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A Study on Environmental Sensitivity and Friendship among Elementary and Middle School Students by the Size of School Forest

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This study attempts to determine the difference in environmental sensitivity and friendship among elementary and middle school students by investigating the geographic areas and size of school forest. For this purpose, self–administered questionnaire surveys were carried out at elementary and middle schools in Chungcheongbuk–do from June to July, 2013. Measuring tools were environmental sensitivity and friendship. The research proves that students attending schools with large school forests had higher environmental sensitivity and better friendship. And students in a city showed higher environmental sensitivity and better friendships than students in a rural area.

Key words: School forest size, Environmental sensitivity, Friendship attitudes, Children, Forest

INTRODUCTION

Even if the world has tried to solve the growing environmental problems with the development of science and technologies, it has failed. Thus, education has been suggested as a way to change human conscience and ethics. More specifically, an educational activity related to environment is called environmental education, and every effort using it has continued to solve the environmental problems. The ultimate aim of environmental education is to raise eco–friendly people. And for real environmental education, 'things to know' and 'things to act' have to be connected each other. The necessary things to achieve the purpose of environmental education are cognitive education in the classroom and environmental education using a field trip (Adams 1995; Jeong *et al*., 2010). A field trip uses surrounding natural environment and facilities as fields of learning and is able to make students curious and improve their participation. It also provides direct contact with environment to them, which is necessary to develop environmental sensitivity. Recently, the main reason of school violence, one of the most serious problems in Korean society, is that students, who are stressed out and cannot find out the right way to solve their problems, choose suicide or violence against others (Yang 2009). And their stress is mainly caused by the loss of ecological sensitivity by the absence of communion with the nature, anxiety about school grades and school admission, etc.

Previous research on the characteristics of youth related to school violence shows that rage and aggression are major variables of school violence (Yang 2009). And as one of the solutions to youth problems such as school violence, research on positive effects of forests has been carried out. For example, research on healing forest program to decrease depression and increase self–confidence of youth (Kim *et al*., 2011), research on forest experience program to increase sociality and decrease depression and anxiety (Ulrich *et al*., 1991; Williams and Allen 2012; Wells and Evans 2013), research on the relationship between the area of neighborhood green space and crime occurrence (Kuo and Sullivan 2001; Kim 2004), and etc. Multiple studies have shown the link between mental health and nature environments.

Under the circumstance, in order to use school forest educationally, the movement to make schools eco–friendly has happened everywhere, such as 'school forest decoration,' 'school afforestation,' 'green school decoration,' 'beautiful school making,' 'green school making,' 'school fence removal campaign,' and etc. (Chong 2001). Therefore, the purpose of this research is to determine environmental sensitivity and friendship among elementary and middle school students by the size of school forest in Chungcheongbuk–do and to provide basic information about the necessity of school forest.

THEORETICAL BACKGROUNDS

School forest is an artificial outdoor space of a school that has a certain theme and is made of trees appropriate to the school. It is an artificial green space in a school, so it is different from a natural forest (Seo 2010).

Environmental sensitivity is 'empathy for the environment or an individual empathetic view about the environment' (Sivek 2002). It is an affective attribute, and it shows the subconscious mind. So, it is different from a cognitive attribute, such as knowledge or function of the environment.

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The sociality of children is much affected by a peer relationship, that is to say, friendship. The importance of relationships in a peer group has been attracted a lot of attention recently. A basic factor of friendship among children is that they like each other, feel pleasure, and amicably interact with each other (Howers 1983). Therefore, according to him, friendship among children means a loving relationship. In addition, friendship is a mutual social relationship between two individuals. They like each other and their relationship is made by a free choice on equal ground. And the relationship is informal and needs social understanding. Therefore, through friendship, children can develop emotional stability, gain amicable working experience with others, and take the chance to improve social skills by their advanced hospitality and understanding (Jin 2004).

The growing interest in children's outdoor play is proven by the number of research on children's outdoor play; however, most have focused on the Forest School approach (O'Brien and Murray 2007; O'Brien 2009), promotion of children's learning (Trisha and Jane 2007), and benefits of children's mental, physical, and social aspects (Hower 1983; Valentine and McKendrick 1997; Tranter and Pawson; 2001; Sivek 2002; Clements 2004; Jin 2004; O'Brien 2009). For instance, the study by Tranater and Pawson (2001) suggested that children's contact with outdoor environment benefits not only children but also the whole community through social, economic, and educational aspects, in raising children's environmental awareness, expanding outdoor opportunities, and improving the quality of life. Also, O'Brien (2009) revealed that children's contacts to nature improved confidence, concentration, motivation, communication, language, and physical abilities. Kellie *et al.* (2011) found that nature developed children's imaginative play, positive relationships, and place of learning. For effective outdoor use, this study stated that early childhood centers are necessary for providing children with contact with nature and helping teachers to improve relationships between children and nature.

However, compared to previous generations, children's outdoor experiences are declining in spite of its physical, mental, and social development (Valentine and McKendrick 1997; Clements 2004). For this reason, researchers proposed that parents' concerns over traffic safety and stranger danger have led to a sharp decline in outdoor play. Clements (2004) conducted a survey over 800 mothers across the U.S., comparing their childhood outdoor play with that of their own children. The results showed that 70% of the mothers in their childhood had every day outdoor play, while 31 percent of their children did the same. 82% of the mothers reported safety and crime as reasons that prevented their children from outdoor play. In addition, Valentine and McKendrick's (1997) research on changes in children's outdoor play behaviors explained that children's leisure time was spent significantly indoors and engaged in outdoor scheduled activities. The authors found that parental concerns about children's outdoor play have heightened due to danger from road safety and strangers, regardless of whether the adequate play facilities. For safety reasons, children are more likely to play outdoors in situations in which they are under adult supervision, such as institutionalized places, close–to–home areas, and private gardens. If there are adequate play options in a neighborhood, then children would use them and would have no need to play outdoors or further away from home (Valentine and McKendrick 1997).

Despite the importance of children's outdoor play, there are only limited number of studies focusing on the geographical environments and the size of school forests in terms of rural and urban areas for the impacts of the outdoor behaviors. Few studies examined the differences in geographic areas, such as urban and rural areas, may result in a different level of outdoor activity, a lower level of outdoor activity in rural youths than those in urban (Sjolie 2000; Sjolie and Thuen 2002). For instance, Sjolie and Thuen's (2002) study looked at both urban and rural youths spent higher portion of time on inactive activities (watching TV, playing games) than on outdoor activities (walking, cycling). Even though there was no difference in the behavior patterns and the geographic areas, the median distance of urban youth was triple times higher on the walking and cycling to school than that of rural youth, revealing the urban youth walked or cycled more than the rural youths.

To reiterate, while many studies have acknowledged the significance of children's contact with the nature, it is more and more decreased due to children's reduced access to the outdoors (Sjolie and Thuen 2002; Kellie *et al.*, 2011). Thus, there is a need to explore how children's outdoor play in the nature would influence children's environmental sensitivity and friendship. To apply outdoor play into the institutionalized setting as Valentine and McKendrick's (1997) suggestion, the current study adopted school forests to develop children's environmental and social development through outdoor play. Thus, an understanding of the natural living environments in terms of geographical areas and the size of school forests is necessary to environmental sensitivity as well as friendships related to outdoor play behaviors among children.

METHODS

For this research, 14 elementary schools with large school forest in 8 cities and counties and 12 ones with small school forest in 5 cities and counties were selected and examined. In the case of middle school, 11 middle schools with large school forest in 7 cities and counties and 10 ones with small school forest in 5 cities and counties were selected and examined.

This research was conducted with self–administered questionnaire surveys at elementary and middle schools in Chungcheongbuk–do from June 17 to July 17, 2013. The surveys were carried out by 6 previously–educated surveyors. They visited each school in person, explained about the purpose of the research and questions on the questionnaire, and made students complete the questionnaire for themselves. Major measuring items were 15

environmental sensitivity questions and 20 friendship questions. After the survey, 2,302 questionnaires were finally used (1,028 of elementary school students and 1,274 of middle school students) excluding insincere ones.

Measuring tools

Environmental sensitivity

To measure environmental sensitivity, 'a test tool for measuring environmental sensitivity' made by Lee, Jae–Boong and Lee, Du Gon was used (2006). The person, who has high environmental sensitivity, cares for the natural environment, prefers activities in the nature, is aware of and sensitive to environmental pollution and destruction, and advocates making artificial environments which gives consideration to the harmony between the natural scenery and wildlife. The questionnaire consists of 15 questions, and 4 among them are reverse ones. The total Crobach's α coefficient is .749.

Friendship

A friendship test used a questionnaire made by Kim, Young–Jin to check the existence of a friend and trust in a friend, continuance of friendship, adaptation, and cohabitation with a friend (Kim 2005). The questionnaire consists of 4 sections and 20 questions, and Cronbach α coefficient is .89. Responses of the test use the 5–point Likert scale according to the level of an accord between questions and their attitude. And negatively worded questions were scored reversely.

The analysis of the data

Using a SPSS (Statistical Package for Social Science) 18.0 program, a crossover analysis was conducted to determine the present condition of school forest, the level of satisfaction, and perceptions and attitudes towards school forest. And t–test was also carried out to analyze the difference of environmental sensitivity and friendship related to school forest among respondents.

RESULTS

Analysis of the effects by the size of school forest

T–test was carried out to determine whether the difference of environmental sensitivity and friendship existed or not between schools with large school forest and schools with small one. The results show that environmental sensitivity and friendship were higher at schools with large school forest (Table 1). With reliability of 95%, P value of environmental sensitivity was .002($p<.05$), and P value of friendship was .000($p<.001$) by the size of school forest.

Analysis of environmental sensitivity and friendship at elementary schools

Environmental sensitivity and friendship among elementary school students by the size of school forest in cities and counties was analyzed. The results of the t–test show that in the cities, environmental sensitivity and friendship were statistically different by the size of school forest. However, in the counties, they were not (Table 2).

Table 1. Environmental sensitivity and friendship by the size of school forest (total)

	The size of school forest	n	Mean	SD	t	*P* value
Environmental sensitivity	Large	1,284	54.24	6.798	.232	.002*
	Small	1,018	53.39	6.429		
Friendship	Large	1,284	74.19	9.948	3.657	.000†
	Small	1,018	72.68	9.733		

*p<.05, †p<.001

Table 2. Environmental sensitivity and friendship by city and county (elementary school)

	Area	The size of school forest	n	Mean	SD	t	*P* value
Environmental sensitivity	City	Large	200	56.16	6.978	3.054	.002*
		Small	294	54.17	7.218		
	County	Large	349	55.48	6.775	1.889	.059
		Small	185	54.35	6.283		
Friendship	City	Large	200	76.93	10.927	3.186	.002*
		Small	294	73.95	9.667		
	County	Large	349	74.82	11.003	1.366	.173
		Small	185	73.48	10.333		

*p<.05

Analysis of environmental sensitivity and friendship at middle schools

Environmental sensitivity and friendship among middle school students by the size of school forest in cities and counties was analyzed. The results of the t–test show that in the cities, environmental sensitivity and friendship were statistically different by the size of school forest. However, in the counties, they were not (Table 3).

Analysis of sub–factors of environmental sensitivity

Environmental sensitivity consists of 5 sub–factors, that is 'natural environment,' 'activities in the nature,' 'artificial environment,' 'environmental destruction,' and 'environmental pollution.' The research shows that there was statistically significant difference in 'natural environment,' 'artificial environment,' and 'environmental

Table 3. Environmental sensitivity and friendship by city and county (middle school)

Tool	Area	The size of school forest	n	Mean	SD	t	*P* value
Environmental sensitivity	City	Large	557	53.20	6.734	2.664	.008*
		Small	240	51.87	5.864		
	County	Large	178	52.89	5.925	–.651	.515
		Small	299	53.26	5.901		
Friendship	City	Large	557	73.48	8.867	3.036	.002*
		Small	240	71.41	8.717		
	County	Large	178	72.10	9.103	.165	.869
		Small	299	71.94	10.035		

*p<.05

Table 4. Analysis of sub–factors of environmental sensitivity by the size of school forest

Kind of school	Sub–factor	The size of school forest	n	Mean	SD	t	*P* value
Elementary school	Natural Environment	Large	549	12.57	1.850	3.743	.000*
		Small	479	12.11	2.048		
	Activities in the nature	Large	549	9.18	2.112	1.624	.105
		Small	479	8.96	2.241		
	Artificial Environment	Large	549	11.44	1.961	3.373	.001*
		Small	479	11.01	2.143		
	Environmental destruction	Large	549	11.42	1.959	2.004	.045
		Small	479	11.18	1.934		
	Environmental pollution	Large	549	11.09	1.735	1.321	.187
		Small	479	10.95	1.664		
	Total	Large	549	55.73	6.851	3.481	.001*
		Small	479	54.24	6.866		
Middle School	Natural Environment	Large	735	11.82	1.995	1.626	.104
		Small	539	11.64	1.907		
	Activities in the nature	Large	735	8.37	2.060	–.794	.428
		Small	539	8.46	1.915		
	Artificial environment	Large	735	10.83	2.017	.474	.636
		Small	539	10.78	1.893		
	Environmental destruction	Large	735	10.96	1.955	1.217	.224
		Small	539	10.83	1.867		
	Environmental pollution	Large	735	11.12	1.751	2.225	.026*
		Small	539	10.90	1.604		
	Total	Large	735	53.13	6.545	1.372	.170
		Small	539	52.64	5.919		

*p<.05

Table 5. Analysis of sub–factors of friendship by the size of school forest

Kind of school	Sub–factor	The size of school forest	n	Mean	SD	t	*P* value
Elementary school	Existence of and trust in friend	Large	549	23.70	4.353	2.904	.004*
		Small	479	22.94	3.967		
	Continuance of friendship	Large	549	23.24	3.833	2.238	.025*
		Small	479	22.72	3.581		
	Adaptation between friends	Large	549	17.36	3.062	1.585	.113
		Small	479	17.06	2.938		
	Cohabitation with friend	Large	549	10.20	2.389	1.649	.099
		Small	479	9.96	2.320		
	Total	Large	549	75.59	11.012	2.767	.006*
		Small	479	73.77	9.921		
Middle School	Existence of and trust in friend	Large	735	22.49	3.364	1.717	.086
		Small	539	22.14	3.721		
	Continuance of friendship	Large	735	22.43	3.513	2.519	.012*
		Small	539	21.92	3.535		
	Adaptation between friends	Large	735	16.88	2.698	2.025	.043*
		Small	539	16.56	2.879		
	Cohabitation with friend	Large	735	9.64	2.156	.963	.336
		Small	539	9.52	2.047		
	Total	Large	735	73.14	8.938	2.765	.006*
		Small	539	71.71	9.466		

*p<.05

destruction' at elementary schools (Table 4). In the case of middle school, there was remarkable difference in 'environmental pollution.'

Analysis of sub–factors of friendship

Friendship consists of 4 sub–factors, that is 'the existence of a friend and trust in a friend,' 'continuance of friendship,' 'adaptation between friends,' and 'cohabitation with a friend.' The research shows that there was statistically significant difference in 'the existence of a friend and trust in a friend' and 'continuance of friendship' at elementary schools (Table 5). In the case of middle school, there was difference in 'continuance of friendship' and 'adaptation between friends.'

CONCLUSTIONS

This research was conducted in order to find out the difference in environmental sensitivity and friendship among elementary and middle school students by the size of school forest. The results of the research show that students attending schools with large school forests had higher environmental sensitivity and friendship. And students attending schools in the cities had higher environmental sensitivity and friendship than students in the counties did. A county is less developed and has much more natural environment than a city. And students in a city relatively do not have many chances to be in the forest. Therefore, their environmental sensitivity and friendship seem to be largely influenced by school forests.

The results prove that the size of school forest could affect environmental sensitivity and friendship among elementary and middle school students. It means that if the size of school forest is reduced to build up a new facility, it could negatively affect students. School forests need to be protected because it could be a useful space for students to learn about the environment and get along well with other students.

With this research, it was proved that the size of school forest could affect environmental sensitivity and friendship among elementary and middle school students in Chungcheongbuk–do. And further research on high school students and other schools in other cities and counties should be conducted.

AUTHOR CONTRIBUTIONS

P. S. YEON designed the study and wrote the paper. J. W. LEE performed the questionnaire surveys. C. S. SHIN and J. Y. CHA performed data analysis. C. S. SHIN and S. OHGA designed the study, supervised the work. All authors assisted in editing the manuscript and approved the final version.

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