have been enriched and started to be used (Trickey & Topping, 2004). Lone (2015) stated various questions that can help in philosophical conversations: "What did you mean when you say …", "What is the meaning of …?", "When you say … do you want to say…? "," What are the things that make you say that? ".

Philosophy practices for children vary across the cultural structures and perspectives of countries on education, which paves the way for developing new methods related to the approach (Erdoğan, 2018). Each method has similar aspects and significant differences. For instance, Lipman's method is mostly applied to children and young people, the Socratic method to adults, and the Philosophical Inquiry Society method to adults and children (Boyacı, Karadağ & Gülenç, 2018).

The philosophical inquiry society (PIS) method that was used in this research was developed by Catherine McCall after the studies with Matthew Lipman. The aim of this method is to transform the children of any group that knows or does not know each other into a "Philosophical Inquiry Society" as a result of their philosophical dialogue. In PIS sessions, the chairperson should have a basic knowledge of philosophy and logic. Their task is to seek different dynamics and provide different conditions for the emergence of philosophical dialogue. The chairperson must ensure that the discussion continues in a philosophical line, to create a chance for every child to participate and to warrant different opinions (Boyacı, Karadağ & Gülenç, 2018).

Lipman regarded philosophy as a fun activity in which ideas are increasingly enhanced and grounded on each other. He called the philosophy session as "the community of inquiry" (Juuso, 2007). The community of inquiry is a group convened through a dialogue-based investigation to examine a topic or theme of common interest. The most important point is that this community generates knowledge. Its foundations are based on the concept of collaborative knowledge creation and Peirce, Dewey and Lipman (Dumitru, 2012).

The relevant literature showed a limited number of studies conducted in Turkey regarding the Philosophy for Children (Akkocaoğlu Çayır, 2015a; Aydın Yardım, 2005; Erdoğan, 2018; Okur, 2008; Taş, 2017). Only two of them were carried out with preschoolers. Okur (2008) prepared a training program for the approach and examined the effect of this program on preschoolers in terms of several variables. Taş (2017) attempted to identify the impact of the curriculum prepared in line with the approach upon preschoolers' theory of mind and creativity.

This study is paramount in terms of drawing attention to the "Philosophy for Children" approach, which is a lesser-known approach in Turkey, and that young children can make philosophy at an early age. Besides, the study is expected to contribute to the related literatureby examining the effect of Philosophy for Children on preschoolers' thinking skills such as critical thinking and problem solving through philosophical inquiry.

Aim of the Study

This study aims to examine the effect of P4CC on 5-6-year-old children's critical thinking through philosophical inquiry and their problem-solving skills and contribute to the field in this regard and shed light on further studies. In service of this aim, answers to the following sub-problems were sought:
1. Is there a significant difference between the critical thinking skills through philosophical inquiry pretest and posttest scores of the children in the experimental and control groups?

2. Is there a significant difference between the children in the experimental group's critical thinking through philosophical inquiry pretest and posttest scores?

3. Is there a significant difference between the children in the control group's critical thinking through philosophical inquiry pretest and posttest scores?

4. Is there a significant difference between the problem-solving pretest and posttest scores of the children in the experimental and control groups?

5. Is there a significant difference between the children in the experimental group's problem-solving pretest and posttest scores?

6. Is there a significant difference between the children in the control group's problem-solving pretest and posttest scores?

Method

This study aims to examine the effect of P4CC on 5-6-year-old children's critical thinking skills through philosophical inquiry and their problem-solving skills. Since the experimental and control groups would be compared before and after the implementation, the study used a quasi-experimental model with the pretest-posttest control group, one of the quantitative research designs. Table 1 depicts the study design and measurement tools.

Table 1. Experimental Design Used in the Study

Group	Pretest	Process	Posttest
Experimental	CTSPI & PSSS	Philosophy for Children Curriculum	CTSPI & PSSS
Control	CTSPI & PSSS		CTSPI & PSSS

The purpose of experimental research is to create an environment in which the researcher can distinguish a certain variable by controlling all other variables to show what the effect of a specific approach or intervention is and the cause-effect relationship between variables (Büyüköztürk, 2016; Johnson, 2015).

The study's dependent variable was 5-6 year-old children's critical thinking through philosophical inquiry and their problem solving skills, and the independent variable was the "Philosophy for Children Curriculum". P4CC was administered to the children in the experimental group for 10 weeks, and no intervention was made in the control group. P4C curriculum practices were carried out in the experimental group by the researchers. The control group continued their standard curriculum with their own teacher.

Study Group

The study group composed of 60-72 months (5-6-year-old) and the mean of the months is 65.4 months 40 children. The children who are in the study group are studying in kindergartens of a primary school in Çanakkale in the 2018-2019 academic year and have similar socio-economic status. There were 20 children in the experimental group and 20 children in the control group. The children in the study group are in the range of 60-72 months, and the mean of the months is 65.4 months.

Considering the demographic characteristics of the experimental and control groups; 25% (n=5) of the students in the experimental group were female, and 75% (n=15) were males, while 40% (n=8) of the students in the control group were female, and 60% (n=12) were males. 30% (n=6) of the mothers of the experimental group graduated from primary school, 35% (n=7) secondary school, 15% (n=3) high school and 20% (n= 4) university graduates, while %45 (n = 9) of the mothers in control group were primary school graduates, 25% (n=5) were secondary school graduates, 25% (n=5) were high school graduates and 5% (n=1) were university graduates. Upon examining the educational status of the experimental group students' fathers; 35% (n=5) were identified to be primary school graduates, 35% (n=7) were secondary school, 20% (n=4) were high school graduates and 20% (n=4) were university graduates; whereas, 40% (n = 8) of the fathers of the control group students were primary school graduates, 15% (n=3) were secondary school, 40% (n=8) were high school and 5% (n=1) were university graduates.

While 85% (n=17) of the mothers of those in the experimental group do not work, 5% (n=1) work in the public sector and 10% (n=2) in the private sector. 80% (n=16) of the mothers of the control group do not work, 5% (n

=1) work in the public sector, and 15% (n=3) in the private sector. While 15% (n=3) of the fathers of those in the experimental group work in the public sector and 85% (n=17) in the private sector, while 15% (n=3) of the fathers of the control group were in the public sector and 85% (n=17) works in the private sector. While the families of 90% (n = 18) of the experimental group students live together, the families of 10% (n=2) are separate. On the other hand, 95% of the families of the control group (n=19) live together, and 5% (n = 1) are divorced.

Data Collection Tools

This study deployed a "Personal Information Form" to obtain demographic information regarding children and their families. To measure the effectiveness of the developed curriculum, "Critical Thinking Scale through Philosophical Inquiry for Children 5-6 Years Old (CTSPI)" developed by Karadağ, Yıldız Demirtaş and Yıldız (2017) and "Problem Solving Skills Scale for Children (PSSS)" developed by Oğuz and Köksal Akyol (2015) were used as pretest and post-test.

Critical thinking scale through philosophical inquiry for children 5-6 years old (CTSPI): Being a 5-point Likert type ("Never", "Sometimes", "Rarely", "Often" and "Always"), the scale consisted of three sub-factors (Philosophical Inquiry, Language and Cognitive Skills and Formulating Question) and 38 items. Karadağ, Yıldız Demirtaş and Yıldız (2017) examined the implicit structure of the scale through exploratory factor analysis and model fit with confirmatory factor analysis to ensure the construct validity of the scale. The internal consistency coefficients of the scale were noted to be high (.974, .955, .983, .986).

Problem solving skills scale for children (PSSS): The "Problem Solving Skills Scale for Children (PSSS)" developed by Oğuz and Köksal Akyol (2015) was measured on five-point Likert-type (0: No solution, 1: A single solution, 2: Two solutions, 3: Three solutions, 4 : More than three solutions). The tool included eighteen problem statements, drawings relevant to these problem statements and evaluation form. The developers of the scale examined content Validity Index and Explanatory Factor Analysis for validity studies, and the content validity index was calculated as 0.99. The appropriateness level of drawings was determined as 0.96. As for reliability studies, Cronbach Alpha Internal Reliability Coefficient was identified as .86, and the correlation coefficient after the test-retest was found to be .60. The validity and reliability analyses revealed that the scale is appropriate for children aged 60 to 72 months.

Philosophy for children curriculum: While preparing the Philosophy for Children Curriculum, similar curricula were initially examined in the relevant literature. The researcher participated in the Philosophy for Children and Communities (P4C) Specialization Certificate Program and had the competence to practice Philosophy for Children educational practices. After the training and the research, activity plans consisting of storybooks and videos with the theme of philosophical inquiry that can be used in pre-school education were prepared. They were submitted to experts for their opinions, the shortcomings were eliminated, and a 10-week P4CC was formed within this framework. The learning outcomes and indicators overlapping with the Turkish Ministry of National Education Preschool Curriculum were determined while preparing P4CC activity plans. Large group Turkish-language activities were organized in line with the learning outcomes related to the Philosophy for Children Curriculum within the context of the cognitive domain in the Pre-School Curriculum as "Establishes cause-effect relationships.", "Produces solutions to problems."Expresses what they listen/watch in various ways."; Social-emotional development learning outcomes such as "Explains others' feelings about an event or situation," "Shows positive/negative feelings about an event or situation in appropriate ways," "Respects differences," "Feels safe". Concepts such as "Right to Life," "Friendship," "Sharing," "Tolerance," "Selfishness," "Patience," "Anger," "Injustice," and "Justice" were discussed using various books and videos for a total of 20 sessions. Some examples of the questions asked during the philosophical explorations with the children are as follows: "What does it take to be friends with someone?", "What does friendship mean to you?", "Should we be friends with someone just like us?", "Do we have to be the same to be friends?" , "What does patience mean?", "Is it always a good thing to be patient?", "Should we be patient in every situation?" . The teacher helped children sit in a circle to actively participate and see each other. After a short conversation, the teacher created a warm conversation environment by showing the book and asking them to guess what it was about by looking at the picture on its cover. Afterwards, the book was read, the children's own ideas and feelings were discussed, and the evaluation was made under the teacher's guidance.

Data Collection

Prior to administering the P4CC and pretests, necessary permissions were obtained from Turkey Çanakkale Provincial Directorate of National Education, the families of the children and the scale developers. The families

of the children filled the personal information form. The practitioner, that is the researcher, individually administered the PSSS pretests to each child in the experimental and control groups in a quiet environment. Those who did not want to complete or fill the test were excluded from the working group. The tests lasted approximately 20 minutes. CTSPI pretests were filled with the support of the researcher and the control group teacher. After the pretest applications, "Philosophy for Children Curriculum" was administered to the experimental group for ten weeks, two sessions per week, for a total of 20 sessions lasting nearly 40 minutes, and then post-tests were carried out in the same way.

Data Analysis

Statistical analyzes were performed through the use of the SPSS package program. At first, normality tests were conducted to determine whether the data showed normal distribution. Shapiro-Wilk, Skewness-Kurtosis values were examined, and the coefficients of variation were calculated to determine whether the data were appropriate for using parametric methods.

Table 2. The Shapiro-Wilk Test Results of the CTSPI and PSSS

	Group	Statistics Value	df	p
CTSPI	Experimental	.958	20	.504
	Control	.963	20	.595
PSSS	Experimental	.952	20	.403
	Control	.906	20	.052

Table 2 displays that the data obtained from the experimental and control groups regarding CTSPI and PSSS showed a normal distribution ($p > .05$).

Table 3. The Skewness and Kurtosis Values of the CTSPI and PSSS

	Group	N	Skewness	Kurtosis
CTSPI	Experimental	20	-.152	-.946
	Control	20	-.077	-.814
PSSS	Experimental	20	.173	-.810
	Control	20	-.959	.257

Upon analyzing Table 3, the data demonstrated a normal distribution, since kurtosis and skewness values obtained from the overall scales and its dimensions were between (+2.0) and (-2.0) (George & Mallery, 2010).

Table 4. Coefficient of Variation Results of the CTSPI and PSSS

	Group	Variation Coefficient
CTSPI	Experimental	%26
	Control	%23
	Experimental	%17
PSSS	Control	%22

The coefficient of variation was calculated as a result of dividing the standard deviation value by the arithmetic mean and expressing the obtained value in percentile. The results are depicted in Table 4. In cases when the coefficient of variation is below 50%, the distribution is accepted as normal (Bahar, Nartgün, Durmuş & Bıçak, 2008). Considering the results related to Shapiro-Wilk, Skewness-Kurtosis and variation coefficient, the data regarding CTSPI and PSSS were determined to show normal distribution. Histogram distributions also demonstrated a normal distribution. Correspondingly, parametric tests were used during data analysis. Independent Groups t-test was used for comparing the pretest and post-test mean of the experimental and control groups, and Dependent Groups t-test to compare the pretest and post-test mean of the experimental and control groups in itself.

Findings

Findings Regarding the First Sub-Problem

The first sub-problem of the study was "Is there a significant difference between the critical thinking skills through philosophical inquiry pretest and posttest scores of the children in the experimental and control groups?". Table 5 presents findings related to the Independent Samples t test results to reveal whether there was a difference between the groups.

Table 5. t-Test Results between the Pretest and Posttest Scores of the CTSPI

Groups	Test	N	$\bar{X}$	Sd	t	df	p
Experimental	Pretest	20	2.79	.78	.144	38	.887
Control	Pretest	20	2.75	.72			
Experimental	Posttest	20	3.30	.87	1.337	38	.189
Control	Posttest	20	2.97	.69			

Table 5 suggests no significant difference between the experimental group pretest mean scores ($\bar{X}$=2.79) and the control group pretest mean scores ($\bar{X}$=2.75) regarding CTSPI measurements and the groups were close to each other (p=.887>.05). Considering the measurements made as a result of the administering P4CC, no significant difference was identified across the experimental group posttest mean scores ($\bar{X}$=3.30) and the control group posttest mean scores ($\bar{X}$=2.97) (p=.189>.05). Although there was no statistically significant difference when the means of the groups were compared, a higher increase was noted across the mean of the experimental group, meaning that P4CC positively affects critical thinking skills through philosophical inquiry.

Findings Regarding the Second Sub-Problem

The second sub-problem of the study was, "Is there a significant difference between the children in the experimental group's critical thinking through philosophical inquiry pretest and posttest scores?". The results of the paired-samples t-test conducted to compare the experimental group's pretest and posttest CTSPI averages are shown in Table 6.

Table 6. t-Test Results between Experimental Group CTSPI Pretest and Posttest Scores

Group	Test	N	$\bar{X}$	Sd	t	df	p
	Pretest	20	2.79	.78			
Experimental					-7.174	19	.000*
	Posttest	20	3.30	.87			

*Significant at p<.05 level.

Table 6 demonstrates a significant difference between the experimental group's pretest score mean ($\bar{X}$=2.79) and that of the posttest score ($\bar{X}$=3.30) regarding CTSPI (p=.000<.05). Accordingly, it may be wise to mention that P4CC positively affects the critical thinking through philosophical inquiry levels of the children in the experimental group.

Findings Regarding the Third Sub-Problem

The third sub-problem of the study was, "Is there a significant difference between the children in the control group's critical thinking through philosophical inquiry pretest and posttest scores?". Table 7 shows the results of the paired-samples t-test conducted to compare the control group's pretest and posttest CTSPI averages.

Table 7. t-Test Results between Control Group CTSPI Pretest and Posttest Scores

Group	Test	N	$\bar{X}$	Sd	t	df	p
	Pretest	20	2.75	.72			
Control					-3.703	19	.002*
	Posttest	20	2.97	.69			

* Significant at p<.05 level.

According to Table 7, a significant difference was noted between the control group's pretest score mean ($\bar{X}$=2.75) and that of the post-test score ($\bar{X}$=2.97) regarding CTSPI (p=.002<.05). This may be because the Preschool Curriculum with which the students in the control group are familiar in this process has a positive effect on their critical thinking levels through philosophical inquiry.

Findings Regarding the Fourth Sub-Problem

The fourth sub-problem of the study was "Is there a significant difference between the problem-solving pretest and posttest scores of the children in the experimental and control groups?". Table 8 suggests findings regarding the Independent Samples t Test results conducted to compare the mean scores between the groups.

Table 8. t-Test Results between the Pretest and Posttest Scores of the PSSS

Groups	Test	N	$\bar{X}$	Sd	t	df	p
Experimental	Pretest	20	1.90	.42	1.051	38	.300
Control	Pretest	20	1.75	.45			
Experimental	Posttest	20	2.33	.40	2.407	38	.021*
Control	Posttest	20	2.00	.45			

* Significant at p<.05 level.

Upon analyzing Table 8, no significant difference was determined between the experimental group pretest mean scores ($\bar{X}$=1.90) and the control group pretest mean scores ($\bar{X}$=1.75) regarding PSSS measurements (p=.300>.05), referring that the groups were close to each other before the experimental operation. A significant difference was identified across the experimental group post-test mean scores ($\bar{X}$=2.33) and those of the control group ($\bar{X}$=2.00) (p=.021<.05). Based upon this finding, PSSS can be said to be effective on children's problem solving skills.

Findings Regarding the Fifth Sub-Problem

The fifth subproblem of the study was, "Is there a significant difference between the children in the experimental group's problem-solving pretest and posttest scores?". The results of the paired-samples t-test conducted to compare the mean scores of the experimental group's PSSS pretest and posttest are shown in Table 9.

Table 9. t-Test Results between Experimental Group PSSS Pretest and Posttest Scores

Group	Test	N	$\bar{X}$	Sd	t	df	p
Experimental	Pretest	20	1.90	.42	-5.245	19	.000*
	Posttest	20	2.33	.40			

* Significant at p<.05 level.

Table 9 reveals that there was significant difference between the experimental group's pretest score mean ($\bar{X}$=1.90) and that of the post-test score ($\bar{X}$=2.33) regarding PSSS (p=.000<.05). This means that P4CC positively affects the students' problem solving skills.

Findings Regarding the Sixth Sub-Problem

The sixth sub-problem of the study was "Is there a significant difference between the children in the control group's problem-solving pretest and posttest scores?". Findings related to the results of the Paired Samples t Test performed to compare the control group PSSS pretest and post-test averages are illustrated in Table 10.

Table 10. t-Test Results between Control Group PSSS Pretest and Posttest Scores

Group	Test	N	$\bar{X}$	Sd	t	df	p
Control	Pretest	20	1.75	.45	-3.677	19	.002*
	Posttest	20	2.00	.45			

* Significant at p<.05 level.

According to Table 10, a significant difference was identified between the means of the control group pretest scores ($\overline{\mathbf{X}}$=1.75) and the posttest ($\overline{\mathbf{X}}$=2,00) in favor of posttest (p=.002<.05). However, when the mean increases of the two groups were examined, the experimental group achieved a higher increase compared to the control group, indicating that P4CC is more effective on problem solving skills. In line with these findings, it can be interpreted that Preschool Curriculum has a positive effect on the problem solving skills of the students' problem solving skills in the control group.

Discussion, Result and Recommendations

Discussion and Results related to Critical Thinking Skills through Philosophical Inquiry

The results of the study showed that the Philosophy for Children curriculum promotes critical thinking skills through philosophical inquiry. Upon analyzing the relevant literature, various studies (Gasparatou & Kampeza, 2012; Karadağ & Yıldız Demirtaş, 2018; Lam, 2011) have shown that the Philosophy for Children Curriculum contributes to the development of critical thinking skills in line with the findings of the 1st and 2nd questions of this study. Gasparatou and Kampeza (2012) underlined the positive effect of P4C in the development of critical thinking. Gasparatou and Kampeza (2012) also conducted a study with control and experimental groups consisting of 30 children aged 5-6 years. Likewise, a total of 20 sessions were organized, using 8 picture books on topics such as friendship and respect for differences, which encourages asking questions and making comments. Karadağ and Yıldız Demirtaş (2018) formed a training program on the Philosophy for Children approach and after the implementation of the program, they concluded that it had a positive effect on the critical thinking skills of the preschoolers. Karadağ and Yıldız Demirtaş (2018) applied a 10-week P4C curriculum to a working group consisting of 30 children aged 5-6 years. Just as in our study, this curriculum devised in a manner consistent with the learning outcomes of the TMoNE preschool curriculum, asked questions about such topics as beauty, good-evil, forgetting, knowing-learning, thinking, tolerance, freedom, happiness, favor, and growing-maturing, and obtained similar results. Lam (2011) noted that P4C, which he affiliated 32 sessions over 16 weeks, played a significant role in developing students' critical thinking skills.

Studies (Benade, 2011; Naseri, Gorjian, Ebrahimi & Niakan, 2017; Rahdar, Pourghaz & Marziyeh, 2018) show that the Philosophy for Children approach has a significant effect on the level of critical thinking. For instance, Benade (2011) noted that implementing the Philosophy for Children approach within a 7-month program results in a significant difference in the critical thinking levels of primary school 5th grade students. Naseri, Gorjian, Ebrahimi and Niakan (2017) statistically demonstrated that the philosophical approach encourages critical thinking. Rahdar, Pourghaz and Marziyeh (2018) concluded that the philosophical practices conducted with children for 12 weeks positively impacted skills such as self-efficacy and critical thinking.

Though there was a greater increase in the posttest mean scores of the experimental group with the implemented program, no statistically significant difference was identified between the control group and the experimental group. Considering the reasons for the fact that no significant difference was found in terms of critical thinking dimension of the curriculum, these factors may include the time period and the number of the working group, as well as the learning outcomes of the Preschool Curriculum, including those related to critical thinking skills, and activities that allow critical thinking and inquiry-based thinking.

In their study, Fair, Haas, Gardosik, Johnson, Price and Leipnik (2015) found that the seventh-grade students who had experienced the P4C curriculum achieved significant gains relative to those in the seventh grade control group at a statistically significant level. Yet, the eighth-grade students in the experimental group did not have such gains compared to the control group. The reason for this was that the seventh-grade teachers started the program early in the school year and continued for a period of 22 to 26 weeks, whereas the eighth-grade teachers started later and used the curriculum only for 4 to 10 weeks. Thus, they argued that the P4C curriculum shows its real effects when students are involved in activities for a certain period of time. A significant effect on students can be achieved after approximately the 24th week of lessons. Besides, Daniel and Auriac (2011) claimed that critical thinking skill is not innate. Therefore, they agreed that critical thinking requires learning and that this learning can be managed and acquired successfully by students as long as they benefit from regular philosophical praxis. Fair, Haas, Gardosik, Johnson, Price, and Leipnik (2015) stated that P4C programs are unlikely to have a noticeable impact on students in just a few weeks because acclimating students to practices such as "justifying and explaining their views" and "critically evaluating reasons" are skills that require some repetition and practice.

The relevant literature also involves studies (Colom, Moriyón, Magro & Morilla, 2014; Fair, Haas, Gardosik, Johnson, Price & Leipnik, 2015; Sigurborsdottir, 1998) examining the effectiveness of the Philosophy for Children approach in the long run. Colom, Moriyón, Magro and Morilla (2014) conducted a longitudinal study considering that the Philosophy for Children program should be administered for a reduced period of time and throughout the school years in the long term. Sigurborsdottir (1998) implemented the Philosophy for Children approach with preschoolers over a period of two years and indicated that the curriculum increased critical thinking skills. Topping and Trickey (2015) state that short-term positive effects may occur for studies on Philosophy for Children, but on the contrary, it is possible to have "sleeping" gains that can take long years. Garcia-Moriyon, Rebollo and Colom (2005) argued that the intensive administration of P4C not only along a school year, but across several school years will provide a greater advantage in experimental groups than observed in the short term.

All these studies are in parallel to those of this study related to critical thinking. This study is thought to be supported with extra alternatives because the curriculum's insufficient length of time is a significant factor in showing the effectiveness of the curriculum. As a result, the administration of the curriculum in the longer term is expected to create more positive effects and marked differences in terms of critical thinking skills through philosophical inquiry.

Discussion and Results related to Problem-Solving Skills

Based on the results related to problem-solving skills in the 4th and 5th sub-problems of the study, a significant difference was found between problem-solving skills related to P4C. There are not many studies in the relevant literature that examine the effects of Philosophy for Children practise on problem solving skills; however, there are some studies that support the findings of this study. Gillies, Nichols and Burgh (2011) implied that the Philosophy for Children approach is the one that encourages reasoning and problem solving. Seifi, Shaghagni and Kalantari (2011) sought the effect of Philosophy for Children curriculum on secondary school students' self-esteem and their problem solving skills.

The results obtained after P4C was administered to the experimental group for a total of 15 sessions for 45 days showed that the experimental group's self-esteem level and problem-solving skills increased significantly. Likewise, Erfani, Shobeiri, Karimi and Atar (2014) conducted an experimental study aiming to examine the effect of philosophy instruction on the problem solving skills and creativity of secondary school students. In this regard, the experimental group was subjected to 8 sessions of P4C, each of which lasted 2 hours. The results indicated that P4C encourages the development of students' problem-solving skills and creativity. The results of the study were also evaluated in terms of the problem-solving and creativity levels of the male students and it was found that these were higher than those of the female students. Millett and Tapper (2012) also confirmed that philosophical inquiry with children is an approach that develops problem-solving skills.

Within the 6th sub-problem of the study, a significant difference was found between the pretest and posttest results of the control group. This may be because the pre-school curriculum that the control group received during the experimental process had a positive effect on problem-solving skills. Considering the Pre-School Curriculum, cognitive development includes "Learning outcome 19: She/he produces solutions to problematic situations." The field of social emotional development involves "Learning outcome 17: She/he solves problems with others.". These learning outcomes aim to improve the child's ability to solve the problems she/he encounters in daily life and social relationships.

In addition, curriculum explanations of field trips and arts activities include objectives related to the development of problem-solving skills. In their study, Gur and Kocak (2018) examined the effects of the thinking curriculum they created on the social problem-solving skills of 5-6-year-old children and found a statistically significant difference between the pretest and posttest scores of the experimental group and the control group. They stated that the preschool education that the control group received during the 5-month period in which the curriculum was implemented had a positive effect on the children's social problem-solving skills.

Hence, both P4C and Preschool Curriculum were determined to positively affect children's problem-solving skills. However, taking the PSSS post-test scores of both groups into account, a significant difference was observed in favor of the experimental group. This can be explained by the fact that the stages required for problem-solving skills are also the learning outcomes of the Philosophy for Children approach. Britz (1993) put forward that the problem-solving process is based on the sequenced steps such as identifying the problem, thinking to produce various solutions, brainstorming, choosing one solution or trying it out, and evaluating what

has been done. These prerequisites required for problem-solving skills are among the learning outcomes of the Philosophy for Children Curriculum, which is one of the thinking education approaches. Therefore, the children in this program hold some features such as multi-dimensional thinking, being able to look from different perspectives, and establishing cause-effect relationships, which is thought to contribute to the development of children's problem-solving skills. Similar findings emerged in the studies conducted by Erfani, Shobeiri, Karimi and Atar (2014), Gillies, Nichols and Burgh (2011), Gur and Kocak (2018), Millett and Tapper (2012), Seifi, Shaghagni and Kalantari (2011), Tok and Sevinç (2010).

Recommendations

Based upon the study findings, various recommendations were provided for the practitioners and further studies: Philosophy for Children Curriculum was facilitated in 20 sessions for 10 weeks in the present study. Spatial studies can be carried out to examine the long-term effectiveness of the curriculum in detail.

- This study analyzed the effect of the Philosophy for Children Curriculum on critical thinking through philosophical inquiry and problem-solving skills. Researchers may examine its effect in different areas.
- This study used a quantitative experimental research design. Researchers can analyze Philosophy for Children Curriculum in different dimensions and in more depth through using qualitative or mixed methods.
- This study was conducted in kindergartens of a public school. Researchers may seek and compare the Philosophy for Children approach at different educational levels or in different types of institutions.
- Researchers who will study on this subject can compare the Philosophy for Children Curriculum with other thinking curricula.
- Researchers can compare the Philosophy for Children Curriculum with other alternative programs applied in pre-school.

Author (s) Contribution Rate

1. Author: 60%, 2. Author: 40%

Conflicts of Interest

No potential conflict of interest

Ethical Approval (only for necessary papers)

Prior to administering the P4CC and pretests, necessary permissions were obtained from Turkey Çanakkale Provincial Directorate of National Education, the families of the children and the scale developers. The personal information form was filled by the families of the children.

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