

The Effect of Forest Experience Program on the Lung Capacity, Health & Fitness, Emotional Intelligence, and Psychological Well-being of Local Children

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숲 체험 프로그램이 지역아동의 폐활량과 건강체력, 감성지능, 심리적 안녕감에 미치는 효과

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Abstract The purpose of this study is to investigate the effect of a forest experience program on the lung capacity, health & fitness, emotional intelligence, and psychological well-being of local children. This study was conducted on 3rd and 4th grade elementary school students for 12 weeks from July 10 to September 30, 2022, at a local children's center in D City. Changes were analyzed and verified using t-test. Verified. The changes in the lung capacity, health & fitness, emotional intelligence, and psychological well-being of the experimental group and the control group were analyzed and verified using t-test. For the changes in lung capacity and health & fitness, there was a statistically significant difference between the control group and the experimental group in lung capacity ($t=24.56, p<.05$), and there was also a statistically significant difference between the two groups in cardiorespiratory endurance among the elements of health & fitness ($t=16.64, p<.05$). As for the changes in emotional intelligence and psychological well-being, there was statistically significant differences between the experimental group and the control group in the emotional intelligence ($t=2.31, p<.05$) and in psychological well-being ($t=3.21, p<.05$). Through this study, the positive effects of the forest experience program were confirmed, and it is believed that institutional arrangements are needed to improve children's participation conditions by expanding forest experience spaces and developing customized forest experience programs to suit the characteristics of the region.

Key Words : Children, Forest experience program, Vital capacity, Physical fitness, Emotional intelligence, Psychological well-being

요약 본 연구의 목적은 숲 체험 프로그램이 지역아동의 폐활량, 건강체력, 정서지능, 심리적 안녕감에 미치는 효과를 규명하는 것입니다. 본 연구는 D시 지역아동센터에 2022년 7월 10일부터 9월 30일까지 12주간 초등 3, 4학년층을 대상으로 진행되었으며, 실험군과 대조군의 폐활량, 건강체력, 정서지능, 심리적 안녕감의 변화를 t-test를 이용하여 분석하고 검증하였다. 폐활량과 건강체력의 변화는 폐활량에서 대조군과 실험군 간에 통계적으로 유의한 차이가 있었으며($t=24.56, p<.05$), 건강체력의 요소 중 심폐지구력에서도 두 집단 간에 통계적으로 유의한 차이가 있었습니다($t=16.64, p<.05$). 정서지능과 심리적 안녕감의 변화는 정서지능($t=2.31, p<.05$)과 심리적 안녕감($t=3.21, p<.05$)에서 실험군과 대조군 간에 통계적으로 유의한 차이가 있었습니다. 본 연구를 통해 숲 체험 프로그램의 긍정적인 효과를 확인하였고 지역의 특성에 맞게 숲 체험 교육 공간의 확충과 맞춤형 숲 체험 프로그램의 개발로 아동들의 참여 여건이 개선되어 많은 아동들이 경험할 수 있도록 제도적 장치가 필요하다고 사료된다.

키워드 : 아동, 숲 체험 프로그램, 폐활량, 건강체력, 감성지능, 심리적 안녕감

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1. Introduction

1.1 The Need for the Study

As the educational value of forests comes to the fore, 'forest kindergartens', which are based on nature-friendly education, are attracting a lot of attention. This can be seen from the fact that Korean-style forest kindergarten pilot organizations have been recruited since 2010, and as a result, more than 100 organizations nationwide participated [1]. As part of this interest, various nature experience-oriented programs have been developed in Korea[2]. In addition, various types of forest experience-related programs have been activated as experiential education using forests comes to the fore [2]. In Korea, interest has increased since 2008 as the Northern Regional Forest Service introduced it on a pilot basis around national forests in the metropolitan area. Recently, efforts to revitalize government-led forest experiences have been made in earnest[3].

The details of the concept of forest experiences are as follows: Forest experience activities in early childhood education institutions, which are called by various names such as forest kindergarten, forest play school, and forest class, take various forms[3]. The research on forest experience[3] defines forest experience activities more comprehensively as: not a forest experience such as a picnic or field trip in which the subject participates as a one-time activity, but an activity in which the subject continuously goes to the forest a certain number of times and is given enough time to fully experience the forest for at least 2 hours after arriving at the forest. In the case of Japan, which is close to Korea, the operation of a forest experience program means a program that involves activities in the mountains three days a week for more than three hours[4]. As awareness of forest experience activities spreads, there has been an increase in studies examining program effects related to forest experiences, the meaning and concept of forest experiences, or the relation-

ship between variables[5], which also means that the educational value and importance of forest experiences are emphasized.

In particular, side effects arising from anxiety, depression, obesity, and interpersonal relationships caused by a decrease in physical and social activities due to the pandemic are also affecting the educational aspects such as interpersonal maladjustment, poor consideration for others and poor academic performance[6]. It was found that these forest experience activities improve the psychological and social health abilities and physical health abilities of elementary school students[7], and forest experiences not only help improve children's physical, mental, and spiritual health, but also provide many educational benefits[10].

Although the ultimate purpose of school health education is to improve the health of students and teaching staff, actual school health education is giving way to knowledge-oriented structured education programs, making it interested in the ecological paradigm of care and coexistence where people and nature can live happily together through the forest experience programs[8,9]. This interaction with nature is a representative activity including the process of understanding the natural ecology in the forest and various educational values[10].

In a study on the educational effects of forests, Walker[12] stressed the positive aspects of forests, stating that play in the forest is helpful for children's holistic development. MacDemott[13] also reported that activities in the forests allow young children to understand a life that resembles nature. As can be seen from many studies that emphasize the relationship between education in the forest and children's development, activities and play in the forest have a significant effect on holistic development and growth[11].

In Switzerland, emphasis was placed on the emotional perception of forests in the process of establishing the first forest school(Waldschule) in 1986 [14]. According to Jenssen[15], environmental edu-

cation through nature experiences affects environmental awareness and emotions for the development of behavior[15]. These previous research results showed that forest experience programs have a positive impact on emotional aspects such as emotional intelligence[16] and psychological well-being[17] and physical health[18], and in this study, other forest experience programs In order to differentiate from other factors, we would like to measure the physiological variable called lung capacity and examine the effectiveness of the forest experience program as an objective indicator.

1.2 The Purpose of the Study

The purpose of this study is to conduct forest experience programs for local children to find out the effects of the forest experience programs on lung capacity, physical fitness for health, emotional intelligence, and psychological well-being of local children, and to provide basic data for applying the forest experience programs to the curriculum. The specific research objectives are as follows:

- To organize forest experience programs for local children.
- To understand the effect of the forest experience programs on the lung capacity and physical fitness for health of local children.
- To understand the effect of the forest experience programs on the emotional intelligence and psychological well-being of local children

2. Materials and Method

2.1 Sampling Method

2.1.1 Research Design

The experimental design to be used in this study is a quasi-experimental design. The pre-test and forest experience program was applied to the experimental group before a post-test, while after the pre-test, no treatment was given to the control group before a post-test. It was conducted for 12 weeks in the forest of City D from July 10 to September 30, 2022.

2.1.2 Subjects

The subjects of this study were 3rd and 4th grade children living in city D and attending Local Children's Center H, who voluntarily applied. In order to prevent the spread of the resulting experiment, the control group was also randomly selected from children attending Local Children's Center B, which was geographically distant, through voluntary applications.

The specific criteria for selection are as follows:

- Randomly selected among elementary school students in the 3rd and 4th grades, the largest number of children using local children's centers
- Students who can read, fully understand, and answer the questionnaire on their own
- Students who can participate in the program
- Students who did not participate in the after-school exercise program because it could affect the research results of exercise
- Students who understand the purpose of this study and both they and their parents agree in writing to participate

A formula commonly used in behavioral science research was applied through before-and-after comparison of the experimental and control group presented by Cohen(1988), and the G*power3.1.7 program was used to set the power($1-\beta$) to 0.80, the significance level(α) to 0.05, and the effect size (f) to 0.25, finding out that 28 subjects were needed for this study. The subjects were randomly assigned and a preliminary homogeneity test was conducted. Considering the dropout rate during the experiment, a total of 30 people were selected, 15 in the experimental group and 15 in the control group. Among them, the study was conducted with a total of 28 subjects, 14 in the final experimental group and 14 in the control group, including 1 person in the experimental group(absent from the program once due to field experience study) and 1 person in the control group (absent from the post-survey).

2.1.3 Research Tool

In this study, a structured questionnaire was used to collect data, including 2 questions on general characteristics, 4 questions on physical fitness for health (muscle strength, muscular endurance, cardiorespiratory endurance, and flexibility), 1 question on lung capacity, 17 questions on emotional intelligence related to emotions, and 34 questions on psychological well-being.

1) General characteristics

General characteristics, such as grade and gender, were surveyed in a self-report format.

2) Physical fitness for health and lung capacity

To find out physical fitness for health, we measured muscle strength (grasping power), muscular endurance (push-ups), cardiorespiratory endurance (jumping rope), and flexibility (sitting and bending the upper body forward) by referring to the Physical Activity Promotion System (PAPS) and research on physical fitness for health targeting elementary school students.

3) Emotional intelligence

The emotional intelligence questionnaire used in this study was developed by Moon[19], and the scale used by Shin[20] and Ban[21] was reorganized according to this study. The survey questions were 17 questions based on four factors: emotional awareness, emotional expression, emotional control, and empathy. Each question was set on a 5-point scale with a Likert scale ranging from 'Absolutely not(1 point)' to 'Absolutely yes(5 points)', and negative statements were analyzed through reverse scoring. This tool was found to be Cronbach's $\alpha=.94$, while this study was found to be Cronbach's $\alpha=.88$.

4) Psychological well-being scale

In order to measure psychological well-being, this study used a scale modified and supplemented by Kim[22] for adolescents. Kim's scale is a Ryff's

[23] psychological well-being scale adapted by Kim et al[24]. The survey had a total of 34 questions, asking about six factors: self-acceptance, positive interpersonal relationships, autonomy, environmental governance, life goals, and personal growth. Each question was set on a 5-point scale with a Likert scale ranging from 'Absolutely not(1 point)' to 'Absolutely yes(5 points)', and negative statements were analyzed through reverse scoring. This tool was found to be Cronbach's $\alpha=.78$, while this study was found to be Cronbach's $\alpha=.81$.

2.1.4 Research procedures

1) Composition of forest experience programs

One nursing professor, one elementary school teacher, and one forest commentator reviewed the validity of the educational content of the program. Based on a study that developed a 12-week elementary school education program, we structured the intervention period of the program into 12 sessions, once a week, 60 minutes each by considering the operation of a sustainable program, which is a program for elementary school students (Table 1). The 1st session was composed of Get Familiar with the Forest, the 2nd session, the 3rd session, and the 12th session conclude the entire program. Each session focused on hands-on experience. During the education, explanations were provided in detail and in an easy-to-understand manner, and activity sheets suitable for the topic were produced and distributed.

2) Application of forest experience program

Fourteen students in the experimental group participated in a forest experience program in the forest located in city D once a week for 12 weeks. The program was held after school and was conducted every Wednesday between 2 and 3 p.m. In addition to the researcher, one children's forest commentator conducted the forest experience program as a research assistant. It took about 60 minutes for 1 activity. Due to the influence of the outdoor place,

Table 1. Forest experience program

Steps	wk	Objective of Session	Related elements
Familiarize yourself with a forest	1	Make preparations for the following activities and create a sense of closeness	Creating a sense of closeness
	2	Enhance the interest in the participation in activities and a sense of closeness between students who participate in the program through the Wake Up Senses activity.	Create a sense of closeness, promote the interest and participation in activities
Forest and I	3	Learn appropriate attitudes to deal with a life	Respect for life, diversity of thoughts
	4	Learn the value of life through various living things' way of life, understand and respect different ways of life.	Respect for life, awareness of others' minds
I, you and our forest	5	Understand others' thoughts and minds different from my thoughts through various ways of life of living things in the forest.	Understand others' minds
	6	Create a sense of closeness with friends in the process of performing missions in the forest.	Exchange of emotions
	7	Develop a sense of cooperation and cohesiveness through ecological plays and activities.	Cohesiveness, sense of cooperation
	8	Develop a sense of cooperation and cohesiveness through ecological plays and activities.	Cohesiveness, sense of cooperation
Forest of life practice through living together	9	Feel the beauty of living together from ecosystem.	Living together
	10	Understand what we must do for living together	Living together
My changes	11	Dream of the future of forest and think about my future.	Psychological wellbeing
	12	Seek psychological wellbeing	Psychological wellbeing

however, it took about 70 to 90 minutes to prepare and finish. Before the program, subjects were recruited, orientation was held for students who consented to the study, and they were asked to fill out a questionnaire including general characteristics, emotion-related emotional intelligence, and psychological well-being. Physical fitness for health and lung capacity were measured. The 14 control group members had difficulty participating after school, so they were selected as a group to participate in the program during the winter vacation after the semester ended.

The forest experience program was conducted by the researcher, and one research assistant also participated.

3) Program evaluation

This program, which was structured to improve the physical and emotional health of local children, provides various experiences in the forest for 12 weeks for 14 children attending the Local Children's Center H in city D to measure their physical fitness for health, lung capacity, emotional intelligence, and psychological well-being. Objective physical fitness for health was measured using each device

for muscle strength(grasping power), muscular endurance(push-ups), cardiorespiratory endurance (jumping rope), and flexibility(sitting and bending the upper body forward), while lung capacity was measured using a spirometer(K5). Based on the questionnaire, subjective emotional intelligence and psychological well-being through the forest experience program were evaluated. In order to find out changes before and after the forest experience program, a total of 2 measurements were conducted at the beginning and end of the program. A survey was conducted for the control group in the same manner as the experimental group. Finally, the forest experience program was explained with data, and we promised that participants would have priority access to the next program.

2.2 Data Collection

Data collection for this study was conducted through a pre-survey and a follow-up survey after the program. In order to select subjects of the experimental group, the purpose of this study, the research plan, and the questionnaire were explained to the director and person in charge of the Local Children's Center located in city D, and data was

collected after obtaining approval for the program and survey. We met with the director and person in charge of the Local Children's Center located in city D, explained the purpose of the study, provided a gift in return each time data was collected, and selected the control group through voluntary recruitment. The survey was conducted within a local children's center that was comfortable and familiar to elementary school students participating in the program, and efforts were made to reduce errors as much as possible by allowing the survey to be conducted one hour after arriving at the local children's center and before dinner.

2.2.1 Pre-survey

Before the forest experience program of this study, a survey was conducted on the experimental group, and a questionnaire composed of the subjects' general characteristics, physical fitness for health, lung capacity, emotional intelligence, and psychological well-being was surveyed. We helped children who had difficulty understanding the questionnaire to read the questionnaire and write the answers. Objective physical fitness for health was measured by creating a list with ID so that questions could be checked, and lung capacity was measured and recorded three times repeatedly. The control group's physical fitness for health, and lung capacity were measured through the questionnaire in the same way as the experimental group.

2.2.2 Post-survey

A second survey was conducted for the post-survey of the experimental group, and physical fitness for health and lung capacity were measured in the same way as the pre-survey. The post-survey of the control group was also conducted in the same way as the experimental group, and physical fitness for health and lung capacity were measured.

2.3 Data Analysis

The collected data were analyzed using the SPSS/WIN 24.0 program as follows:

- The homogeneity test of the subjects' general characteristics was analyzed through χ^2 -test.
- The homogeneity test of the subjects' prior dependent variables was analyzed through an independent t-test.
- Changes in variables of the experimental and control groups were verified using t-test.
- The statistical significance level was set to .05.

2.4 Ethical Considerations for Research Subjects

To ensure the human rights of participants, we conducted the study after review and approval by the Kangwon national University's Institutional Review Board (IRB No. KWNUIRB-2018-03-001-001). After explaining and guiding the research, we received the consent forms signed by the elementary school students and their parents.

A recruitment notice was issued before the start of the program, and only those who wished to participate in the study were provided with an explanation of the purpose and background of the study, methods and procedures, risks and benefits that may arise for research participants, protection of personal information, etc., and the fact that the collected data will be used only for the research purpose and personal information will be encoded, stored and managed in a form that does not identify the individual to ensure confidentiality. After fully explaining that if they do not want to participate during the research, they may withdraw their participation at any time and there will be no disadvantage, we obtained written consent from the subjects who expressed their intention to participate in the study. The written consent was obtained from the control group through the same procedure, and the opportunity to participate in the next program was provided after the program was completed.

3. Result and Discussion

3.1 Homogeneity Test of General Characteristics of the Research Subjects and Prior Dependent Variables

The homogeneity of the general characteristics of the experimental and control groups participating in the study was examined. As a result, there were no differences between the two groups in terms of gender and grade (Table 2). The result of checking the homogeneity of the prior dependent variables of the experimental and control groups showed that there were no differences between the two groups in physical fitness for health (muscular strength and muscular endurance), and lung capacity and flexibility. There were no significant differences between the two groups in emotional intelligence and psychological well-being (Table 3).

Table 2. Homogeneity test for general features

Variable		Experimental group(n=14)	Control group(n=14)	x ²	p
		N(%)	N(%)		
Sex	Male	8(57.1)	6(42.9)	0.571	.706
	Female	6(42.9)	8(57.1)		
Grade	3	7(50)	7(50)	0.000	1.000
	4	7(50)	7(50)		

Table 3. Homogeneity test for dependent variables

Variable	Experimental group(n=14)	Control group(n=14)	x ²	p
	Mean±SD	Mean±SD		
Muscular strength	21.14±5.44	21.014±5.44	<i>p</i> <.05	.943
Muscle endurance	23.27±5.37	22.65±5.56	<i>p</i> <.05	.995
Cardiopulmonary endurance	126.27±5.37	102.65±5.56	<i>p</i> <.05	.995
Flexibility	11.62±5.37	10.00±.56	<i>p</i> <.05	.995
Lung capacity	41.90±13.93	33.29±14.51	<i>p</i> <.05	.844
Emotional intelligence	69.80±5.51	65.32±10.01	3.302	.075
Psychological Well-being	141.13±10.05	127.40±16.06	1.414	.239

3.2 Hypothesis Test

Hypothesis 1: There will be differences in lung capacity and physical fitness for health between the experimental group that participated in the forest

experience program and the control group that did not participate in the program. In order to test Hypothesis 1, the values measured in the Physical Activity Promotion System (PAPS) were analyzed before and after the 12-week program.

In the case of changes in physical fitness for health after the forest experience program, there were no significant differences in muscle strength ($t=0.39, p=.697$) and muscular endurance ($t=0.47, p=.638$). In cardiorespiratory endurance, however, the experimental group scored 23.96 ± 10.13 points, while the control group scored $23.39 \pm .83$ points, showing statistically significant differences ($t=16.64, p<.05$). There was also a statistically significant difference in lung capacity, with 9.07 ± 2.36 points in the experimental group and 8.78 ± 1.42 points in the control group ($t=24.56, p<.05$), partially supporting Hypothesis 1 (Table 4).

Hypothesis 2: There will be differences in emotional intelligence and psychological well-being between the experimental group that participated in the forest experience program and the control group that did not participate in the program.

In order to test Hypothesis 2, the emotional intelligence questionnaire and psychological well-being questionnaire were provided.

The changes in emotional intelligence according to the forest experience program were 0.38 ± 0.73 points in the experimental group and 0.20 ± 0.61 points in the control group, showing a statistically significant difference ($t=2.31, p<.05$). In addition, psychological well-being was 0.48 ± 0.64 points in the experimental group and 0.27 ± 0.60 points in the control group, showing a statistically significant difference ($t=3.21, p<.05$), and Hypothesis 2 was supported (Table 4).

4. Discussion

This study was conducted to see the effect of the forest experience program on lung capacity, health physical strength, emotional intelligence, and psy-

Table 4. Hypothesis test

(N=28)

Variable	Groups(n)	pre	post	Difference	t	p
		Mean±SD	Mean±SD	Mean±SD		
Muscular strength	Exp.(14)	21.26±7.32	1.97±0.56	0.84±10.35	0.39	.697
	Cont(14)	19.98±3.14	20.28±3.39	0.29±3.94		
Muscle endurance	Exp.(14)	3.63±0.71	4.11±0.41	0.96±10.13	0.47	.638
	Cont(14)	22.01±3.14	22.40±3.38	0.39±3.83		
Cardiopulmonary endurance	Exp.(14)	2.50±0.83	3.75±0.45	23.96±10.13	16.64	p<.05
	Cont(14)	102.01±3.14	125.40±3.38	23.39±3.83		
Flexibility	Exp.(14)	3.47±0.64	4.88±5.01	1.96±10.13	1.17	.249
	Cont(14)	9.36±3.14	10.75±3.38	1.39±3.83		
Lung capacity	Exp.(14)	27.33±0.52	38.22±1.25	9.07±2.36	24.56	p<.05
	Cont(14)	27.93±5.26	36.71±5.58	8.78±1.42		
Emotional intelligence	Exp.(14)	3.80±0.70	4.18±0.32	0.38±0.73	2.31	.028
	Cont(14)	3.88±0.47	4.08±0.28	0.20±0.61		
Psychological Well-being	Exp.(14)	3.68±0.48	4.17±0.27	0.48±0.64	3.21	p<.05
	Cont(14)	3.88±0.45	4.15±0.33	0.27±0.60		

chological well-being of local children. After carrying out the 12-week forest experience program, lung capacity increased statistically significantly in the experimental group than in the control group, and cardiopulmonary endurance increased significantly in the experimental group than in the control group. In emotional intelligence, the experimental group increased statistically significantly compared to the control group, and psychological well-being also increased statistically significantly in the experimental group compared to the control group. These results show that lung capacity, simple endurance, emotional intelligence, and psychological well-being were significantly different in the experimental group that received the forest experience program intervention than the control group, so this program was effective. These results are consistent with previous studies[25] that forest experience programs for infants were emotionally effective and research[26] that integrated nature-friendly education programs for elementary school students are effective in emotional improvement.

As such, it is meaningful that the forest experience program can prove its effectiveness on emotional parts such as emotional intelligence and psychological well-being.

In addition, this study is meaningful in that it saw changes in lung capacity and health fitness as well as emotional effects when looking at the differences

between forests and related programs in previous studies,

It has been shown to have a significant effect on cardiopulmonary endurance in health physical strength, and these results can be found in previous studies for elementary school students. Kim[27]'s study shows that cardiopulmonary endurance of the experimental group who participated in dance activities during after-school activities significantly increased, and that after-school broadcasting dance significantly increased cardiopulmonary endurance of elementary school students.

Looking at studies on lung capacity of elementary school students, we can see a study[28] that showed an increase in lung capacity due to jump rope activity in the effect of jump rope exercise on lung capacity of elementary school students, and it can be said that it is the same as this study in terms of activity, but I think there could be a difference in terms of activity, and I think this study is meaningful that most of the studies conducted forest experience programs were emotional and studied by measuring lung capacity.

As such, I think the forest experience program for local children in this study is an effective program for improving lung capacity, health physical strength, emotional intelligence, and psychological well-being.

5. Conclusion and suggestion

This study was conducted to see the effect of the forest experience program on local children's physical activity, health fitness, emotional intelligence, and psychological well-being. According to this study, it was found that there were statistically significant differences in the experimental group in cardiopulmonary endurance, emotional intelligence, and psychological well-being among local children's lung capacity and health physical fitness. Based on these results, educational policy efforts are needed to prepare a plan to expand and apply forest experience programs to regular elementary school programs in the future. This study measured the effectiveness after applying the forest experience program for 12 weeks to see the effects of lung capacity, health fitness, emotional intelligence, and psychological well-being, but suggests that further studies that can be re-measured over a certain period of time are needed to verify the continuity of the effect. In addition, this study is focused on local children's centers, and it is believed that institutional arrangements are needed to improve children's participation conditions by expanding forest experience education spaces and developing customized forest experience programs to improve lung capacity, health physical strength, and emotional areas for all elementary school students in the future. In order to design a forest experience program, after deciding on the direction of the program, going through the design process of demand survey and description, program modification for each session, security and development, etc., a final program was derived that has a series of systematic processes, so the program participant group It contributed to maintaining interest and participation until the end. In addition, the validity of the program content was improved by revising and supplementing the provisionally designed program through consultation with theoretical expert groups

and field experts. By applying this to the preliminary group, problems that may arise when applying the program to the field are confirmed in advance. In practice, it is believed that increasing the completeness of the final program by increasing field applicability had a positive effect in increasing program effectiveness. Therefore, we hope that it will be used as basic data for improving the curriculum of elementary schools. A few suggestions are made based on the results and conclusions of this study. First, although this study tested the effectiveness of the program by conducting it with the limitation of 3rd and 4th graders, there is a limitation in that it is not possible to see differences in the program effect considering the level of growth and development. . Therefore, follow-up research should be conducted to classify growth and development criteria and verify program effectiveness. Second, this study has a limitation in that it only verified short-term effects of the program and was unable to measure continuous effects. Therefore, it appears that research should be conducted to verify the lasting effect by applying it to a curriculum that can be continued throughout the research period.

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