Needs analysis and revitalization planning for School Forest Welfare Services using mixed method

Nee Eun Lee and Poung Sik Yeon

ABSTRACT

The purpose of this study is to identify the needs and suggest a revitalization plan for School Forest Welfare Services in Korea which is defined as “school-based services that provide forest education, forest healing, and cultural and recreational activities in the forest by creating, managing, and utilizing local or in-school forest environments to help children and adolescents develop and improve their quality of life.” To this end, using a mixed method, in-depth interviews and needs surveys were conducted with School Forest Welfare Service experts and teachers and parents of middle and high school students to understand the current status of School Forest Welfare Services and to identify their needs. As regards the current status, the environment for the services was assessed at the “middle” level while the forest welfare program was assessed at the “low” level. On the other hand, all the needs asked were found to be at a “high” level; especially, the needs for the “forest therapy” program, both for the selected group of and all students, were the strongest. In regard to revitalization, “programs linked to regular school curriculum,” “policies and budgets,” “green zone in school area,” and “expert supports by forest healing instructors and forest interpreters” were found to be demanded mostly. As a conclusion of the in-depth interviews and needs surveys, a plan to revitalize School Forest Welfare Services has been derived, which includes such objectives as; (1) to strengthen awareness of the necessity (assigning experts within the responsible institution to provide expertise, strengthening awareness among principals, teachers, and parents, and building social consensus with active publicity), (2) to prepare policy and legal basis, and (3) to establish a support system. This study was conducted to revitalize School Forest Welfare Services for adolescents in Korea, but it is hoped that School Forest Welfare Services will be developed and widely implemented for many children and adolescents around the world through diverse further studies.

Introduction

The need and purpose of the study

In the life cycle, adolescence is a very important period for physical and mental growth and character formation, and at the same time, it is a vulnerable period in terms of mental health as more dynamic changes than any other life cycle are experienced in that period (Lee 2018). According to the data presented by the 16th Adolescent Health Behavior Survey, 34.2% of all adolescents felt “very much” or “much” stress and 25.2% had felt sad or hopeless at least once in the past 12 months enough to stop daily activities for two weeks. In particular, the survey showed that 10.9% of students have seriously considered suicide in the past 12 months and 2.0% have actually attempted suicide (Ministry of Education et al. 2020), which clearly shows how mentally vulnerable current young people are, further “self-harm (suicide) has been the number one cause of death among Korean adolescents since 2011 for nine consecutive years (Statistics Korea and Ministry of Gender Equality and Family 2021).

Feelings of low happiness during adolescence increase the likelihood of school dropout, running away from home, delinquency, and intentional self-harm (Kamerm et al. 2010), which can place a huge burden on society and the country as well as on individuals (Lee et al. 2013). It is necessary to publicize the youth problem on a social level, not just on an individual level so that active concern and systematic efforts can be made.

Recently, various studies have shown that activities in the forest have a positive effect on the holistic growth of adolescents, which became a widely supported opinion.

Looking at domestic studies, various positive effects have been proven, such as enhanced self-esteem (Kim 2011; Song et al. 2012; Woo 2016), alleviated stress (Cho et al. 2014; Lee 2017; Kim 2018a, 2019), reduced aggressiveness (Woo 2016), increased psychological well-being (Cho et al. 2014; Kim 2019), improved
environmental sensitivity and eco-friendly behavior (Kang 2004; Eom et al. 2015), positive changes in personality, sentiment, and emotion (Mam 2014; Jang et al. 2017; Kim 2018c; Kim et al. 2020) raised sociability (Choi and Ha 2015), and elevated self-efficacy (Jang et al. 2015; Oh 2016).

Looking at overseas studies, O’Brien (2009) found that the students attending forest schools in the UK had increased self-confidence, cooperative behavior, awareness of their own actions, motivation to participate in activities, physical endurance, and respect for ecology and the natural environment, which suggests repeated and regular contact with the natural environment in daily lives is important. Snell et al. (2020) reported that those who had more contact with nature during childhood, showed higher facets of openness, for example, creative imagination and intellectual curiosity, and lower mental health problems, such as anxiety and depression, in adulthood. In the study of Tesler et al. (2022), Israeli youth in crisis aged between 15 and 18 who participated in a program in urban forests showed statistically significant improvement in physical activity, healthy eating habits, self-efficacy, and life satisfaction compared to the non-participant’s group.

In 2010, the Korea Forest Service proposed a forest welfare policy initiative customized for each life cycle, and in 2015, the “Forest Welfare Promotion Act” was enacted to lay the legal basis for forest welfare. Although one of the purposes which forest welfare aims is to resolve inequality in health by providing all people with equal access to the natural benefits of forests to improve physical and mental health, there is no choice but to create underprivileged groups due to limitations of local conditions, time, and economic resources. In the case of children and adolescents, in particular, the limitations and inequalities become clearer. According to the “2020 Urban Planning Status Statistics” released by the Ministry of Land, Infrastructure, and Transport and Korea Housing and Land Corporation, out of the total population of 51.83 million, 91.8% or 47.57 million people live in urban areas (MOLIT 2021). Due to this urban concentration, for most people to enjoy the various benefits of forest welfare, it is inevitable to spend considerable time reaching a distant place. Cho (2011) argues that forest benefits are said to be equal to all, but the benefits may remain as a part of opportunity without active efforts by users. He says that since social welfare provides benefits to the underprivileged in society, forest welfare should give everyone a full opportunity to enjoy equal benefits. In that respect, children and adolescents inevitably have more disadvantages than adults in enjoying the universal benefits of forest welfare because they depend on their parents or guardians. Whether they have the opportunity to grow in the forest or not totally depends on their parents’ or guardians’ economic condition, whether they like it or not, and whether they live near forests or parks.

Kim et al. (2019) stated that to practice forest welfare services based on the needs of the people, it should be based on the living ground; to realize forest welfare services as universal welfare for the healthy and happy growth of adolescents, it is most appropriate to base it on “school” where they spend the most time except at home.

In this study, the definition and components of “School Forest Welfare Services” as an integrated forest welfare service concept targeting “children and adolescents” in “school,” as a physical and mediating space, were derived. School Forest Welfare Services in this study is “The school-based services to help the children and adolescents grow to be a holistic person and improve their quality of life utilizing school forest and other regional forest environments that are created, managed, and utilized to provide activities, such as forest education, forest therapy, and forest cultural and recreational activities.” The components of School Forest Welfare Services are divided into “forest welfare environment” including school forest, local forest environment, and other forest environments, and “forest welfare program” including forest education, forest therapy, and forest cultural and recreational activities.

In this study, the current status of School Forest Welfare Services in Korean middle and high schools was understood, and the needs of experts, teachers, and parents were identified, to finally find a way to revitalize the services. The detailed purposes of this study are as follows.

First, to understand the current status of School Forest Welfare Services in middle and high schools. Second, to identify the needs of School Forest Welfare Services in middle and high schools. Third, to find a way to revitalize School Forest Welfare Services in middle and high schools.

**Research method**

**Research design**

This study was designed and conducted as a “mixed research design method (hereinafter referred to as a mixed study)” to analyze the needs of School Forest Welfare Services in middle and high school and to find ways to revitalize the services. Mixed research is an integrated research method in which researchers derive results by collecting and analyzing data using both qualitative and quantitative methods (Tashakkori and Creswell 2007) to overcome the weaknesses of one method with the strength of another method (Shin 2008).

In the data integration method of this study, an exploratory sequential design was first applied, with which qualitative data were collected and analyzed through in-depth interviews as step 1 and, based on the first stage data and previous research, quantitative data were collected and analyzed through a needs survey as step 2. Then a convergent design that integrates and interprets the analysis results of steps 1 and 2 was applied.
Data collection
The in-depth interviews were conducted with a total of seven people consisting of two school forest experts, one forest activist, two environment teachers, and two parent representatives. The interviews were conducted once per interviewee, either in person or remotely with a semi-structured questionnaire with one to one and a half hours of time duration between 1 April and 10 May 2021. Data collection and analysis were conducted at the same time and each interview was completed when theoretical saturation was reached. To obtain the validity of the qualitative data, the “member check” suggested by Merriam (2009) was used. In the “member check” method, the researcher asks for feedback from the participant to ensure that his or her opinion is understood correctly, and the analysis is done properly. Through this process, the researcher checks if the participant’s opinion is properly interpreted without distorting, if the researcher’s expressions and descriptions are fair and accurate, if the researcher omitted or arbitrarily added anything while analyzing, and if the interpretation and report are in line with the participant’s intention (Yu et al. 2020).

Open Coding, Axial Coding, and Selective Coding were used for data analysis according to the method developed by Strauss and Corbin (1998), based on grounded theory among qualitative research methods.

The needs survey was conducted with voluntary participants composed of 245 incumbent middle and high school teachers (middle-98, high-147) and 314 parents with middle and high school children (middle-156, high-158). The survey period was 12 days from 6 June to 17 June 2021 for the teacher group and 13 days from 4 July to 16 July 2021 for the parent group. Naver form, an online survey program, was used as a survey method. The survey target group was approached through teachers’ and parents’ various associations, societies, or online communities. A small gift as a reward to participants who faithfully answered all questions helped further spread out the questionnaire to their professional or local networks. To obtain validity, the final questionnaire was prepared after being reviewed by a total of 11 people including teachers, parents, and professors in related fields. For data analysis, descriptive statistical analysis and frequency analysis were performed using the statistical programs which were jamovi and Excel.

To protect the rights and safety of research participants, this study was conducted with deliberation and approval from the Bioethics Committee of Chungbuk National University (task management number: CBNU-202104-HR-0016).

Findings
Expert group in-depth interview analysis
In this study, the expert group in-depth interviews were analyzed with open coding, axial coding, and selective coding according to grounded theory.

Open coding
The interview contents were carefully reviewed line by line and categorized into the current status and obstacles, and demands for revitalization through open coding that conceptualized them as abstract semantic units. First of all, the upper categories derived from the current status and obstacles are “education system focused on entrance exams,” “absence of policies and experts,” “lack of green zone in schools,” “lack of programs with sustainability, universality, and expertise,” “lack of will and awareness of principals,” “lack of will and awareness of teachers,” “lack of competency of teachers,” and “lack of opportunities for interest groups around school to participate.” The upper categories derived from the demands for revitalization were “will and commitment of the responsible authorities,” “preparation of policy,” “redefinition of school forest and building connection to regular school curriculum,” “introduction into regular curriculum,” “community-based forest education,” “establishment of a support system,” “establishment of school-centered councils,” “preparation of teacher competency development system,” “strengthening of active public relations,” etc.

Axial coding
According to the coding paradigm analysis frame presented by Strauss and Corbin (1998) as a grounded theory method, causal conditions, contextual conditions, mediating conditions, action/interaction strategies, and results were conceptualized as a single schema, Figure 1 is a paradigm model for “activating middle and high School Forest Welfare Services.”

Selective coding
Selective coding was applied to reduce information by arranging the core categories with high importance from the codes identified through open coding and axis coding derived earlier. As a result, the codes were narrowed into three core upper categories which were “strengthening awareness of the necessity of the services,” “preparation of policy and legal basis,” and “establishment of a support system.”

Needs survey analysis
Demographic analysis
In the teacher group, 245 teachers participated from middle and high schools in Seoul, Inchon, and Gyeonggido. Looking at their demographic characteristics, males were 34.3% and females were 65.7%. By age group, those in their 20 s were 6.9%, 30 s were 18.0%, 40 s were 40.4% (the highest), 50 s were 31.0%, and 60 s were 3.7%. By school location, 45.7% were in Seoul and 54.3% were in Inchon and Gyeonggido. At the school level, 40.0% were in middle school and 60.0% were in high school. By school type, 20.0% were in boys’ school, 19.2% were in girls’ school, and 60.8% were in gender-mixed school.
A total of 314 parents participated in the parent group and among them, 10.2% were male and 89.8% were female. By age group, 20 s were none, 30 s were 1.0%, 40 s were 72.3% (the highest), 50 s were 25.2%, and 60 s were 1.6%. By location, 32.5% were living in Seoul and 67.5% were in Incheon and Gyeonggido. Among their children, 49.7% were in middle school and 50.3% were in high school and 14.6% were in boys’ school, 7.6% were in girls’ school, and 77.7% were in gender-mixed school (Table 1).

Current status of School Forest Welfare Services
To understand the current status of School Forest Welfare Services perceived by teachers and parents, a total of 13 items (six items for forest welfare environment, seven items for forest welfare programs) were used on a five-point Likert scale with 1 for “none,” 2 for “poor,” 3 for “moderate,” 4 for “somewhat,” and 5 for “excellent,” and mean and standard deviation of each item was computed.

In the case of the forest welfare environment, the overall mean was 3.17 among middle school teachers, 2.90 among middle school parents, 3.09 among high school teachers, and 3.0 among high school parents. In particular, it was confirmed that both middle and high school teachers and parents perceived that the indoor and outdoor environment in school was insufficient compared to the environment outside the school.

In the case of the forest welfare program, the overall mean was 1.98 among middle school teachers, 2.18 among middle school parents, 1.98 among high school teachers, and 2.11 among high school parents, which were low compared to the scores for forest welfare environment.
Overall, the forest welfare environment was assessed at the middle level and the forest welfare program was assessed at the low level, indicating that the current forest welfare services in middle and high schools are not well-activated (Table 2).

**Demands for School Forest Welfare Services**
To understand the needs of teachers and parents for School Forest Welfare Services, a total of 13 items (six items for forest welfare environment, seven items for forest welfare programs) were used on a 5-point Likert scale with 1 for “not necessary at all,” and 2 for “not necessary,” 3 for “moderate,” 4 for “necessary,” and 5 for “highly necessary.”

When looking at the demands of middle and high school teachers and parents for school forest welfare services, both forest welfare environment and forest welfare programs were demanded at the “high” level. The item that middle and high school teachers and parents showed the highest demand was “forest therapy” for both all and selected groups of students, indicating that there is a high expectation for “forest therapy” as an alternative approach to solve various problems that Korean adolescents are experiencing or as a desirable activity for all (Table 3).

**Demands for vitalization of School Forest Welfare Service**
To understand the demands of teachers and parents for revitalizing School Forest Welfare Services, a multiple response method was used with which six options were to be selected out of 14 (including “others”).

There was no significant difference between teachers and parents in middle and high schools and demands for “forest welfare program linked to regular curriculum,” “policy and budget,” “creation of green zone in schools,” and “support from experts, such as forest healing instructor, forest interpreter, etc.” were high. Considering the low demand for “providing incentives for schools and teachers” and the high demand for “expert support,” there are concerns about the overload of teachers’ work independent of the high awareness or demand for School Forest Welfare Services. Therefore, it seems that a wide range of the supportive method is needed so that the implementation does not lead to a burden on teachers (Table 4).

**Plan to revitalize School Forest Welfare Services**
Based on the findings through in-depth interviews and needs analysis, the policy objectives to revitalize School Forest Welfare Services in middle and high schools are suggested as follows; (1) to enhance the awareness of the necessity of School Forest Welfare Services, (2) to build policy and legal basis, and (3) to establish a support system.

**Enhancing awareness of the necessity of School Forest Welfare Services**

**Experts within the responsible institution and strengthened expertise**
Throughout in-depth interviews, interviewees answered that even if they wanted to initiate a project or proposal related to School Forest Welfare Services, it was difficult because there was no organization or human resources to implement it. According to Choi and Choi (2019), even the youth policy in general also relied on very limited organizational support and human resources who are even frequently transferred
between organizations, which consequently makes it difficult to have continuity or expertise. Therefore, it is necessary to make organizations and hire experts for School Forest Welfare Services within the policy management authorities, and to provide them with education and support to develop expertise.

**Enhanced awareness of the necessity of School Forest Welfare Services by principals, teachers, and parents**

In an in-depth interview, it was mentioned as a problem that although the school forest movement has been in action for over 20 years, the school forest becomes a landscaping rather than an educational function, depending on the mindset of the principal and even well-made school forest is not utilized because of the lack of teacher’s interest. Despite the fact that parents are also important actors in school education, it was also raised as a problem that their making process to make the policy highly acceptable will be affected by the policy throughout the policy-making process to make the policy highly acceptable. Publicity should not only inform people but also be the channel to reflect the opinions of the people who will be affected by the policy throughout the policy-making process to make the policy highly acceptable (Kim 2018b). Through the needs analysis, both teachers and parents as confirmed in the needs survey, but to prevent the burden on teachers, institutional support, such as support from forest welfare experts should be provided.

**Achievement of social consensus and active publicity**

Another opinion that many interviewees had in common was that no matter how good a policy is, without a social consensus, the policy will lose its driving force. It is needed to encourage direct and indirect participation of teachers and parents as confirmed in the needs survey, but to prevent the burden on teachers, institutional support, such as support from forest welfare experts should be provided.
Building policy and legal basis for School Forest Welfare Services

Throughout in-depth interviews and needs surveys, there was an opinion from many people that policy based on a legal basis is necessary to expand and revitalize School Forest Welfare Services systematically and gradually.

Currently, forest welfare services for adolescents are provided based on the “Forest Welfare Promotion Act,” “Forest Education Act,” and “School Forest Ordinance.” On this legal basis, Korea Forest Service established 21 forest education centers nationwide to practice forest welfare services for youth; however, despite 91.8% of the total population living in urban areas as of 2021, the centers are mainly located in mountainous areas away from the city center, which causes limitations in accessibility.

On the other hand, Korea Green Ranger, the most well-known youth club for forest-related activities with a 30-year history, has not been able to continue its activities worthy of its reputation as its participation has declined since 2001 though it had been highly acknowledged by both teachers and parents. 17,363 schools and 249,088 students participated in their programs between 1991 and 1995 but the numbers decreased to 728 schools (23.9%) and 15,514 students (16%) in 2015 (Korea Green Ranger 2018).

The school forest committee was formed as well in August 1999, resulting in the creation of ~4,000 school forests nationwide since 2003 (Kim et al. 2021).

However, despite the quantitative achievements, there are many areas to be improved. It is difficult for students and other school entities to actively participate in school forest planning, designing, constructing, and maintaining processes. The lack of utilization in connection with the school curriculum needs to be addressed and the consensus and awareness of school forest need to be enhanced. The focus of the committee also needs to be transferred from creation to maintenance and management (Hue et al. 2019).

As stated above, various attempts have been being made to provide forest welfare services for adolescents based on certain consensus on the necessity, but the reality is that it is failing to reflect needs and requirements, to provide the service with continuity, and to associate environment and programs in a systematic and integrated way. Therefore, it is most important to establish a policy and legal basis that can enable integrated, sustainable, and efficient School Forest Welfare Services.

Establishing School Forest Welfare Services support system

In the cases of Learning through Landscape (LtL) in the UK, Grum Macht Schule (GMS) in Germany, Schoolyard Habitats, Eco School, and ISGA in the U.S., they form a network with local communities, schools, central government, local governments, school districts, related society, experts, and NGOs to practice School Forest Welfare Services. In addition, research and analysis to verify the effectiveness of the projects are conducted in connection with local universities and research institutes to obtain social trust. Such a network is solid enough not to stop at creating school forests, but to play an important role in implementing various programs and projects obtaining public trust and continuity (Hue et al. 2019).

In-depth interviews and needs analysis showed that teachers and parents did not know where and how to reach School Forest Welfare Services, what support they are eligible for, and how to connect with forest welfare experts. Overall, they responded that information is scattered or insufficient and an integrated support system is required to associate the local environment, human resources, and programs together. Ha et al. (2013) pointed out that forest education-related human and material resources are too scattered and unorganized to provide timely support and suggested a forest welfare support system to collect resources (experts, programs, facilities, and places) into a database to be shared and utilized in the educational field.

To provide integrated and systematic support by making use of local resources and expertise, the “School Forest Welfare Service Support System,” is composed of School Forest Welfare Support Center, central government, local governments, research institutes, School Forest Welfare Regional Support Centers, companies, NGOs, and School Councils, is suggested as a conclusion of this study (Figure 2).

To establish this support system, a legal basis for School Forest Welfare Support Center is first needed. The School Forest Welfare Support Center will be operated in close cooperation with all players in the support system. When a government agency launches a policy initiative, it plays a role in preparing and operating detailed policies. It serves as an integrated platform for close networks with central and local governments, research institutes, companies, NGOs, and School Forest Welfare Local Support Centers. It will also play a role in creating and managing forest welfare environments including school forests, and developing and providing forest welfare programs, such as forest education and forest healing. It will be responsible for organizing a consulting group to enable continuous and systematic support provided to each school and School Forest Welfare Local Support Center.

As a branch of the School Forest Welfare Support Center, School Forest Welfare Local Support Centers will plan and operate projects for each region. They will develop local human and material resources and establish networks with local organizations and experts to provide services to schools in each region. They will play a practical role in supporting and getting feedback through continuous communication with school councils or each school.

Conclusion

“Forest welfare” can be an alternative approach in preventing and addressing the low happiness and various
other problems currently experienced by Korean adolescents. In the 3rd Basic Plan for School Violence Prevention and Countermeasures (2015–2019) in December 2014, to achieve the policy objective of “increasing experience-oriented personality education,” the policy task to “provide the opportunity to experience emotional stability, such as stress reduction and self-reflection utilizing natural surroundings in and around school” by expanding hands-on programs in nature, such as forest experiences “and develop an educational forest program to prevent school violence using forest resources” was promoted (Kim 2017).

In this study, the needs analysis was conducted and the plan to revitalize School Forest Welfare Services was proposed through the mixed research design method. As a result of an in-depth interview analysis of the experts group, “enhancing awareness of the necessity of School Forest Welfare Services,” “building policy and legal basis,” “establishing School Forest Welfare Service support system” were derived as the upper objectives for revitalization.

According to the result of needs analysis with teachers and parents about the current status of School Forest Welfare Services, the forest welfare environment in both middle and high schools was at the middle level while the forest welfare program was assessed at the low level, which shows that programs are relatively insufficient. Therefore, it is necessary to develop and apply forest welfare programs along with the creation of forest welfare environments.

In the level of demands examined in the same category, both the demands for the forest welfare environment and forest welfare programs were found to be high. In particular, as the demand for “forest therapy” both for all and a selected group of students was the highest, it can be said that “School Forest Welfare Services” is regarded by teachers and parents as a desirable alternative approach to support adolescents. Therefore, to apply forest healing to adolescents that improve body and mind health by utilizing various elements of the forest, such as sunlight, landscape, phytoncide, and anion, it is necessary to design an environment for forest welfare in consideration of not only educational elements but also therapeutic elements, and effective program development is also required.

Lastly, in the question asking about the demands for the revitalization of School Forest Welfare Services, “forest programs linked to regular school curriculum,” “policies and budgets,” and “creation of green zone in schools” were found to be highly demanded, so it can be said that there is a high demand for policies and budgets to incorporate forest welfare services into regular school education. In addition, “support from forest experts, such as forest healing instructors and forest interpreters” was demanded highly, suggesting that the institutional support which prevents the burden on teachers is needed.

The plan to revitalize School Forest Welfare Services derived from this study is as follows. First, awareness of the necessity of School Forest Welfare Services needs to be enhanced. To this end, it is necessary to (1) allocate experts within the responsible institutions and strengthen their expertise, (2) increase the awareness among principals, teachers, and parents, (3) form a social consensus, and (4) actively promote the services.

Second, policy and legal basis for School Forest Welfare Services need to be built. To meet various demands and needs based on school, it will be most important to build a policy and legal basis that can enable the provision of forest welfare environment and
forestry welfare programs systematically and in an integrated way.

Third, the establishment of a School Forest Welfare Services support system is needed. A systematic and integrated “School Forest Welfare Services support system” consisting of the School Forest Welfare Support Center, central government, local governments, research institutes, School Forest Welfare Regional Support Centers, companies, NGOs, and School Councils is needed.

This study has significance in that it presented basic natural data necessary for future practice by analyzing the current status and needs of School Forest Welfare Services and trying to find ways to revitalize them, through a mixed research design method.

Nevertheless, this research is conducted centered on Seoul, Incheon, and Gyeonggido, and the survey is limited to teachers and parents, so there is a limit to generalizing it to the overall needs for School Forest Welfare Services.

It is expected that School Forest Welfare Services, which is for the healthy growth and happy future of children and adolescents, can be further revitalized through future research that diversifies regions and research subjects. Further research on Korean children and adolescents’ perspectives would also be welcome.

**Disclosure statement**

No potential conflict of interest was reported by the author(s).

**References**

Cho KJ. 2011. A study on conceptualization of forest welfare. Daejeon: Korea Forest Service; p. 190–266.

Cho YM, Kim DJ, Yeoun PS, Kwon HK, Cho HS, Lee JM. 2014. The influence of a seasonal forest education program on psychological well-being and stress of adolescents. J Korean Inst Forest Recreat. 18(2):59–69.

Choi IS, Ha SY. 2015. Experiential changes of the young people through ecological experience activities: targeting the 2014 green camp participants. J Tourism Leis Res. 27(2):99–114.

Choi S-S, Choi E-S. 2019. A comparative study on the delivery system of youth policies. KIYS. 26(5):1–26.

Eom MS, Ha SY, Lee YH. 2015. Effect of forest experience on female high school students’ attitudes toward forest, environmental sensitivity, and state-trait anxiety. J Korean Inst Forest Recreat. 19(4):45–52.

Ha SY, Son JW, Kim JJ. 2013. A task to revitalize forest education for adolescents. Vol. 1. KFRI.

Hue YS, Kim IH, Jung SJ, Hseo DY, Kwak JN. 2019. Case study on overseas school forest movement. J Korean Soc Environ Educ. 32(3):334–347.

Jang I, Lee YH, Ha SY. 2017. A study on effect of forest education program for juvenile probationers. J People Plants Environ. 20(3):271–282.

Jang I, Kim NY, Lee SH, Kim BS. 2015. The forest experience program and improvement of depression, anxiety, and self-concept in adolescents. J Korean For Soc. 104(1):127–132.

Kamerer SB, Phipps S, Ben-Ariea A. 2010. From child welfare child well-being (an international perspective on knowledge in the service of policy making). Vol. 1. Springer Science & Business Media.

Kang YK. 2004. Study on building up the sensitivity to environment for pro-environmental behavior of the students in cities: in the metropolitan districts. Cheongju: Korea National University of Education.

Kim BY. 2018a. The effects of perceived self-confidence of youths participating in tree climbing on physical self-efficacy and self-esteem in local children’s center. J Korea J Sport. 16(4):557–567.

Kim HK. 2018b. A recognition study on PR models & practitioners’ roles in public sector: focused on comparison of PR practitioners & general adults.

Kim HR. 2019. The influence of urban forest park and school forest experience activities on attitude toward forest, psychological well-being and stress of high school student. Cheongju: Chungbuk National University.

Kim HS. 2018c. The influence of nature-experiencing activities on emotion of adolescents – with special reference to forest and river activities. Daehoeon.

Kim HS, Lee KY, Im H. 2020. The influence of forest experience education programs on the relief of aggression and positive/negative emotions in adolescents. Sky. 31(4):107–135.

Kim HH, Kim JJH, Lee SH, Hue DH, Yoon YJ, Lee HY. 2021. A study on the effect of green school forest in the playground. Korea Forest Service.

Kim JG. 2017. The effects of forest healing program on reduction of high-risk bullied group middle school student. Seoul: Chungbuk National University, Cheongju, Kookmin University.

Kim MJ, Bang KS, Lee IS, Kim SJ, Yi YJ, Chin YR, Moon HJ, Ha EY. 2019. Elementary school teachers’ awareness of forest welfare services and promotion of strategies for school-based health promotion programs using the forest. Perspect Nurs Sci. 16(1):1–11.

Kim YS. 2011. The influence of forest therapeutic program on the depression and self-esteem of middle school students in WEEclass. Cheongju: Chungbuk National University.

Korea Green Ranger. 2018. Summary of instructor’s manual for Korea Forest Ranger.

Lee BH. 2018. Individual and regional factors affecting adolescents’ mental health: a multi-level analysis. Seoul: Korea University.

Lee CH, Kang SY, Lee DH. 2013. A study on the supporting measures for the improvement of mental health of children and adolescents III—a study on the development of a field application program for the improvement of mental health in children and adolescents. Res Rep Natl Youth Policy Inst. 2013(12):1–251.

Lee J. 2017. A study on the stress relief effects of adolescent physical activity in city parks: based on psychological and physiological evaluations. Seoul: Seoul National University.

Mam SJ. 2014. Effects of the forest experience activities on personality of elementary and middle school students. Wonju: Sangji University.

Merriam SB. 2009. Qualitative research & evaluation methods. 3rd ed. Thousand Oaks (CA): Sage.

Ministry of Education, Ministry of Health & Welfare, Korea Disease Control and Prevention Agency. 2020. Statistics of the 16th youth health behavior survey (Report No. 11-1460736-000058-10). Cheongju: Author. Available from: http://www.kdca.go.kr/yhs.

[MOLIT] Ministry of Land, Infrastructure and Transport. 2021. 2020 Urban planning status statistics.

O’Brien L. 2009. Learning outdoors: the forest school approach. Education. 3–13(37):45–60.

Oh. 2016. The development and effects of the forest experience program for internet addicted teenagers. Jeju: Jeju National University.

Shin JS. 2008. The research results diffusion model for technology commercialization in government-funded research institute. Busan: Busan National University.

Snell TL, Simmonds JG, Klein LM. 2020. Exploring the impact of contact with nature in childhood on adult personality. Urban For Urban Green. 55:126864.
Song JH, Shin YS, Yeoun PS, Kim YS, Cho YM, Kim JY, Son SA, Shin KH. 2012. The influence of forest healing camp on psychology stability of adolescents victimized by school violence. J Korean Inst For Recreat. 16(3):109–115.

Statistics Korea and Ministry of Gender Equality and Family. 2021. 2021 Youth statistics. Daejeon.

Strauss A, Corbin J. 1998. Basics of qualitative research (2nd edition): grounded theory procedures and techniques. 2nd ed. Thousand Oaks (CA): Sage.

Tashakkori A, Creswell JW. 2007. Editorial: the new era of mixed methods. J Mixed Methods Res. 1:3–7.

Tesler R, Endevelt R, Plaut P. 2022. Urban forest health intervention program to promote physical activity, healthy eating, self-efficacy and life satisfaction: impact on Israeli at-risk youth. Health Promot Int. 37(2):23.

Woo YJ. 2016. Influence of the forest image on mental health of reformatory facility students and academic high school students: focused on aggression, self-esteem, stress and psychological well-being. Cheongju: Chungbuk National University.

Yu GU, Jeong JW, Kim YS, Kim HB. 2020. Understanding qualitative research methods. 2nd ed. Seoul, Korea: ParkYoung Story.