Analysis of Horticultural Activities in the Teacher's Guidebooks of Nuri Curriculum for 5-Year-Olds

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ABSTRACT

The purpose of this study was to analyze the frequency and contents of horticultural activities in 696 individual activities listed in 11 teacher's guidebooks of Nuri Curriculum for 5-year-olds, and to find out the perceptions of horticultural activities in the formal curriculum. The target horticultural activities that were selected were those using natural objects like potted plants, water, wind, soil, stones, etc. as the topic or subject of activities, and those with different topics but are mentioning plants or natural objects as an example at least twice.

The 150 selected horticultural activities were classified by life-based theme, activity type, activity domain, and medium. As a result of examining horticultural activities by life-based theme, there were 150 horticultural activities (21.55%): 40 in Spring, Summer, Autumn and Winter (5.75%), 34 in Animals, Plants, and Nature (4.89%), 22 in Environment and Life (3.16%), 19 in Our Country (2.73%), and nine in Our Neighborhood (1.29%), nine in Various Countries of the World (1.29%), four in Health and Safety (0.57%), four in Living tools (0.57%), four in Transportation (0.57%), three in Kindergarten and Friends (0.43%), two in Me and My Family (0.29%; $\chi^2=130.427$, $p < .001$). As a result of examining horticultural activities by activity type, there were 61 free choice activities (40.67%), 80 large and small group activities (53.33%), and nine outdoor play activities (6.00%), indicating that outdoor play was the fewest activity type ($\chi^2=54.040$, $p < .001$). The results of analyzing horticultural activities by activity domain showed that there were 25 in conversation (16.67%), 19 in science (12.50%), 14 in art (9.33%), 14 in cooking (9.33%), 10 in fairy tales (6.00%), nine in music (6.00%), eight in language (5.33%), eight in number operation (5.33%), eight in others (5.33%), six in children's plays (4.0%), six in games (4.0%), four in body and movement (2.67%), three in stacking (2.00%), three in roles (2.00%), three in rhythm (2.00%), two in children's poems (1.33%), two in field experience (1.33%) and one in outside play (0.67%; $\chi^2=87.600$, $p < .001$). As a result of examining the mediums used in the horticultural activities, 46 activities (30.67%) directly used plants as the mediums, 11 activities (7.33%) used soil such as stones, gravel, and earth as the mediums instead of plants, four activities (2.67%) used dry plants such as branches and dry leaves as the mediums, and 89 activities (59.33%) used videos, photos of plants, and pictures of plants as the mediums ($\chi^2=121.307$, $p < .001$).

Keywords: activity domains, activity types, children's horticulture, horticultural program, life-based themes

Introduction

The Nuri Curriculum for 5-year-olds is a national-level curriculum for 5-year-olds comprised of five domains - physical activity and health, communication, social interactions, art experiences, and nature exploration - with the

aim to develop the basic abilities and upright character necessary for 5-year-old children and lay the foundation to become democratic citizens (Ministry of Education Science and Technology [MEST], 2012). Moreover, there are 11 teacher's guidebooks for smooth guidance of teachers, which contain 696 individual activities and are distributed to kin-

This paper was funded by the research funds of Daegu Catholic University in 2019.

Received: January 7, 2020, **Revised:** February 2, 2020, **Accepted:** March 6, 2020

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dergartens and daycare centers nationwide (MEST, 2015).

Many studies are conducted on the contents in teacher's guidebooks of Nuri Curriculum for 5-year-olds, and as a result of analyzing creativity-character elements of these guidebooks, creativity-character elements showed highest frequency in Kindergarten and Friends and Our Neighborhood by life-based theme, and they showed highest frequency in free choice activities by activity type (Choi and Choi, 2018). As a result of analyzing the content of education in coexistence-oriented early childhood education as education for sustainable development, 'Kindergarten and Friends', 'Me and My Family', 'Our Neighborhood', 'Transportation', 'Living Tools', 'Health and Safety', and 'Our Country' showed highest frequency in the view of others or view of self, 'Animals, Plants and Nature', 'Environment and Life', and 'Spring, Summer, Autumn, Winter' in the view of environment, and 'Various Countries of the World' in the view of society and culture (Kim et al., 2014). As a result of analyzing art-related goals, the goals were set in the order of promoting artistic expressiveness, promoting creativity, and aesthetic attitude (Ahn and Kim, 2012). An analysis on the contents of teacher's guidebooks of Nuri Curriculum for 5-year-olds based on Freudenthal's mathematization showed that 'cardinal and ordinal numbers' was mathematized as highest frequency and 'patterning and algebra' as lowest frequency, and in most cases they appeared among various experiential activities focused on daily conversations (Song and Park, 2019). There was also a study claiming that the Nuri Curriculum guidebooks lack activities related to emotional intelligence and thus teachers face limitations in improving preschoolers with problem behaviors, and proving a program linking play, reading, music and art aligned with art therapy (Jo and Rhee, 2016). An analysis on total 49 activities such as fairy tales and children's plays showed that in 20.4% of cases, goal setting matched the content of education, and 16.3% selected fairy tales suitable for content of activities (Cho and Kim, 2014). Many studies are conducted in various fields on teacher's guidebooks of Nuri Curriculum for 5-year-olds, such as creativity-character elements, education for sustainable development, art education, mathematics education, fairy tales, etc.

Even in early childhood education, the need for educa-

tion in nature is also widely perceived among related institutes based on the perception that 'nature is the source of education (Lee, 2011). The purpose of early childhood education for children to lead the 21st century knowledge and information era in the 'Revised Kindergarten Curriculum 2007' is to 'foster Koreans that respect and love people and nature' (MEST, 2007). Moreover, there is a growing interest in horticultural activities as nature-friendly education, which is because early childhood is the time in which the basis of all development areas is formed, and the values and attitudes formed in this period may have a great impact on future attitudes toward life (Kim, 2010). As a result of examining the domestic research trends about nature-friendly education for preschoolers, many studies were conducted to develop educational activities and programs, as well as many studies related to nature-friendliness (Cho et al., 2018). Ecological experience programs for preschoolers are known to improve preschoolers' use of their emotions, perception and consideration of other people's emotions, perception and expression of their own emotions, and intelligence such as emotional regulation and impulse inhibition (Kang and Park, 2010). Moreover, horticultural activities improved emotional intelligence of children who participated and also relieved daily stress (Park and Huh, 2010), proving the positive effects of horticultural activities. As a result of conducting a meta-analysis on master's and doctoral dissertations to determine various research findings about horticultural activities, it was found that these activities have relatively positive effects on subject learning, cognitive functions, character, emotional intelligence and ego of students from kindergarten to high school (Lee and Jeong, 2018). As such, horticultural activities turned out to have an effect on development of preschoolers' nature-friendly attitudes and emotional intelligence, and thus there is an increasing attention in horticultural activities that are nature-friendly education using green plants as the medium. However, there is insufficient research analyzing the relevance between horticultural activities and teacher's guidebooks of Nuri Curriculum for 5-year-olds used as a reference by teachers in early childhood education settings.

Therefore, this study is conducted to determine the perception on horticultural activities in formal education of preschoolers by analyzing the frequency and contents of

horticultural activities using 969 activities in 11 teacher's guidebooks of Nuri Curriculum for 5-year-olds, and provide basic data to apply horticultural programs to formal kindergarten education and come up with policies related to horticultural education for preschoolers.

Research Methods

Subjects

Teacher's guidebooks of Nuri Curriculum for 5-year-olds are comprised of 11 themes such as Kindergarten and Friends, Me and My Family, Our Neighborhood, Animals, Plants and Nature, Health and Safety, Living Tools, Transportation, Our Country, Various Countries of the World, Environment and Life, and Spring, Summer, Autumn, Winter. Each of the life-based themes is classified by topic and sub-topic into total 696 individual activities. This study used 696 individual activities as the subjects of analysis.

Criteria

The objective of this study is to analyze horticultural activities in teacher's guidebooks of Nuri Curriculum for 5-year-olds. The 696 individual activities are comprised of activity topic, activity type, domain, goal, elements related to Nuri Curriculum for 5-year-olds, activity data, activity method, cautions, activity assessment, and extension activities. First, horticultural activities were selected based on the

analysis criteria of 696 individual activities. The target horticultural activities that were selected were those using natural objects like potted plants, water, wind, soil, stones, etc. as the topic or subject of activities, and those with different topics but are mentioning plants or natural objects as an example at least twice. For example, the goals of 'Finding out the meaning of the class name' in the kindergarten activities of Vol. 1 'Kindergarten and Friends' are to learn the meaning of the class name, feel the community spirit of class, and deciding on the class motto by discussing with friends, and they were included as horticultural activities since they mentioned the plant 'rose' as an example of the class name seven times and also mentioned the language and fragrance of flowers. However, when plants and natural objects are merely used as the background and mentioned only once as an example, they were excluded. For example, 'Spring Outing' among spring activities of Vol. 11 'Spring, Summer, Autumn, Winter' has the aim of finding out whether there are animals that appear in spring. The content mentioned 'forsythias and azaleas' as the names of plants, but merely mentioned as a setting for children's plays and thus excluded from horticultural activities.

Activities selected as horticultural activities were analyzed after setting the analysis criteria (Table 1). Analysis was conducted after classifying the activities by life-based theme, activity type, activity domain, and medium. There were 11 life-based themes classified based on the teacher's guidebooks of Nuri Curriculum for 5-year-olds: Kindergarten and Friends, Me and My Family, Our Neighborhood,

Table 1. Configuring analysis compliance

Activity by life-based theme	Activity type	Active domain	Medium
Kindergarten and Friends			
Me and My family		• Roles	
Our Neighborhood		• Number & operation	
Animals, Plants, and Nature	• Free choice activities	• Stacking	• Plants
Health and Safety		• Language	• Soil
Living Tools	• Large and small group activities	• Science	(stone, gravel, soil)
Transportation		• Fairy tales	• Dry plants
Our Country	• Outdoor activities	• Children's plays	• Others
Various Countries of the World		• Game	(Pictures of plants, photograph of plants)
Environment and Life		• Cooking	
Spring, Summer, Autumn, Winter		• Field experience	
		• Body	
		• Outdoor play	
		• Etc.	

Animals, Plants and Nature, Health and Safety, Living Tools, Transportation, Our Country, Various Countries of the World, Environment and Life, and Spring, Summer, Autumn, Winter. The analysis criteria of activity type and activity domain were based on the study analyzing the types of verbal interactions of teachers presented in teacher's guidebooks of Nuri Curriculum for 3, 4 and 5-year-olds (Jeon and Lee, 2017), and the study analyzing creativity-character elements that appeared in the activity methods in teacher's guidebooks of Nuri Curriculum for 5-year-olds (Choi and Choi, 2018). The activities were classified into three types: free choice activities, large and small group activities, and outdoor activities. They were divided into those presenting 17 activity domains such as stacking, roles, language, number operation, science, art, rhythm, conversation, fairy tales, children's poems, children's plays, music, body, games, cooking, outdoor play, and field experience, and those not presenting the domains. Furthermore, natural objects used as a medium were analyzed by dividing them into plants, soil (stones, gravel, earth), dry plants like branches, and others. Others included photos of plants and pictures of plants.

Procedures

The research data was analyzed as follows. First, we selected horticultural activities based on literature review and derived the criteria for analysis, and the validity of

the contents was tested by two persons with a doctoral degree in horticulture. Based on the criteria, two researchers conducted a preliminary analysis on 62 activities in Kindergarten and Friends and 60 activities in Animals, Plants and Nature among the life-based themes. The preliminary analysis was conducted individually for approximately 7 weeks from April 1 to May 20, 2019, and the consistency between the two researchers was 85.5%. The adequacy of inconsistency was sufficiently discussed, after which the secondary analysis was conducted for approximately 4 weeks from June 1 to 30, 2019. The consistency between the researchers in the secondary analysis was 92.5%. For other subjects of analysis with inconsistency, we derived results agreed after discussing the results among the analysts. The research on total 11 volumes were conducted for approximately 10 weeks from July 1 to September 15. The results were analyzed after statistical treatment with frequency, percentage, and χ^2 test using IBM SPSS Statistics 19.0 Program.

Results and Discussion

Horticultural activities by life-based theme

As a result of examining horticultural activities by life-based theme, there were 150 activities (21.55%) related to horticulture out of total 696 activities (Table 2). Spring,

Table 2. Frequency of horticultural activities by life-based theme

Activity by life-based theme	Total number of activities	Number of horticultural activities (%)	χ^2	<i>p</i>
Kindergarten and Friends	62	3 (0.43)	130.427	< .001
Me and My family	60	2 (0.29)		
Our Neighborhood	60	9 (1.29)		
Animals, Plants, and Nature	60	34 (4.89)		
Health and Safety	63	4 (0.57)		
Living Tools	76	4 (0.57)		
Transportation	60	4 (0.57)		
Our Country	63	19 (2.73)		
Various Countries of the World	64	9 (1.29)		
Environment and Life	60	22 (3.16)		
Spring, Summer, Autumn, Winter	68	40 (5.75)		
Total	696	150 (21.55)		

Summer, Autumn, Winter had 40 out of 68 activities (5.75%), Animals, Plants and Nature had 34 out of 60 activities (4.89%), Environment and Life had 22 out of 60 activities (3.16%), Our Country had 19 out of 63 activities (2.73%), Our Neighborhood had nine out of 60 activities (1.29%), Various Countries of the World had nine out of 64 activities (1.29%), Health and Safety had four out of 63 activities (0.57%), Living Tools had four out of 76 activities (0.57%) Transportation had four out of 60 activities (0.57%), Kindergarten and Friends had three out of 62 activities (0.43%), and Me and My Family had two out of 60 activities (0.29%), showing that there was a difference in horticultural activities according to each activity even though the number of activities by each of the 11 life-based themes is classified almost equivalently ($\chi^2=130.427$, $p < .000$). Similar results were found in an analysis of character elements in conversation activities presented in the Nuri Curriculum guidebooks, which proved that character elements are focused on certain topics such as Kindergarten and Friends, Me and My Family, Our Neighborhood, and Environment and Life, and the distribution was uneven in each life-based theme (Choi and Ahn, 2019). Horticultural activities also did not appear evenly in each life-based theme. This indicates that Animals, Plants and Nature is a topic directly related to plants, and Spring, Summer, Autumn, Winter have mentioned horticultural activities more frequently than others due to the seasonality, but

overall, only a few direct horticultural activities were being carried out.

Horticultural activities by activity type

As a result of examining horticultural activities by activity type among 150 horticultural activities, there were 61 free choice activities (40.67%), 80 large and small group activities (53.33%), and nine outdoor play activities (6.00%), indicating that outdoor play was the fewest activity type ($\chi^2=54.040$, $p < .001$; Table 3). This was similar to the results of the analysis on 117 art-related activities for preschoolers in the teacher's guidebooks of Nuri Curriculum for 5-year-olds, in which free choice activities took up 80.3%, large and small group activities 11.1%, and outdoor activities 6.8% (Ahn and Kim, 2012). Moreover, an analysis of environment-related contents in the teacher's guidebooks of Nuri Curriculum for 5-year-olds showed that there was highest frequency in free choice activities, which consist of activities giving options to provide educationally meaningful activities for preschoolers, enabling them to choose the play activity they want and enjoy self-directed learning through various activities, thereby showing high frequency (Kim and Woo, 2014). The activity type that showed lowest frequency was outdoor play. Due to the recent change in the atmospheric environment such as increased particulate matter, outdoor activities of preschoolers

Table 3. Frequencies of horticulture activities according to activity topics

Activity by life-based theme	Activity type(%)				χ^2	p
	Free choice	Large and small group	Outdoor	Total		
Kindergarten and Friends	1 (0.67)	1 (0.67)	1 (0.67)	3 (2.00)	54.040	<.001
Me and My family	0 (0.00)	1 (0.67)	1 (0.67)	2 (1.33)		
Our Neighborhood	4 (2.67)	4 (2.67)	1 (0.67)	9 (6.00)		
Animals, Plants, and Nature	18 (12.00)	15 (10.00)	1 (0.67)	34 (22.67)		
Health and Safety	1 (0.67)	3 (2.00)	0 (0.00)	4 (2.67)		
Living Tools	1 (0.67)	3 (2.00)	0 (0.00)	4 (2.67)		
Transportation	2 (1.33)	2 (1.33)	0 (0.00)	4 (2.67)		
Our Country	9 (6.00)	10 (6.67)	0 (0.00)	19 (12.67)		
Various Countries of the World	4 (2.67)	5 (3.33)	0 (0.00)	9 (6.00)		
Environment and Life	3 (2.00)	18 (12.00)	1 (0.67)	22 (14.67)		
Spring, Summer, Autumn, Winter	18 (12.00)	18 (12.00)	4 (2.67)	40 (26.67)		
Total(%)	61 (40.67)	80 (53.33)	9 (6.00)	150 (100.00)		

tend to decrease, but forest and ecological experience programs for preschoolers are proved to be effective in improving concentration, promoting problem-solving skills, helping a balanced development of both sides of the brain, relieving stress, alleviating anxiety and tension, and bringing mental stability (Shin, 2019). Forest play activities for preschoolers also helped increase positive vocabulary and decrease negative vocabulary (Jang et al., 2019), and reduce cortisol in the body, which is a stress hormone (Yun et al., 2019), and thus there are many reports on the positive effects of preschoolers' outdoor play.

Horticultural activities by activity domain

Activities of the Nuri Curriculum for 5-year-olds are comprised of 17 domains such as stacking, roles, language, number operation, science, art, rhythm, conversation, fairy tales, children's poems, children's plays, music, body, games, cooking, outdoor play, and field experience as well as activities that did not present domains. The latter activities are classified as 'others', and we examined 150 horticultural activities by activity domain as follows (Table 4). An analysis of all 696 activities presented in the teacher's guidebooks of Nuri Curriculum for 5-year-olds shows that, unlike the result in which the order of frequency was conversation 19.8%, number operation 8.2%, science 6.7%, and fairy tales 6.6% (Cho and Kim, 2014), the result of analyzing 150 horticultural activities was as follows: 25 in conversation (16.67%), 19 in science (12.50%), 14 in art (9.33%), 14 in cooking (9.33%), 10 in fairy tales (6.67%), nine in music (6.00%), eight in language (5.33%), eight in number operation (5.33%), eight in others (5.33%), six in children's plays (4.00%), six in games (4.00%), four in body (2.67%), three in stacking (2.00%), three in roles (2.00%), three in rhythm (2.00%), two in children's poems (1.33%), two in field experience (1.33%), and one in outdoor play (0.67%); $\chi^2=87.600$, $p < .001$; Table 4). For conversation, the result of examining the distribution of total 25 horticultural activities by life-based theme was as follows: nine in Environment and Life, five in Animals, Plants and Nature, four in Spring, Summer, Autumn, Winter, two in Various Countries of the World, and one each in Kindergarten and Friends, Health and Safety,

Living Tools, Transportation, and Our Country (Table 4). This indicates that there are many activities showing environmental changes as ways to have conversations about plants in Environment and Life.

Medium by life-based theme

As a result of examining the mediums used in horticultural activities by classifying them into plants, soil, dry plants and others (videos, photos of plants, pictures of plants), 46 activities (30.67%) directly used plants as the mediums, 11 activities (7.33%) used soil such as stones, gravel, and earth as the mediums instead of plants, four activities (2.67%) used dry plants such as branches and dry leaves as the mediums, and 89 activities (59.33%) used videos, photos of plants, and pictures of plants as the mediums, adding up to total 104 activities (69.33%; $\chi^2=121.307$, $p < .001$; Table 5). As such, there were few (30.67%) horticultural activities in the Nuri Curriculum for 5-year-olds in which the children actually encountered plants such as observing flowers or leaves and cooking with vegetables or fruits. However, compared to preschoolers who participated in taking a walk, those who participated in horticultural activities based on direct experience of nature showed improvement in emotional intelligence as well as sub-factors such as emotional self-awareness, emotional self-regulation, emotional awareness of others, and emotional regulation of others (Ryu et al., 2013). Moreover, in consistent with the study proving that horticultural activities in which participants could actually cultivate color food vegetables helped them consume vegetables voluntarily, thereby significantly reducing avoidance of vegetables and improving emotional intelligence (Son et al., 2015), it is reported that active participation in horticultural activities resulted in greater effect than passive and participation in horticultural activities. Furthermore, preschool children that participated in horticultural activities accepted them as fun and interesting, and preferred plant activities in which they had participated and have much experience (Park and Huh, 2010). As a result of a meta-analysis on the effects of horticultural activities and horticultural therapy in each class, it was found that implementing 11 sessions of the horticultural program is more effective than implementing 10 or less

Table 4. Frequencies of horticulture activities according to activity domains

Activity domain	Activity by life-based theme (%)											Total
	Kindergarten and Friends	Me and My family	Our Neighborhood	Animals, Plants, and Nature	Health and Safety	Living Tools	Transportation	Our Country	Various Countries of the World	Environment and Life	Spring, Summer, Autumn, Winter	
Stacking	0 (0.00)	0 (0.00)	1 (0.67)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	3 (2.00)
Roles	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	3 (2.00)
Language	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	0 (0.00)	1 (0.67)	4 (2.67)	8 (5.33)
Number/Operation	0 (0.00)	0 (0.00)	0 (0.00)	4 (2.67)	0 (0.00)	0 (0.00)	1 (0.67)	3 (2.00)	1 (0.67)	0 (0.00)	4 (2.67)	13 (8.67)
Science	1 (0.67)	0 (0.00)	2 (1.33)	6 (4.00)	0 (0.00)	1 (0.67)	0 (0.00)	2 (1.33)	1 (0.67)	2 (1.33)	4 (2.67)	19 (12.67)
Art	0 (0.00)	0 (0.00)	0 (0.00)	4 (2.67)	1 (0.67)	0 (0.00)	1 (0.67)	3 (2.00)	1 (0.67)	1 (0.67)	3 (2.00)	14 (9.33)
Rhythm	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	0 (0.00)	0 (0.00)	3 (2.00)
Conversation	1 (0.67)	0 (0.00)	0 (0.00)	5 (3.33)	1 (0.67)	1 (0.67)	1 (0.67)	1 (0.67)	2 (1.33)	9 (6.00)	4 (2.67)	25 (16.67)
Fairy tales	0 (0.00)	0 (0.00)	1 (0.67)	3 (2.00)	0 (0.00)	1 (0.67)	0 (0.00)	1 (0.67)	0 (0.00)	2 (1.33)	2 (1.33)	10 (6.67)
Children's poems	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	1 (0.67)	2 (1.33)
Children's play	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	2 (1.33)	1 (0.67)	6 (4.00)
Music	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	3 (2.00)	0 (0.00)	2 (1.33)	2 (1.33)	9 (6.00)
Body	0 (0.00)	1 (0.67)	0 (0.00)	1 (0.67)	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	4 (2.67)
Game	0 (0.00)	0 (0.00)	1 (0.67)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	4 (2.67)	6 (4.00)
Cooking	0 (0.00)	0 (0.00)	1 (0.67)	1 (0.67)	2 (1.33)	1 (0.67)	1 (0.67)	2 (1.33)	2 (1.33)	0 (0.00)	4 (2.67)	14 (9.33)
Outdoor play	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)
Field experience	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)
Etc.	1 (0.67)	1 (0.67)	1 (0.67)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (0.67)	4 (2.67)	8 (5.33)
Total	3 (2.00)	2 (1.33)	9 (6.00)	34 (22.67)	4 (2.67)	4 (2.67)	4 (2.67)	19 (12.67)	9 (6.00)	22 (14.67)	40 (26.67)	150 (100.0)

 $\chi^2=87.600, p < .001$.

(Lee and Jeong, 2018), implying the importance of experience and number of sessions for horticultural activities.

Conclusion

As a result of analyzing the frequency and contents of 696 individual activities in the teacher's guidebooks of

Table 5. Frequency of the medium used in activities

Activity by life-based theme	Medium (%)					χ^2	<i>p</i>
	Plants	Soil	Dry plants	Others	Total		
Kindergarten and Friends	1 (0.67)	0 (0.00)	0 (0.00)	2 (1.33)	3 (2.00)	121.307	<.001
Me and My family	2 (1.33)	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.33)		
Our Neighborhood	6 (4.00)	1 (0.67)	0 (0.00)	2 (1.33)	9 (6.00)		
Animals, Plants, and Nature	13 (8.67)	0 (0.00)	3 (2.00)	18 (12.00)	34 (22.67)		
Health and Safety	2 (1.33)	0 (0.00)	0 (0.00)	2 (1.33)	4 (2.67)		
Living Tools	3 (2.00)	1 (0.67)	0 (0.00)	0 (0.00)	4 (2.67)		
Transportation	3 (1.97)	0 (0.00)	0 (0.00)	1 (0.67)	4 (2.67)		
Our Country	2 (1.33)	0 (0.00)	1 (0.67)	16 (10.67)	19 (12.67)		
Various Countries of the World	0 (0.00)	0 (0.00)	0 (0.00)	9 (6.00)	9 (6.00)		
Environment and Life	2 (1.33)	9 (6.00)	0 (0.00)	11 (7.33)	22 (14.67)		
Spring, Summer, Autumn, Winter	12 (8.00)	0 (0.00)	0 (0.00)	28 (18.67)	40 (26.67)		
Total(%)	46 (30.67)	11 (7.33)	4 (2.67)	89 (59.33)	150 (100.00)		

Nuri Curriculum for 5-year-olds, 150 (21.55%) of them were horticultural activities. By life-based theme, there were 42 in Spring, Summer, Autumn, Winter (5.75%), 34 in Animals, Plants and Nature (4.89%), 22 in Environment and Life (3.16%), and 19 in Our Country (2.73%). By activity type, there were 61 free choice activities (40.67%), 80 large and small group activities (53.33%), and nine outdoor play activities (6.00%), with outdoor play being the fewest type of activity. By activity domain, 25 activities were in conversation (16.67%) and 19 in science (12.50%), and then two in field experience (1.33%) and one in outdoor play (0.67%), showing that there was a gap in the number of horticultural activities by domain. As a result of examining the mediums used in horticultural activities by life-based theme, 46 activities (30.37%) directly used plants as the mediums, 11 activities (7.33%) used soil such as stones, gravel, and earth as the mediums, four activities (2.67%) used dry plants such as branches and dry leaves as the mediums, and 89 activities (59.33%) used videos, photos of plants, and pictures of plants as the mediums.

In sum, horticultural activities in the Nuri Curriculum for 5-year-olds are concentrated in certain life-based themes, and the activities were focused mostly on indoor large and small group activities based on conversation and science, using videos or photos and pictures of plants as the mediums rather than actual plants. Accordingly, as reported by the study in which horticultural activities of pre-

schoolers in the teacher's guidebooks of Nuri Curriculum for 5-year-olds based on direct experience of nature resulted in higher score of emotional intelligence even when the natural environment of the institute for early childhood education is not suitable (Ryu et al., 2013), this study has significance in proving the need to implement active horticultural activities in the Nuri Curriculum for 5-year-olds. The results can be used as the basic data for extended application of horticultural programs to formal kindergarten education and policies related to horticultural education for preschoolers.

This study also confirmed the need for follow-up research to apply horticulture to existing activities while maintaining the goals provided for each individual activity in order to promote various positive effects of horticultural activities for preschoolers, as well as the need to improve the passive activities using videos, photos and pictures and the mediums to more active activities in which participants actually touch and feel the plants. Furthermore, as shown in the study analyzing the musical difficulty of the Nuri Curriculum for 3- to 5-year-olds (Kim, 2014), the study analyzing the verbal interactions of teachers presented in fairy tale activities (Jeon and Lee, 2017), and the study analyzing the connection in mathematics education between the Nuri Curriculum for 3- to 5-year-olds and curriculum for the first grade of elementary school (Seo and Byun, 2019), it is necessary to also study horticultural ac-

tivities by expanding the scope of the subject to the Nuri Curriculum for 3- to 5-year-olds and curriculum for the first grade of elementary school.

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