

The Perceptions of Fifth-Graders Following Ecology Service Learning—The Case of the “Lesser Kestrel Day”

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ABSTRACT

An instrumental case study examined the experiences and emotions of fifth-graders, aged 10-11, following their service-learning, which was designed to help the Lesser Kestrel, an endangered species in Israel. The case study methodology used three research tools that included analyses of drawings and explanations, personal reflections, and focus groups. The research revealed four processes that students went through: emotional, social, cognitive and behavioral. These processes supported the creation of an educational setting that allowed students to develop as independent learners with responsibilities towards their peers and a high level of empathy while experiencing environmental citizenship. In addition, the successful experience generated a positive feeling together with pro-environmental behavior leading towards biodiversity conservation.

Keywords: service learning, environmental citizenship, Lesser Kestrel, drawings, elementary school, pro-environmental behavior

INTRODUCTION

Encouraging environmental citizenship through service learning (SL) may contribute to resolving environmental problems and preventing the onset of new ones (Gericke et al., 2020; Hadjichambis & Paraskeva-Hadjichambi, 2020). One of the major environmental problems is the biodiversity crisis (Georgiou et al., 2021), which has a major impact on humanity (Cardinale et al., 2012). One of the species whose population is declining in Israel is the Lesser Kestrel (LK) (Gal, 2018), a small raptor (approximately 30 cm in length), which nests in the roofs of the Falcon Elementary School.

In light of the decline in the size of the population of this species in the school's nesting colony, fifth-graders have been helping to protect the LK since 1996 (Gal, 2019). Fifth-graders' activities include outdoor learning about the LK, building nesting boxes, and towards the end of the year, the students guide more than 1,250 adults on LK day, who come to hear about the students' activities. In fact, students are involved in a significant project saving an endangered species through SL and other methodologies, which combine theoretical knowledge with practical action. According to the literature, SL is meant to empower students' learning and provide them with practical tools for developing self-efficacy to act as environmentally-aware citizens.

Theoretical Background

Two theoretical anchors are at the base of students' pro-environmental behavior designed to help the LK population: SL and environmental citizenship.

Service learning

The core principle of SL is the connection of academic learning with meaningful service to society (Pérez-Ordás et al., 2021; Snell & Lau, 2020) and the focus on experiential learning and elements that encourage the creation of personal change (Mtawa et al., 2021). Accordingly, there is broad agreement on the definition of SL as a type of experiential education in which students are involved in activities that address human and community needs along with built-in reflection opportunities designed to promote student learning and development (Mtawa et al., 2021; Snell & Lau, 2020). SL is a type of experiential learning based on founded on Dewey's (1938) theory in which learning necessitates requires action or skill. Dewey (1938) described it as an “organic connection between education and personal experience” (p. 25). According to the literature (Campbell, 1995; McLaughlin, 2010), Dewey's (1938) belief was that the role of education is to engage students in citizenship and their civil environment, or in other words, the connection between the subject and the environment. Hence, SL is specifically designed to enhance meaningful discourse among students and community members, which by their very nature, triggers action, involvement, and mutual benefit

(Adarlo, 2020). Similarly, SL follows Kolb's (1984) experiential learning model, offering students create an opportunity to engage further explored through interactions with others.

Environmental citizenship

There is a wide range of definitions of environmental citizenship in the literature (Gericke et al., 2020). Many of the definitions include environmental behavior of citizens acting and participating in society as agents of change in the private and public sphere on a local, national and global scale, through individual and collective actions towards solving contemporary environmental problems, preventing new environmental problems, achieving sustainability and developing a healthy relationship with humans and their environment (Dobson, 2007; Gericke et al., 2020). In order to address environmental problems, there is an urgent need to provide young citizens with sources of hope in troubled times. Environmental citizenship can provide the hope that necessary urgent solutions can be found to combat modern environmental challenges (Chawla, 2020; Dahlbeck, 2014; Huckle, 2014; Ojala, 2015). Despite the importance of encouraging environmental citizenship, environmental citizenship has never been at the heart of education systems (Hadjichambis & Paraskeva-Hadjichambi, 2020). According to the literature review, the following question was asked: What were the experiences and emotions of fifth-graders regarding the service-learning process, involving the Lesser Kestrel?

Objective

This study addressed the need to better understand the factors that influence pro-environmental behavior described in the literature (Shipley & van Riper, 2022; Zelenski & Desrochers, 2021). In a more concrete way, the study sought to reduce the gap reported in the literature in the context of fifth-graders working to preserve the LK. Reducing this research gap is important in light of the fact that fifth-graders belong to the "screen generation" (Oswald et al., 2020), that (a) on a daily basis spends less time outdoors (Hoover, 2021; Larson et al., 2019; Soga & Gaston, 2016), (b) suffers from "nature deficit disorder" (Hilbruner, 2006), (c) feels disconnection and a lack of appreciation of the natural world (Walimbe & Chitgopkar, 2018), and (d) negatively affects their attitude towards nature and their desire to work for its conservation (Beery et al., 2015; Ives et al., 2018; Mazouchová & Šorgo, 2021).

The requirements of fifth-grade participation in the EE program bridges a gap to their conduct in daily life: Instead of digital screens, students use binoculars. Instead of remaining only within the walls of the classroom, they enter the outdoor environment. Instead of moving quickly from site to site on the Internet, students actually go out and observe the behavior of the LK for a period of approximately 45 minutes during each observation. Instead of purchasing nesting boxes online, students build the nesting boxes for the LK. Instead of keeping the information about the LK to themselves, they guide adults about the LK, hence, sharing the information they have learned not only with their peers. Therefore, the goal of this study is to examine the experiences and feelings of fifth-graders in an EE program, who are part of the "screen generation", following their outdoor SL and environmental citizenship, which aims to help preserve the LK population.

METHODOLOGY

The study was based on the qualitative approach with additions of quantitative analysis. In the qualitative approach, the research was based on an instrumental case-study methodology based on the constructivist approach that seeks to describe a complex reality. This method is intended to allow for general insights, in this case the SL of fifth-graders on the issue of helping the LK, and not for gaining insights for the case itself. In addition, instrumental case-study research is designed to generate generalized findings that can be used to lead to changes in practices, plans, and policies (Yin, 2006).

The Context

The Lesser Kestrel

One of the species whose population has been declining rapidly in the past five decades in Israel is the *falco naumanni* (Fleischer, 1818)—commonly known as the Lesser Kestrel (LK). The LK was classified as a vulnerable species, which has become a symbol of nature conservation activities in Israel. Several reasons have led to a decrease in the size of the LK population: shortage of nesting sites, shortage of hunting sites, poisoning, invasive species, and pets (Gal, 2018, 2019). In fact, since the establishment of the school in the 1950s it has become a symbol of the school and a synonym for the school. For the farmers in the area, the LK also serves as a biological pesticide, hence it has gained biological importance as well as its cultural importance.

"Lesser Kestrel" environmental education program

The LK program was established in 1996 and has steadily continued to this day. The founder was a bird watcher whose two children attended the Falcon Elementary School. After many years of watching the LKs' behavior and numbers, during the mid-1990s she identified a decline in the LK population and was determined to try and make a difference for them. She knew that alone it would be impossible, and called the principal of Falcon School and suggested to him to create an educational program to try and contribute to the protection of the LK in Israel. From a small school program, with the help of the community, it blossomed into a very well-known national environmental-education program. The EE program is a unique school program and there is no other like it in Israel. It can be defined as a bottom-up program because it was founded by school educators, and not by an external authority such as the Ministry of Education. Like other environmental education programs in Israel, this program is a local initiative, because in Israel there is no obligation to teach environmental education. However, since 1996, all fifth-grade students from this school participate and support the conservation action plan of the LK population.

The program is taught by two teachers who teach together in two classes. The first teacher is a science teacher from the school. The other is an expert on LK and is the author of this paper. The learning takes place throughout the year for two hours a week as part of this school's unique curriculum.

The learning processes about the LK includes acquiring knowledge about birds, the food chain, biodiversity and the relationship between humanity and its environment.

Moreover, hands-on activities are a key part of the program. These activities include building nesting boxes for LK for the community and installing them below the eaves of the roof on the external wall of the houses near the schools, as the LK is known to nest in these eaves. Experimental learning is another facet of the program. Laboratory work conducting scientific experiments are part of the students' experiences in the program. Students practice diverse skills such as teamwork, self-learning, observation, speaking in front of an audience and data collection.

The Lesser Kestrel Day

One of the highlights of the program is "LK Day". Advertising for this day is done through social media. On this day, the students guide over 1,250 visitors from all over the country who come to participate. Families with children, families without children, teenagers, bird lovers, nature lovers, all ages and backgrounds come without prior registration to activities in which students emphasize pro-environmental behavior as part SL and environmental citizenship to increase awareness of nature conservation.

Training before LK Day takes place in groups of several students and prepare for at least two weeks. During the preparations, students learn the tour route, which includes eight stations scattered throughout the school. Each station addresses a topic regarding the LK and the project, and the students are responsible for the methodology in teaching about this topic and for the division of roles at each station. On LK Day, the students guide on their own. Only their classmates are by their side while they guide groups of adults; no teachers are present to help them.

On LK Day, all students gather with the teachers in the school yard at 8 a.m., when they are given name tags to put on their shirt and the personal training program from the teaching staff. The program records the hours the child is supposed to mentor and who his or her partners are. In addition, students are given an explanation of the need to be available in case many visitors arrive unexpectedly.

From the time visitors begin to arrive, the teachers organize the visitors in groups and attach the instructor-students to them. From this moment on, the students are in charge of the group of adults. They lead them along the path and make the necessary changes according to unexpected developments, such as the arrival of two groups at the same point, or the appearance of LK in the school sky.

LK Day lasts until noon. As there is no pre-registration for this day, there is a variability in the number of visitors throughout the day. There are groups of only up to 10 participants and then there are situations where students might guide about 40 visitors at once. Therefore, sometimes, there are several groups working parallel to each other. Due to this situation, students must navigate between the stations and not follow a prescribed route. Hence, the unknown number of visitors requires students to be flexible about the time of their guiding during LK Day, the size of the group they will be guiding, the age of the visitors and even who their guiding colleagues will be.

Research Tools

The information in this study is based on an analysis of three tools: students' drawings and a written explanation for each drawing, focus groups and individual written reflections. Stage one—collecting data—was conducted a day after the SL. Students were asked to write an essay, at least one page long, that would reflect their feelings after their SL experience. Stage two, focus groups were conducted several days after the SL. In this case, too, emphasis was placed on students expressing their emotions on LK Day. Stage three was conducted one week after the SL. Students were asked to draw their emotions before and after the SL. Students were also asked to explain what they had drawn.

In fact, students experienced feedback that included the use of visual, textual and verbal tools designed to test their emotions before the SL (drawing+explanation), during the SL (focus groups+personal summary) and after the SL (drawing+explanation). The analysis of the findings was done through first- and second-cycle coding analysis and the creation of categories that arose inductively from the interpretive analysis of the data (Saldaña, 2009).

Data Analysis

The coding processes were inductive (Yin, 2006), and included first- and second-cycle coding (Saldaña, 2009). In first-cycle methods, the initial coding of the data occurred. The purpose of the first encoding is to locate codes, which will allow the creation of categories and then the creation of key topics. Before beginning the encoding process, the texts were read several times. This process allows for a first impression of the information. Then, the encoding process began. The texts were reread carefully and the data were checked before and while the coding was officially performed.

The initial coding is done using short words and phrases, all in conjunction with marking significant citations of the students. After the first coding cycle, a second coding cycle was performed. The main purpose of the second coding cycle process was to reorganize the data and thicken the data set by creating a convenient order of the data. This creates classification, prioritization, integration, synthesis and the like. The second encoding cycle is used to create connectivity between categories to develop a more comprehensive picture of all the data. In some cases, re-encoding was performed when more accurate words or phrases were discovered for the original codes. A merger of several codes that were conceptually similar was also made. Finally, a number of codes were omitted because after further in-depth reading they were found marginal. In the case of this study, a second pattern coding cycle was selected. The choice of pattern coding stems from the fact that it enables the development of key topics from the data that contribute to the search for rules, reasons and explanations in the data, human relations and the formation of theoretical structures and processes. This way, the data can be grouped into a smaller number of groups (Saldaña, 2009). The qualitative section included a descriptive analysis of the frequency of appearance of the students' emotions in each of the research tools.

The Studied Population

This study population involved 60 fifth-graders, between the ages of 10 and 11 years old, who studied in the Lesser Kestrel EE program in the 2020-21 school year. Their school is situated in a rural area of northern Israel and includes a population defined as medium-high socio-economic status (CBS, 2022).

Ethics

The author of this article is one of the teachers who taught the fifth-graders described in the paper. At the same time, he is not the one who conveyed the research tools to the students and did not participate in the focus groups. Moreover, the parents of all the students received a message detailing the study, containing the research objectives and details of the author of this article for the purpose of clarifying various topics that seem relevant to them. Parents were asked to sign a consent form to conduct this study with their children. In addition, students did not record or provide identifying details during the implementation of the tasks that were part of the research tools. Students were given the option to decline to participate in the study. The author of this article was not able to identify the students who participated in the study. In addition, the students who participated in the study brought their consent to the association. Moreover, the findings from the research tools do not form part of the students' assessment, so they have no effect on the students' final academic assessment during his / her studies at the school. Finally, the study received the approval of the Institutional Ethics Committee of the academic institution where the author of the article works.

RESULTS

The research tools enabled students to express themselves visually, textually and vocally, which allowed analysis of the research question, i.e., a better understanding of the factors that influence pro-environmental behavior, while examining the experiences and emotions of fifth-graders before, during and after LK Day. The students' experiences and emotions in all three different research tools included references that incorporated emotional aspects. Accordingly, based on the literature (Linnenbrink-Garcia & Pekrun, 2011; Pekrun, 1992, 2017), emotions were divided into negative and positive categories. Negative emotions included expressions such as "stress", "pressure", and "fear" as one of the students wrote in his explanation to his drawing before LK Day: "I drew myself with a quick pulse because I was very excited and the sea inside me is not calm". Positive emotions included expressions such as "happiness", "excitement", "pleasure", "fun", "joy", and "calmness" as one of the students wrote in his reflection: "I was excited and stressed during LK Day". After LK Day one of the students wrote in his reflection: "A feeling of success, and the closed eyes symbolize calmness and a smile of joy". Therefore, the quantitative part includes descriptive statistics of the percentage of appearances of negative and positive emotions before, during and after LK Day (Figure 1).

As can be seen in Figure 1, there is a transition from mostly negative emotions (approximately 97%) before LK Day to

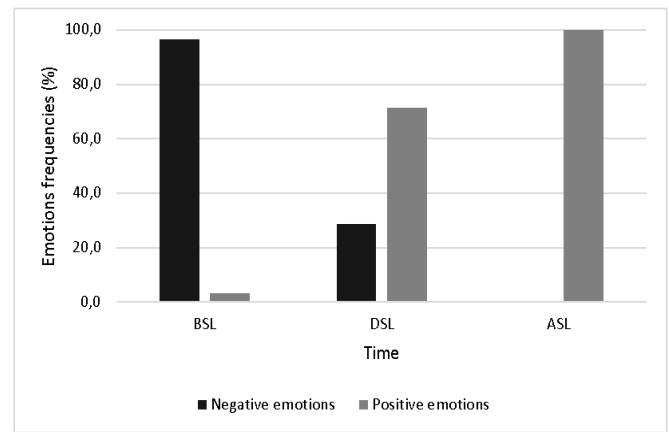


Figure 1. Distribution (%) of students' emotions found before the service learning (BSL), during the service learning (DSL) and after the service learning (ASL)

mostly positive emotions (approximately 70%) during LK Day itself to a state of only positive emotions after LK Day.

The qualitative analysis revealed two key themes related to intrapersonal and interpersonal skills.

Intrapersonal Skills

Two sub-themes were found that allowed us to understand the personal process that the students went through: their perception of the need to become an independent learner prior to LK Day and the behavioral flexibility that they had to demonstrate during LK Day.

Independent learner

The students testified that the preparation for LK Day required them to put to practice the knowledge they learned in class and alone, while developing independent learner skills as one student attests in his reflection: "I enjoyed guiding during LK Day because we had to learn a lot, even alone... our learning without the teacher helped us a lot... it was fun". The student emphasized self-learning which included deepening the knowledge and reviewing for LK Day and notes that the investment before LK Day helped him while guiding during LK Day. Moreover, the student indicates that learning alone was very beneficial and enjoyable.

As part of the focus group, the students referred to the development of their ability to learn independently as a different student noted: "Independent learning of information prior to our training, without the teacher, was important". The student noted the contribution of the self-learning process was important.

Flexibility

Students had to deal with unforeseen changes during LK Day. For example, "during LK Day we had to change the route because another group was at the station. At first it was a bit stressful, but after moving to another station we were able to continue... it gave me a great feeling" (focus group). The student describes the change in his emotions, from negative to positive following his success in coping with the change in the planned LK-Day order and his need to recalculate a route.

Here is another example written by a student in his personal reflection: "Suddenly, I had to guide with a student

from the other class...it was very stressful... we coordinated what to say a moment before the tour; in the end it was great... we managed even though we had to make a change.” The change that students experienced indicates their ability to be flexible.

Interpersonal Skills

This theme is related to developing a relationship with classmates and the audience. The first sub-theme is related to the teamwork they experienced. The second sub-theme is related to empathic feelings towards classmates. A third sub-theme is related to students' self-esteem as they become better environmental citizens.

Teamwork

With the textual and vocal research tools, the students addressed many different aspects related to teamwork. The students' coping with the need for cooperation and teamwork was complex, as one of the students wrote in his reflection: “It showed that you can make a mistake in your explanation, because your teammates can help and correct the knowledge... it is a good feeling”. The student describes the strength of the group during LK Day, in which other students can help transfer the knowledge correctly. On the other hand, during the focus group another student described the difficulties: “Teamwork is not simple; it is even difficult. We fought, we argued... who would say what and when... but it was very important. Teamwork helped us pass on the knowledge, so in the end we felt good”. The student presents the benefit of teamwork despite the difficulties encountered along the way.

Empathy

A sense of empathy developed in the students during LK Day. In the focus group, one of the students described his experience: “Suddenly, one of the children forgot what he had to say; he was embarrassed... I calmed him down a bit... I told him it's okay... he came back to guide, and he was really good; we both felt great”. In this quote he emphasized the empathy he showed towards his teammate. Another example that describes consideration for the class was written by one of the students: “All of a sudden, I was asked to guide again ... because one of the students who guided less than me was sad... Even though I really wanted to guide, I encouraged him to guide ... “. In this quote it can be seen that there is empathy towards the classmate which ends in an act of encouragement to boost the spirit of the student.

Self-esteem due to environmental citizenship

The change in students' self-esteem regarding their ability to influence others can be seen in each of the research tools. For example, (Figure 2—before LK Day), the student describes the chaos she experienced and the fear of making mistakes in front of her parents. In Figure 3 (after LK Day), the student wrote “I was able to unfold the project and lecture about it” (drawing+explanation).

In the focus groups the students' position was much more decisive. All students agreed that they had the ability to persuade adults to be more environmentally aware, and especially encourage social change in the context of LK conservation as one of the students said: “Children can make

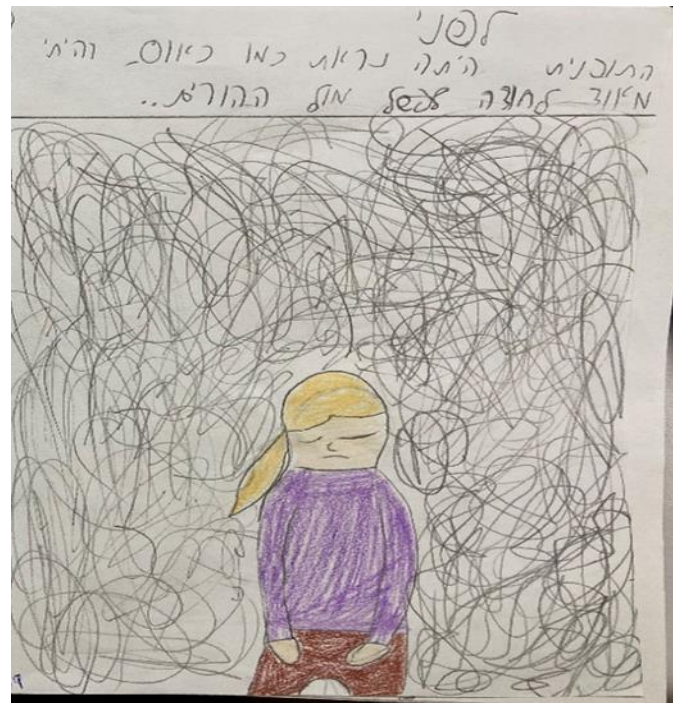


Figure 2. Drawing 1-Before the service learning experience: The words say: “The program [LK program] looks chaotic; I was very stressed not to mess up in front of the parents.” The sad face, the disorder of the threads behind the girl and her words illustrate how the student feels before LK Day

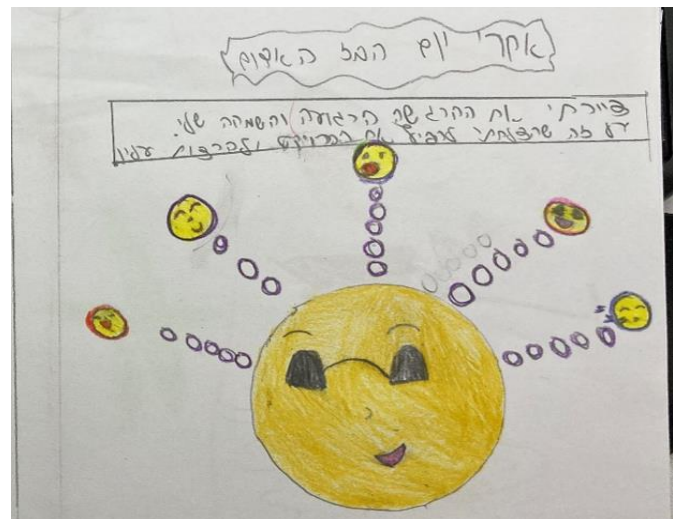


Figure 3. Drawing 2-After the service learning experience: The words say: “I drew my calm and happy feeling; calm that I was able to conduct the project and talk about it.” The happy faces describe the student's emotions after LK Day. A sense of personal success when it comes to her ability to help the LK project as part of guiding adults

a change... we are a new generation... we have new ideas, we can persuade...we know how talk to adults. If we want to, we can succeed; we can help convince adults to help us to protect the LK”. The student speaks in the first-person plural which strengthens her statements and her personal belief in the ability to influence the adults towards pro-environmental behavior in general, and specifically for the LK.

DISCUSSION

The experiences the students described and the emotions expressed by the students as part of their experience of SL to guide various visitors from all over the country on LK Day, highlights four processes that students went through. The first process—emotional processes: The emotional processes that are expressed in the intrapersonal and interpersonal processes are important components in the promotion of environmental citizenship and pro-environmental behavior (Bissing-Olson et al., 2016; Chawla, 2020). LK Day forced students to deal with stressful situations, as well as address fear and anxiety as part of their experience with environmental citizenship and adult guidance. The negative emotions before LK Day were not deactivating negative emotions (Pekrun et al., 2007), but rather negative emotions that encourage action (Kleine et al., 2005). According to the literature, negative emotions can lead to practical anxiety (Pihkala, 2020). In this study, the students did not reach such a level of anxiety. Although they were anxious and felt pressure before their SL, the level of anxiety did not prevent them from continuing to guide the adults. The positive emotions expressed by students at the end their SL as part of the inter- and intra-personal skills, are likely to promote, according to the literature, the students' continued environmental citizenship and reduce the environmental crisis (Kerret et al., 2016).

The second process—the social process: LK Day created situations in which some of the students learned to develop empathy towards their classmates. Empathy, as interpersonal skills, is an important mechanism of experiencing, understanding and responding to other people's emotional state, ideas (Lee et al., 2018), and to be able to include the other (Murphy et al., 2018). Developing care for others, establishing constructive relationships, handling challenging situations, and solving problems effectively (Pekrun, 2017). Therefore, empathy in this way, can create personal change and provide an opportunity for personal growth (Mtawa et al., 2021; Pérez-Ordás et al., 2021; Resch & Schrittmesser, 2021; Snell & Lau, 2020; Zuzana et al., 2020). The development of empathy occurred in the middle of LK Day independently, naturally and not through teacher mediation. This is a process that can lead to proper moral development (Saleme et al., 2020). According to the literature, empathy shown by the students towards each other is considered a higher level of empathy because it led to pro-social action among the students and did not remain only at the level of verbal expression (Saleme et al., 2020). In addition, students learned about the challenges and benefits of teamwork. At the end of the process, most students agreed that despite the challenges of teamwork, it is preferable to individual work. Teamwork also helped reduce the stage fright that affected some of the students. This is not surprising, as presenting in front of adults can be intimidating for many youngsters (Steptoe et al., 1995).

The third process—cognitive processes: As part of intrapersonal skills, students became independent learners and understood that the responsibility for the instruction was theirs. Independent learning is part of professional development and an opportunity for personal growth (Mtawa et al., 2021; Pérez-Ordás et al., 2021; Resch & Schrittmesser, 2021; Snell & Lau, 2020; Zuzana et al., 2020). From this study,

it seemed, and is well known in the literature (Costa et al., 2021; Glaab & Heyne, 2019; Sturm & Bogner, 2010), that the outdoor environment helped students to learn, and created a situation in which learning became student-centered (Sturm & Bogner, 2010). The extensive hands-on activity led to high motivation during the cognitive processes regarding biodiversity (Costa et al., 2021). Furthermore, positive experiential learning, as found in this study as part of interpersonal skills, evokes interest in nature (Cho & Lee, 2018; Christie et al., 2016; Marchant et al., 2019; Reis & Roth, 2009; Wistoft, 2013) Outdoor activities are also important in knowledge construction (Shellman, 2014), in the case of this research as part of the intrapersonal process that students experienced. Combining emotions and cognition in the learning process is as important as developing the students' understanding of environmental problems (Johnson & Fredrickson, 2010). Moreover, it has been found that positive emotions towards nature increase students' motivation to learn and to apply that knowledge by taking environmental action (Chawla, 2020; Nisbet et al., 2008).

The fourth—behavioral processes: Emotions were found as an important element which influences pro-environmental behavior, especially, positive emotions, such as hope and happiness, which were an important motivational factor for pro-environmental behavior (Bissing-Olson et al., 2016). In the interpersonal process that the students went through, they were confident in their ability to persuade adults to preserve the environment, which indicates self-confidence in their ability to lead environmental change in the future as well. The fact that students felt self-confident in their ability to help conserve the LK turns this bottom-up environmental education into an effective program, concurrently with other activities tailored to the specific characteristics of the socio-physical context (De Dominicis et al., 2017). This confidence, at a young age, may be an indicator that perhaps when these students mature, they will have the confidence to continue to work for the betterment of the environment (Chawla, 2020). In addition, it can be estimated that the students' environmental activities help to develop local green communities and increase positive liaisons between places and people (De Dominicis et al., 2017).

CONCLUSIONS

The students knew how to describe their experiences and emotions before, during and after their SL as part of environmental citizenship. Initially, students mostly expressed negative emotions such as stress, tension, worry, apprehension, fear, and failure and a low level of self-esteem for guiding adults. After their SL, they expressed only positive emotions such as pleasure and fun, a high level of self-esteem for guiding adults. Moreover, teamwork had an impact on students' sense of success during LK Day. Despite the difficulties noted, at the end of the process, the classmates served as a source of strength, knowledge, and emotional support for each other. The empathy that the students felt was the basis for the behavioral change they demonstrated during LK Day and for the flexibility that characterized their instruction.

The importance of the study is that it demonstrates how, in practice, an EE program can help students create positive feelings about their environmental activities, increase their personal confidence in their ability to work for the environment and do so in an outdoor environment. In other words, SL as part of environmental citizenship can create an educational, value-based and positive emotional activity that engages students in an action plan to help the LK population. Such activities, which are based on outdoor learning, without using digital screens, contribute to tackling personal challenges, developing social skills, developing independent learning abilities, enabling successful experience with activities for the environment and developing positive emotions towards environmental activities designed to reduce the environmental crisis. This emotional and positive experience for the environment is important for shaping present students who are the decision makers of tomorrow.

Research Contribution

On a theoretical level, this research has helped expand knowledge regarding the way in which SL for fifth-graders is a means with which to encourage environmental citizenship while creating an experience of success and hope - ideals that are recognized in the literature as important for encouraging behavior that will reduce the environmental crisis. In addition, the study added knowledge that may help to understand the barriers and challenges of applying SL in environmental education, which is not common in the literature. At the applied level, the research findings have a significant contribution to make in the following areas: in planning and determining a course of action of SL that will not only discuss the theoretical side but will help reduce the environmental crisis while understanding the challenges facing fifth-graders before SL. In addition, the use of drawings as a pedagogical tool, has proven itself, as effective, simple, and accessible, contributing to the possibility of deciphering the emotions and attitudes of fifth-graders. The combination of a variety of research tools also made it possible to obtain a broader picture of the emotions of fifth-graders, so it is recommended to adopt an approach in which information is collected from as many sources as possible.

Limitations

The main limitation of this study is the size of the sample based on a single school and singular age group. It is recommended to examine a similar overall analysis of the three research tools also in other schools and /or in schools that have an environmental vision designed to encourage environmental citizenship.

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Availability of data and materials: All data generated or analyzed during this study are available for sharing when appropriate request is directed to the author.

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