Development and implementation of evaluation resources for a green outdoor educational program

Gulcan Garip1, Miles Richardson1, Abigail Tinkler2, Susannah Glover2, Alice Rees3

1Human Sciences Research Centre, University of Derby, Derby, UK

2City of London, London, UK

3Philosophy, Psychology, and Language Sciences, University of Edinburgh, Edinburgh, UK

Corresponding author: Gulcan Garip  
Address: College of Health, Psychology and Social Care, University of Derby, Kedleston Road, DE22 1GB   
Email: [G.Garip@derby.ac.uk](mailto:G.Garip@derby.ac.uk)  
ORCID: 0000-0002-7887-3798

Gulcan Garip is a Health Psychologist and Academic Lead in Psychology, and worked on the development and analysis of evaluation of the Green Spaces Learning Places programs.

Miles Richardson is Professor of Human Factors and Nature Connectedness, and led on the development of the evaluation resources and contributed to the paper.

Abigail Tinkler is the Head of Learning for the City of London Open Spaces Department.

Susannah Glover is the Learning Manager for the City of London Open Spaces Department.

Alice Rees is a Cognitive Psychologist and contributed to paper revisions.

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The Green Spaces, Learning Places environmental education initiative runs schools-based and community-based sessions to create opportunities for children and young people to engage with green outdoor environments in London, England (including parks, heaths, and forests). Bespoke evaluation resources were developed by researchers in collaboration with the Green Spaces, Learning Places delivery teams. The evaluation was based on before and after survey responses from 504 school-aged children (5-10 years) and 54 young people (13-19 years), observation of 62 children, and interviews with 18 children and 8 young people. The mixed methods findings suggest the programs had a positive influence on increasing participants’ understanding, confidence, nature connection, wellbeing, and involvement in green outdoor environments.

Keywords: evaluation; nature connectedness; children; young adults

# Overview of the context

There is consensus in the literature that spending time in nature is beneficial to people’s physical and psychological health, as well as contributing to the conservation of the environment (Dopko, Capaldi, & Zelenski, 2019; Hartig, Mitchell, De Vries, & Frumkin, 2014). However, contact with nature has become less and less, particularly for children (Soga & Gaston, 2016). In recent years, this has brought about international interest in connecting and reconnecting people, and especially children (up to age 10) and young people (11-18), with nature (e.g. Charles et al., 2018), to counteract the growing disconnect between children and nature, which has been termed the “nature-deficit disorder” (Louv 2006, 2010). The terminology, although increasingly prevalent, can be challenged for highlighting a separation between people and the rest of nature and that this should be considered in environmental education (Fletcher, 2017). Imai and colleagues’ (2018) analysis of 15-year trends (from 2000 to 2015) of children’s interest and connection with nature revealed an increase in apathy toward wildlife. It is important that children have the time to explore green outdoor environments (Imai, Nakashizuka, & Kohsaka, 2018). Practical solutions to engage children with nature are needed. In this paper we present an evaluation of the Green Spaces, Learning Places (GSLP) initiative in London, England, which aims to help children build *nature connection* and *confidence*, and emphasises doing and discovering to support students as active learners to encourage curiosity and interest in green outdoor environments and nature as a whole (Imai, Nakashizuka, & Kohsaka, 2018).

The Green Spaces, Learning Places (GSLP) environmental educational initiative was developed amidst these rising concerns of people’s increasing disconnect from our natural world in London, England (City of London, 2016). In the context of these programs, ‘green outdoor environments’ refer to the green spaces these programs took place in, including parks, heaths, forests, and gardens. Although an urban area, over 40% of London, England, is covered by public green spaces. These green spaces include over 3,000 parks, heaths, forests, and gardens. Parks make up the majority of the green spaces in London and are typically manicured public areas with grassy areas, trees, and sometimes blue spaces i.e., ponds. Public gardens are very similar to parks in this context but are typically much smaller. Sometimes they are referred to as garden squares which are small plots of land that are communal gardens for local residents, typically comprising of some grass and trees. Heaths are less manicured and typically have rough grass and woody vegetation, there are not normally many trees or bushes like there are in parks. Forests are areas with a large number of trees and shrubbery, sometimes also referred to as woodland.

To determine the effects of GSLP programs on participants, it is important to evaluate such programs using a range of qualitative and quantitative research methods. Combining both qualitative and quantitative methods provides a more holistic account of participants’ experiences than any one method would offer alone. Program evaluation is essential to assess whether a project has been successful in achieving its aims (West, 2014).

Previous evaluations involving children have used games such as presenting children with two cards (I enjoyed it and I did not enjoy it) and asking them to select the card that represents their feelings of an activity or by having the children jumping and waving their arms to indicate their enjoyment (West, 2014). West notes that data from this method would not be considered an evaluation. The most commonly used evaluation methodology, found by West (2014), was the use of questionnaires however, for younger children, written questionnaires are not always appropriate. Some of the GSLP programs involve children under 5 years old and so existing measures as scales for evaluation were not appropriate because the content of these items were unlikely to be understood by children. Furthermore, existing evaluation measures were not appropriate due to the bespoke outcomes of interest established by the GSLP team, and the context in which sessions were delivered. Thus, bespoke evaluation resources were developed collaboratively, by practitioners and researchers - that would be easily understandable by younger children and adolescents, to allow for comparison of outcomes between different groups of program participants. For example, we asked children to provide ratings on a smiley face scale (Hall, 2016). We note that our use of the term *evaluation* is rooted in a psychological perspective rather than the educational evaluation perspective. There is some cross-over between research and evaluation however we define evaluation as a systematically applied inquiry to determine the effectiveness of the GSLP programme across a number of outcomes detailed below (Fournier, 2005).

We present a bespoke toolkit designed to aid in the evaluation of the GSLP program. For the purposes of the program evaluation, the resources presented here were co-developed by researchers and practitioners and implemented across the GSLP programs, which took place in Epping Forest, West Ham Park, and Hampstead Heath, in London, England. This evaluation aligns with calls for researchers and practitioners to work together on the development of evaluation resources for environmental educational programs (West, 2014). A series of single item measures that directly corresponded to the five dimensions of interest were developed. Participants were asked to respond on a 4-point Likert scale to indicate their level of agreement with the items.

Green Spaces, Learning Places (GSLP) programs are learning experiences that have been developed on a set of guiding principles intended to bring about positive change in participants across a number of psychological and behavioural outcome measures. The guiding principles of GSLP were established based on the expertise and experience of the practitioners (third and fourth authors) and relevant research on environmental education programs. The aim of GSLP practitioners was to enable reflective practice, quality learning, and to increase the level of active engagement of program participants (i.e., mainly children and young people aged from under 5 to 13-18 years; see Supplementary Material 1 for guiding principles). Five outcome measures were established by the GSLP practitioners that were used to evaluate the GSLP programs, and shaped the development of the evaluation resources. The focus of this evaluation was to identify the impact of participating in a GSLP program on the following outcomes:

(1) *Understanding*: Participants understand the value and importance of green space.

(2) *Confidence*: Participants are confident to use green spaces, as part of our activities or independently.

(3) *Nature connection*: Participants develop a sense of place with green spaces, and pass this down through generations.

(4) *Wellbeing*: Participants have restorative and meaningful experiences in green spaces.

(5) *Involvement*: Participants take positive action for, and get involved with, green spaces.

The value judgement for this evaluation is based on whether participation in the GSLP programs improved participants’ *understanding, confidence, nature connection, wellbeing,* and *involvement*. This was the first time these outcomes were measured. The GSLP program consists of three initiatives including, ‘Schools Programs,’ ‘Green Talent,’ and ‘Playing Wild,’ which are described below.

## Schools Programs

The Schools Programs were available for booking by schools in London, England, including Epping Forest, West Ham Park, and Hampstead Heath. Epping primary schools, West Ham Park primary schools, and Hampstead Heath primary and secondary schools booked on to these programs. Sessions last around 2 hours, and take place in green outdoor environments (e.g. parks, heaths, forests) where participants can explore various foliage and insects, learn how to safely build a fire in the wild, use natural materials to create works of art, and investigate habitats and lifecycles whilst developing key skills such as questioning, evaluating evidence, creativity and team work. At the time of writing this paper, the program had engaged over 42,000 students in its first three years, including over 31,000 state school students.

## Green Talent

The Green Talent program focuses on working with young people furthest from the job market, to support them to achieve positive and productive futures. The program reaches out to young people in London, England, including but not limited to those in Pupil Referral Units, who have struggled within formal education settings and young people who have been unemployed long-term. The project provides opportunities for young people to explore careers in the environmental and green space sector, including conservation, leisure, and education, in Epping Forest, Hampstead Heath, Burnham Beeches, City Commons, City Gardens, City of London Cemetery and Crematorium, and West Ham Park. Skill building programs such as, working in teams of 4-5 participants to make shelter using fallen branches or going on a scavenger hunt to identify common insects in the green spaces, were intended to enable participants to recognise and develop their ability to work in groups as well as develop their individual talents. At the time of writing this paper, the program had engaged 359 participants in its first three years, including 115 participants from pupil referral units and 80 work experience program placements.

## Playing Wild

The Playing Wild program aims to address barriers to connection with nature by targeting families with under-5s through natural play activities in Hampstead Heath, London, England. Children under the age of 5 can benefit from spending time in green spaces; however, parents often lack the confidence to play in natural settings with their children, instead relying on traditional playgrounds and indoor activities. Playing Wild supports families to play outdoors, together, build confidence, and engage with nature with activities such collecting objects from the natural world, exploring textures, colours and scents, and building mini-dens.

# 2 Aims and objectives

This paper presents the development and findings from the implementation of a bespoke evaluation resource for evaluating the Green Spaces, Learning Places (GSLP) environmental education programs. The evaluation aimed to determine whether participation in a GSLP program improved participants’ ratings across the aforementioned five outcomes. The evaluation resources include a range of qualitative and quantitative measures that can be used to collect data from participants of differing ages, before, during, and after participating in a GSLP program for the purposes of evaluating the influence of the program against the five outcomes. The measures were intended to be used by GSLP program leaders and volunteers to evaluate whether participation in the programs improved outcomes in participants across the five outcomes, namely, *understanding*, *wellbeing*, *nature connection*, *confidence*, and *involvement*. Though the tools were used in programs in London, England, it is intended that the resources shared in the present paper can be adapted by other program leaders for evaluating their programs. When describing the evaluation materials we use the term “green space” to be consistent with the materials, “green space” refers to green outdoor environments as discussed above.

# 3 Methods

## 3.1 Development of the evaluation resources

Although there are existing evaluation tools, these were not appropriate for the current context. Due to time and human resource limitations related to the GSLP programs, bespoke resources were required to ensure the evaluation was feasible for program leaders and participants.

The evaluation resources were developed through a collaborative and iterative process of expert input from researchers from a UK higher education institution and the GSLP practitioners. This approach allowed for the development of resources that would yield information both on outcome measures as well as participants’ reactions to taking part in the program (Kirkpatrick, 1996; West, 2014). The aim of the evaluation resources was to collect data from program participants before, during, and after having taken part in one of the three GSLP programs to gain insights in how the program influenced the participants’ *understanding*, *wellbeing*, *nature connection*, *confidence*, and *involvement* (see Supplementary Material 2 for the full set of resources). Specifically, we were interested in whether program participation increased participants’ ratings across the five outcome measures.

1. Survey questions:

Due to the young ages of some participants in the GSLP programs, existing traditional and validated written questionnaires were not appropriate for all participants. An alternative was to use smiley face Likert scales. Smiley face scales have been understood by 96% of children aged 5 years and over, and produced useful results (Hoey et al., 2017). The survey questions consisted of happy and sad smiley face response scales to collect data on single item measures for each of the five outcome measures. These questions were designed to assess changes, if any, in the outcomes reported by participants from baseline to follow-up after having taken part in a GSLP program. Participants responded by choosing a very sad, sad, happy or very happy smiley face on a printed sheet and circling their choice before and after taking part in a GSLP session. To assess *understanding*, participants were asked ‘do you think parks and places like this are important?’ A ‘happy face’ response to this question was inferred as demonstrating a participant perceiving green spaces as important, indicating green spaces had value and significance and meaning in their life. Figure 1 presents an example of how this item was presented to participants. To assess *nature connection*, participants were asked ‘how special are green spaces like this to you?’ A ‘happy face’ response indicated participants may experience a sense of place and meaning, which are important aspects of the multi-faceted psychological construct of nature connectedness (Lumber et al., 2017). To assess *wellbeing*, participants were asked ‘how does being in nature make you feel?’ The wellbeing benefits of nature are underpinned by positive affect (Capaldi et al., 2015) and nature is known to be associated with positive feelings, such as wonder and happiness (Hinds, 2011; Richardson et al, 2018). A ‘happy face’ response indicated participants reported positive feelings about being in nature. To assess *involvement*, participants were asked ‘I want to take care of nature and green spaces?’ A ‘happy face’ response to this item indicated participants’ pro-environmental attitudes and likelihood of pro-environmental behaviour, which has been shown to be related to nature connectedness (Davis, Le & Coy, 2011; Mayer & Frantz, 2004; Zelenski & Nisbet, 2012). To assess *confidence*, participants were asked ‘how confident or good are you at exploring nature and parks?’

Children’s belief in their ability to engage with and explore green spaces and nature is related to confidence, self-esteem, self-concept, and perceived competence. This single question was informed by the Children’s Perceived Competence Scale (CPCS; Harter, 1982). The CPCS has been used over many decades and is still being translated for use more widely. However, with 40 items, it is not suitable for brief evaluations. The GSLP sessions were purposefully designed to increase participants’ confidence in their ability to explore green spaces. Romagosa and colleagues (2015) suggest the more confident people are, the more likely they are to use and explore green spaces. A ‘happy face’ response to this item indicated that participants were confident in their ability to explore green spaces. The surveys were used for participants in the Primary School and Green Talent programs.

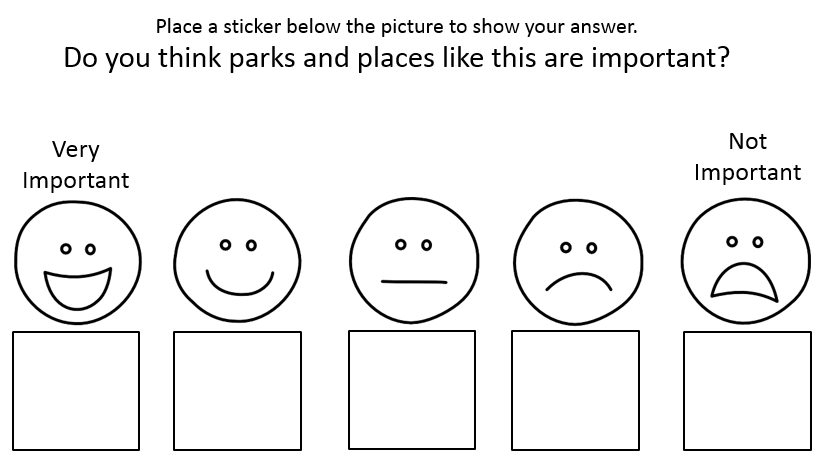


Figure 1. Single-item measure to collect data on *understanding.*

1. Interview questions:

A structured interview schedule was developed to explore participants’ responses of their experiences that were to be collected face-to-face by volunteers or practitioners half-way during a session for Primary School and Green Talent programs. Questions were designed specifically to gauge participants’ views that could be related to the five outcomes. These questions were designed to assess the outcomes through co-production between the GSLP practitioners and the research team. Example questions included: ‘what do you think of this place?’ ‘How would you explain this place to someone who has never been here?’

1. Observation indicators:

A set of behavioural indicators mapped against each outcome was developed for volunteers and practitioners to keep a tally of the occurrence of these indicators for at least three children that they would observe at set intervals during a session. These indicators were developed based on anecdotal behaviours that GSLP practitioners and volunteers had observed in participants during the programs. For example, a show of willingness to help others struggling with an activity was recorded as an indicator of *confidence.* Observations were made only for participants in the Primary Schools program.

1. Drawing activity (only for children under the age of 5):

For children under the age of 5 it was necessary to establish an alternative means to evaluate their experience of participating in a session, as taking part in survey or interview was not feasible. Research has shown that young children express themselves more effectively through drawing and drawings (Evans & Riley, 1996; Koppitz, 1983; Xu, Read, Sim, & McManus, 2009). Consequently, young children were asked to draw a nature scene before taking part in a session and again 6 months later (Jolley, Fenn, & Jones, 2004).

1. Teacher questionnaire (optional resource; see Supplementary Materials 2e):

The teacher questionnaire was developed as a measure for class teachers to rate their class on questions indicative of the impact dimension areas, before and after pupils participated in a GSLP session. Due to time restrictions it was not possible to pilot this component of the evaluation resource.

## 3.2 Implementation of the evaluation resources

The GSLP practitioners attended a half-day workshop led by a researcher from a UK higher education institution, focusing on implementing the evaluation resources across the different GSLP programs. The aim of this session was primarily to standardise data collection from practitioners of the survey responses, and conducting and documenting interviews and observations. Following from an informational session on explaining the purpose and importance of using the evaluation resources, roleplaying activities enabled an opportunity for the researcher to provide feedback to practitioners conducting surveys, interviews, and observations. The researcher was not involved in the implementation of the evaluation resources. The implementation of the resources took place from May 2018 to September 2018.

## 3.3 Recruitment

Ethical approval was obtained from the University of Derby Psychology Research Ethics Committee prior to commencing recruitment. All data were collected by GSLP practitioners and evaluation volunteers who had attended a training workshop for implementing the resources. For the schools programs, primary school groups (ages 5 to 10) book sessions with the appropriate team depending upon the location. Data for the quantitative evaluation is based on 504 school-aged children who took part in schools programs. From this sample, interviews (n = 18 children) and observations (n = 62 children) were conducted by evaluation volunteers with a sub-sample of children attending a schools program.

Green Talent programs focus on working with young people in green spaces. Fifty-four young people, aged between 13 and 19 (up to 25 with additional needs) took part in the Green Talent program and provided responses to a self-reported survey for the evaluation. Eight young people who took part in the Green Talent program and provided responses to the survey also took part in an interview conducted by the practitioner.

The Playing Wild program is attended by parents and carers with children under 5 years of age. In these community-based green space sessions, parents or carers and children may take part once in a session or attend several sessions. Data for the Playing Wild program is based on 11 children’s before and after drawings. Due to the younger age of the children, surveys or interviews were not conducted with this group.

## 3.4 Study design

The evaluation of the programs was based on the baseline and follow-up data that was collected with quantitative (i.e. self-reported surveys) and qualitative (i.e. structured interviews and observations, and drawings from children under the age of 5) methods to capture a holistic view of the programs. For schools and Green Talent programs, quantitative measures via the smiley-face Likert response scales were collected from participants prior to engagement with activities in the session, which ranged from 2 hours to half and full-day sessions. Follow-up responses from participants were collected at the end of the session. We note that the smiley face response scales used for quantitative data collection in the programs was based on a 4-point rather than 5-point response scale to remove the neutral response option.

Interviews with children from the schools and Green Talent programs were conducted halfway through the sessions, in-between participation with program activities. Interviews with young people were conducted at the end of the session. Observations were based on the program leaders and volunteers selecting three participants from the group who were observed midway during each activity in a session.

For Playing Wild, due to the younger ages of children participating in this program (under 5 years old), it was not possible to collect responses to the smiley-face survey or to interview the children. Instead, children were asked to draw a picture of nature at the start of their involvement in the program and 6 months later after having taken part in 6 once-a-month sessions of Playing Wild.

## 3.5 Data analysis

All data analysis was carried out at a UK higher education institution. In total, there were four types of data that informed the evaluation of the GSLP programs:

(1) Before and after smiley-face self-reported survey responses for Primary Schools and Green Talent programs;

(2) Structured interviews during program participation for Primary Schools and Green Talent programs;

(3) Observations and accompanying notes during program participation for Primary Schools program;

(4) Before and after nature drawings from under 5s (only for the Playing Wild program).

Subject to assumptions of normality being met, survey data were analysed using a paired-samples t-test and p values were used to interpret whether differences between baseline and follow-up scores were statistically significant. The present sample size for the schools programs yields valid findings with a 4% margin of error at a 95% confidence level. Caution is needed when interpreting findings from the Playing Wild and Green Talent programs due to relatively smaller sample sizes compared to the schools program sample.

Interviews with and observations of participants were collected by program leaders and volunteers on the schools and Green Talent programs. The qualitative data were analysed by grouping together commonalities in children’s and young adults’ responses to questions whilst paying attention to diverse views and perceptions, in accordance with a deductive thematic analysis approach. Interview transcripts were read and re-read by the first author to identify quotes from interviewees that best illustrated the five outcome measures, namely *understanding, confidence, nature connection, wellbeing,* and *involvement.* All participants were asked the same questions that would provide information that contextualizes the quantitative findings. Illustrative quotes have been presented within each of the five outcomes to present both qualitative and quantitative findings more clearly. For the Playing Wild program, before and after drawings from children under the age of 5 were analysed for their content to construct thematic categories (Cohen, Manion, & Morrison, 1994).

# 4 Results

## 4.1 Overall findings

Data from pupils from 16 schools, who took part in Green Spaces, Learning Places (GSLP) schools programs, resulted in an overall sample size of 504. The findings suggest participation in GSLP programs, on average, significantly improved children’s (ages ranging 5-10) before and after ratings of the five outcomes (i.e. understanding (*t*(503) = 2.64, *p* < 0.01), wellbeing (*t*(503) = 2.96, *p* < 0.001), confidence (*t*(503) = 4.17, *p* < 0.001), connection (*t*(503) = 3.92, *p* < 0.001), and involvement (*t*(502) = 3.49, *p* < 0.001)). The confidence dimension showed the greatest improvement from baseline to follow-up, followed by connection, involvement, understanding, and wellbeing. These findings are presented in Figure 2.

Figure 2. Primary School self-ratings on the 5 outcomes.

For the Green Talent program, 54 participants (aged 13 to 19) completed the survey questions with the smiley face response scales and the findings are presented in Figure 3. A significant improvement across all dimensions was observed following participation in the program, with confidence, showing the greatest improvement, followed by understanding, nature connection, involvement, and wellbeing.

Figure 3. Green Talent self-ratings on the 5 outcomes.

## 4.2 Qualitative findings for each impact dimension

For the Playing Wild program, before (n = 14) and after (n = 11) drawings have been analysed for their content in relation to the nature connection dimension. More specifically, the researcher analysed the drawings in terms of whether contents of children’s drawings included more nature-related depictions at follow-up compared to baseline. Although it was not possible to match before and after drawings for each child, the 11 drawings collected from children after engaging with the Playing Wild program demonstrated much more nature-related depictions when compared to the 14 drawings of children before participation in the program.

For each of the 5 outcome measures, illustrative quotes from children and young people that best captured the definition of the outcome measures are presented. Some children were more talkative than others. However, most children gave brief responses to the questions. This suggests further prompts to encourage children to share more in-depth views and perceptions could be helpful in the future. The interview questions were designed to map against the five outcome measures. Interviews with 18 children and 8 young people revealed these programs were positively perceived to contribute to their understanding, wellbeing, confidence, connection to nature, and involvement, as highlighted in the sub-sections below.

Observations were only conducted for children in school-based programs. These included a sub-sample of 62 children from West Ham and Hampstead Heath who had also provided self-ratings to the five outcomes. These observations were carried out to measure the extent children were demonstrating a number of pre-established behavioural indicators that operationalised the five outcomes. For each group of children attending from a school, one volunteer observed two or three children mid-way during activities and during free-time for 10-minutes. Indicators that occurred during these observation periods are noted in Tables 1 to 5.

### 4.2.1 Understanding

*Understanding: People understand the value and importance of green space.*

“Very adventurous. Like a special time. Can experience Mother Nature. I can experience being free. Hampstead heath is a wonderful place. Lots of animals, you can all get to see. You can enjoy and relax. Great place to come. Not just a garden, part education, part free space.” (Schools program participant)

Participants were asked how they would describe the green space to someone who had never been there, participants reported scenes from their surroundings or places they had seen during their time in the green spaces. These included secret gardens, plants, trees, leaves, bushes, flowers, ponds, hills, animals, colours, signs, facilities, benches and wooden chairs, and different scents they noticed. Children used a variety of positive terms to describe the green spaces, including ‘nice’, ‘the most beautiful place’, ‘fresh’, ‘luscious’, and ‘cool’. One child commented on the continuous changes that take place in nature and as such, there was ‘always something new you can see every time you come’. They also described the types of activities that could be done in the green spaces, such as playing, enjoying nature, and learning. One child described the green space as the ‘most beautiful place I’ve ever been to and don’t think you can improve it. Already really fun’ and another child said ‘would rate it 10 out of 10’.

Table 1. Observations of children across the Understanding dimension indicators.

|  |  |  |
| --- | --- | --- |
| Dimension | Indicator | Number of participants (N = 62) |
| Understanding | Asks relevant questions | 15 |
| Shares relevant prior knowledge | 13 |
| Reminds others of task or rules | 14 |
| Carries out task accurately | 54 |
| Chooses alternative solution | 6 |
| Links activities to activities done in school or home | 2 |
| Shows surprise at what they have found/learnt | 34 |

Seven behavioural indicators were established to signify Understanding. From the 7 behavioural indicators, 138 instances were observed across 62 children, suggesting most children showed an increase in understanding.

In summary, participation in these programs appeared to contribute to understanding in terms of valuing and understanding the importance of green spaces. All participants had positive reports about being in nature.

### 4.2.2 Wellbeing

*Wellbeing: People have restorative and meaningful experiences in green spaces.*

“Usually I would get tired and bored. I may be tired now but I’m not bored. It’s been so fun.” (Green Talent program participant)

When asked about how they felt about being in the green space, a 10-year old female said being in nature was a fun alternative to using electronics. Some children positively commented on the freshness of the air, the coolness of the breeze, quietness, peacefulness, and wonderment they experienced in the green spaces. Children also used a variety of positive terms to summarise how they felt in these spaces, including ‘happy’, ‘ecstatic’, ‘free’, ‘adventurous’, ‘fun’, ‘satisfying’, ‘joyful’, ‘not bored’, ‘amazed’, ‘more [fun] than being at home’, and ‘enjoy[ing] being with friends in nature and the open green spaces’. A number of children commented on the spaciousness of and the opportunities to explore and run around in, in the green spaces; one 9-year old male summed this up by saying, ‘I feel free when I’m outside’. The opportunity to run around in open spaces was particularly mentioned in comparison to schools where children were not allowed to run around. Some children warned against stinging nettles, however despite this, they considered the park to be a nice and peaceful place.

Table 2. Observations of children across the Wellbeing dimension indicators.

|  |  |  |
| --- | --- | --- |
| Dimension | Indicator | Number of participants (N = 62) |
| Wellbeing | Good group dynamics, where children are supporting each other | 51 |
| Non-verbal expressions – e.g. happiness, wonder, calm | 44 |
| Verbal expressions – e.g. enjoyment of task | 31 |

Three behavioural indicators were established to observe Wellbeing. Based on the 3 behavioural indicators, 126 instances were observed across 62 children, suggesting most children had good group dynamics and supported each other throughout the instructed activities.

In summary, in almost all children participation in these programs resulted in reports of feeling positive, suggesting improved wellbeing. In addition to participant reports, they were observed having restorative and meaningful experiences in green spaces.

### 4.2.3 Nature Connection

*Nature connection: People develop a sense of place with green spaces, and pass this down through generations.*

“I’d definitely come here because of all the wildlife. You can do many stuff. Will be a fun packed day. I found it really fun. Fantastic. Very fascinating.” (Schools program participant)

While some children and young people commented on their previous attendance at the green space, for some children, this was an altogether new experience. Even among participants who had been to the green space before, some commented on only spending time in the playground without having explored any of the wider parts of the space. For some, the experience of making a difference to the green spaces suggested a connection between the participants and the green space, “I don’t usually go out much but I have found that I enjoy making a difference to the local park”. Almost half the children mentioned a sense of feeling safe and protected in green spaces. One child rationalised this by stating ‘I’ve never seen anything bad happen here’, and another said ‘adults are always there to help us’. Some children expressed concern about the amount of litter in the green spaces, and suggested that more workers were needed to ensure the green spaces were kept clean. For some children, it was not possible to describe their feelings in the green spaces, and they resorted to saying ‘I don’t know’.

Table 3. Observations of children across the Nature Connection dimension indicators.

|  |  |  |
| --- | --- | --- |
| Dimension | Indicator | Number of participants (N = 62) |
| Nature Connection | Exploring and engaging with nature during ‘free time’ | 24 |
| Engages with nature within the activity or outside of it (e.g. during walk back) | 49 |
| Verbal expressions of emotional attachment to green space | 11 |

Three behavioural indicators were established to observe Nature Connection. Based on the 3 behavioural indicators, 84 instances were observed across 62 children, suggesting most children engaged with nature during instructed activities as well as during free-time. Some observers provided additional notes to highlight the variety of plants, flowers, leaves, insects, animals, rocks, etc. children were interested in.

Before drawings from children prior to partaking in the Playing Wild program included flowers, trees, grass, rainbows, a dog, and butterflies. ‘People’ had not been depicted in these before drawings, which were relatively more simplistic and limited in terms of natural elements compared to the after drawings. After drawings, following 6 sessions over 6 months, showed people in nature, engaging with nature (e.g. attending to flowers), and a wider more complex variety of natural elements (e.g. insects, sky, hills etc.).

In summary, participation in these programs supported and encouraged nature connection, the development of a sense of place with green spaces. Feeling safe and protected was not a topic explicitly asked, however half the children interviewed mentioned a sense of feeling safe and protected, suggesting that program leaders and volunteers created a safe space for children to interact with nature.

### 4.2.4 Confidence

*Confidence: People are confident to use green spaces, as part of our activities or independently.*

“I would feel ready for work and less scared.” (Green Talent program participant)

In terms of children’s and young people’s perceptions of the activities they did as part of the program, they described these as being ‘fun’, ‘the best thing I ever [did]’ ‘exciting’, ‘good’, and ‘fascinating’. One child reported finding the activities ‘easy’, which suggests they may have enjoyed a bit more of a challenge and felt confident in carrying them out. Engaging with the activities was an indicator of confidence, and the children engaged with and expressed their enjoyment of activities that involved making things, building and playing in a den, and the bug hunting activity. Some children felt these activities finished too quickly, again indicating enjoyment.

Table 4. Observations of children across the Confidence dimension indicators.

|  |  |  |
| --- | --- | --- |
| Dimension | Indicator | Number of participants (N = 62) |
| Confidence | Engages with instructed activity | 60 |
| Willingness to share learning with others | 36 |
| Positive body language, e.g. involved with task | 47 |
| Supports those that are struggling | 18 |

Four behavioural indicators were established to observe Confidence. Based on the 4 behavioural indicators, 161 instances were observed across 62 children, suggesting most children engaged with instructed activities and demonstrated positive body language whilst doing so.

In summary, participation in program activities afforded opportunities for participants to demonstrate confidence to use green spaces. Findings suggest being able to explore and take part in various activities in green spaces was valued by children.

### 4.2.5 Involvement

*Involvement: People take positive action for, and get involved with, green spaces.*

“I don’t usually go out much but I have found that I enjoy making a difference to the local park.” (Schools program participant)

Most children and young people expressed they would go back to the green space in question. Some also reported eagerness to bring their family too. One child though, expressed sadness at the thought that their brother ‘[didn’t] go anywhere’. For some children, they stated wanting to ‘go every day’, whereas another child felt ‘at least twice a week’ would be a sufficient amount to benefit from being in nature. Some participants expressed a sense of responsibility to take care of green spaces by saying they would ‘like to work [here]’ or that it was necessary to ‘get more people interested in going’ to maintain and keep green spaces clean. For young people, being involved in a variety of practical activities and being valued in terms of their contribution to the space encouraged them to come again in the future, “I felt really involved here, like my opinions mattered so I’d be really happy to come back”.

Table 5. Observations of children across the Involvement dimension indicator.

|  |  |  |
| --- | --- | --- |
| Dimension | Indicator | Number of participants (N = 62) |
| Involvement | Positive actions towards taking care of the park, e.g. warning others about not picking leaves or flowers from park | 6 |

Involvement only had one behavioural indicator related to this dimension, which was only observed in six children, suggesting further work is needed to best operationalise this dimension in behavioural terms. However, we can draw on the interview data to see that some children already had or developed an interest in taking positive action involving green spaces as a result of participation in the programs.

In summary, following participation in the program, participants stated they would go back to take positive action for, and get involved with, green spaces. A fewer number implied they felt a sense of responsibility to protect and ensure green spaces were maintained for the future.

# 5 Discussion

The aim of this paper was to present the findings from the implementation of a bespoke co-developed evaluation resources for an environmental educational initiative based in London, England. The resources were designed to be appropriate for a wide range of ages by including different approaches such as smiley face scales, interviews, and a drawing task. The implementation of the evaluation resources was straightforward. Staff took part in a half-day workshop focusing on using the evaluation resources across the different programs offered by GSLP. Following this training the resources were implemented across the GSLP programs. The data collected using the evaluation resources shows that by spending a few hours in structured educational activities in green spaces appears to have a positive impact in program participants’ *understanding*, *wellbeing*, *nature connection*, *confidence*, and *involvement*. Thus indicating the effectiveness of the GSLP programs which was the aim of the evaluation. We will now discuss these findings in more detail.

The activities and content of the GSLP sessions are guided by a set of learning principles, were successful in bringing about positive changes in a number of predetermined outcomes. Whilst the outcomes have been defined, measured, and reported separately, in reality there is overlap between some of them. In particular, three of the outcomes (*understanding*, *nature connection*, and *involvement*) form part of the multifaceted psychological construct and pathways to nature connectedness (Lumber et al., 2017).

Recent evidence suggests that knowledge alone predicts a very small proportion (2%) of ecological behaviour, compared to a connection with nature (69%; Otto & Pensini, 2017). *Wellbeing* relates to the emotional attachment to nature, which is essential to nature connectedness and presents another pathway to nature connectedness (Mayer & Frantz, 2004; Zhang, Howell & Iyer, 2014). The *involvement* dimension was defined by taking positive action for green spaces. There are over 40 pro-environmental behaviour scales that focus on positive inaction; that is, refraining from actions with a negative impact (Christmas et al., 2013). There is, however, a gap in the literature of scales measuring positive actions people can take to benefit green spaces and nature. The evaluation showed that a frequency based measure of desire to take positive action, together with observations of taking positive action for nature were beneficial in capturing these attitudes and behaviours. Participating in GSLP programs had a significant impact in improving *confidence* suggesting that time dedicated to allowing children to engage and interact with nature contributes to their belief in their ability to do so in the future.

A strength of this study was the collaborative process involved in the development of the evaluation resources. This ensured approaches to data collection were practical and easy to implement within the confines of the sessions. Due to limited time practitioners had with participants, it was not possible to collect follow-up self-reports to surveys to determine whether the observed positive changes were maintained over a longer time. One suggestion is to integrate environmental education sessions into school curriculums to allow for longer evaluation periods that explore changes in participants’ physical and psychological health, and pro-environmental behaviors (Bratman, Hamilton, & Daily, 2012; Hartig, Mitchell, De Vries, & Frumkin, 2014).

Now more than ever, identifying ways to increase children’s connection to our environment is of utmost importance to reduce and avoid generations with a nature-deficit disorder (Louv 2006; 2010) and to conserve the remaining biodiversity (Beery & Jorgensen, 2016).

## 5.1 Limitations

It is necessary to be aware that this was the first time these evaluation indicators have been used in this context. As such there is no available data to compare with at this stage. The evaluation presented is consistent with a number of the program evaluation standards put forth by Yarbrough et al. (2011). It is important to remember that this evaluation was rooted in a psychological perspective rather than educational. Although the focus of this paper has been more towards the empirical nature of the evaluation, the findings from the evaluation demonstrate that there is value in the GSLP programmes as there were documented increases seen in the outcome measures.

The tools were devised based on previous evaluation literature and adapted to suit the bespoke needs of GSLP. By measuring at baseline and completion of the program we have been able to demonstrate increases across the dimensions measured. Future iterations will be able to refine the toolkit developed here. One example is the need to adapt the Likert scales; the order of the items on the smiley face scale, used with younger participants, would have benefitted from being in reverse order (with the most negative item first) so as to avoid bias from selecting the first option which in this case was “very important”..

In future work we aim to consider the theory of action and theory of change more explicitly than we have done so here (Funnel & Rogers, 2011). Whilst we would be able to do this, it would feel *post hoc* in nature and in addition we do not feel that it would be appropriate to do so in this situation as the purpose of this paper was to present the toolkit that was developed to evaluate the GSLP programs, rather than explain their underlying logic.

## 5.2 Conclusions

Bespoke evaluation resources were co-created by researchers and the Green Spaces, Learning Places (GSLP) delivery teams in London, England. The purpose of these resources was to measure the influence of the GSLP programs on participants’: *understanding, confidence, nature connection, wellbeing,* and *involvement* with green spaces. Creating a bespoke toolkit allowed the GSLP team the evaluation of their programs was tailored to the specific needs and abilities of program users.

The findings from the psychological evaluation show significant positive influences based on before and after self-reports and qualitative findings related to the five outcomes, which support the aims of the GSLP programs. Ensuring sustainable delivery of these programs, with opportunities for children and young people to engage with green spaces as part of these programs, can allow for longer-term evaluation of the effects on participants, as well as on the conservation of green spaces. In sum, the paper shows the value of the collaborative process which provides a model for others in evaluating programs in the field. Furthermore, the positive results related to the five outcome measures highlight value of engaging children and young people with nature and green spaces through participation in programs, such as the GSLP.

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