



IBSE as an approach to reduce the gap between young people and green world: an Italian experience

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Bergamo Botanical Garden has always been interested in conducting visitor surveys. In 2012, we implemented a new survey among students from Elementary school to University. Findings reveal an increasing gap between young generations and green world. The research proposes IBSE methodology and outdoor IBSE activities in Botanical Gardens as an useful approach to reduce this gap.

Introduction

Bergamo Botanical Garden is a public institution: it is run by the municipality and admission is free. During its seasonal opening, we are provided every week with statistics giving us basic information: number of visitors, their provenance, kind of visit (individual, group or school visits), date and weather condition and the most crowded hours. As our Garden offers the city a wide range of different activities and as we always try to integrate these basic data with more specific researches, we conducted in 2012 a quantitative survey to investigate our existing and potential publics, with reference to young people¹. Meanwhile, from October 2012 to May 2013, the Second Italian INQUIRE training course took place in our Garden, in collaboration with Trento Science Museum.

Both these events, in different ways, improved our understanding of the importance of developing and delivering to young people, children and schools high standard botanical education activities about the natural world. Our survey aimed to be an exhaustive study on young visitors, highlighting general information about the respondents (gender, age, education, area of residence), but also a specific focus on such matters as: their outdoor behaviour, their attitude towards specific green areas such as botanical gardens, countryside and mountains and their school knowledge on botanical topics in relation to their actual experience of nature.

METHODS AND FINDINGS

Our survey² was conducted with a structured questionnaire, composed of multiple choice questions and completed by students from Elementary School to University. We reached schools in a radius of about 25 Km from Bergamo, including its lowland and mountain regions³. The survey took place during the school year 2012-2013 and we collected 3000 questionnaires.

The amount of data collected and their interpretation is so complex and large that it is not possible to discuss everything in this paper. Here we are going to discuss two important themes, focusing our attention on Elementary School respondents: young people's behaviour towards nature and their school knowledge of botanical topics.

Examining how children spend their free time, it appears that they have little contact with nature, confirming the tendency that “contact with nature is generally diminishing” (White 2004; Clements 2004;

Moss 2012). If we consider that “visits to parks, national forest and other public lands are a possible indicator of the frequency of children’s exposure to the natural world” (Charles & Louv 2009), we can state that nature-based activities are not so common among our city’s students.

Increasing children’s visits to Bergamo Botanical Garden (29%) will require a lot of work and challenges. Nevertheless, the problem is more general as most respondents have not visited any other Botanical Garden (86%).

Table 1: Have you visited Bergamo Botanical Garden?

	Elementary School	Secondary School	High School	University
Visit to Bergamo Botanical Garden	29%	35.4%	30%	20%

Our study does confirm that children’s lives have become more and more structured (Hofferth & Sandberg 2001) and media-driven (Rideout, Foehr & Roberts 2010; Lazzari & Jacono Quarantino 2010 about our same geographical area). As Table 2 shows, children spend large amounts of time per day in front of a screen. Only 7% of 7-10 years-old do not use media daily and more than 50% spend from two to three or more hours with electronic media.

Table 2: How many hours per day do you spend in front of a screen?

	Never	1 hour	2 hours	3 or more hours
Elementary School	7.2%	39.3%	29.9%	23.6%
Secondary School	2.5%	27.9%	41.0%	28.5%
High School	0.8%	11.6%	40.9%	46.8%
University	2.9%	21.4%	40.0%	37.5%

Figures suggest that our region’s children have a largely screen-based life: when asking children “Choose three activities that you frequently do”, “Television” is the first activity (46%), followed by “Sports” (43%) and “To play” (42%), whereas few children prefer “To stay in open spaces” and “To go to the park” (9%). Furthermore, considering that in urban contexts 18% of young people never go to a park, 40% never have a walk in the countryside and 32% never have a walk in a wood, we can affirm that television and technological devices affects children’s contact with nature.

Comparing children who live in urban and mountain areas, we find out that figures are very different: 11% of young people living in mountain areas never stay in front of a screen (versus 5,7%) and only 16,8% spend more than three hours per day with technological devices (versus 25,9%).

Table 2: How many hours per day do you spend in front of a screen?				
	Never	1 hour	2 hours	3 or more hours
Mountain area	11.5%	38.9%	32.7%	16.8%
Urban area	5.7%	39.5%	28.9%	25.9%

Not only have young people living in mountain areas more contact with nature, but they also have a different behaviour towards it. Our survey shows that many of them usually go to the park more than three times in a week (40%, versus 29%); the large majority usually go for a walk in a wood at least three times during one year (87%, versus 39%). They are engaged in more creative activities and in an active free-play: as most children living in urban settings, they like bicycling, kick scootering and playing football, but only young people living in mountain regions are engaged in building homes with branches, buildings huts with green elements, collecting green elements, planting seeds.

Outdoor playing is different for young people living in mountain areas: they are less monitored and controlled by adults than children living in urban contexts (42%, versus 70%).

Almost all children interviewed prefer outdoor activities (95%) but their way of playing outdoor is very different than years ago. We investigated this perception comparing the Elementary School actual way of playing with the way of playing of the previous generation. Places they usually hang out are more and more structured, and under adults' control. A small amount of respondents from University, who were children in the Eighties, used to play under their parents' control (16%, versus 70% of today's children). Green places attended by today's children are highly furnished and structured (70%, versus 9% in the Eighties).

In conclusion, our figures suggest a general widespread detachment of children from the natural world, exacerbated by a radical change in their way of playing outdoors.

Nature And Knowledge

Our data point out the general lack of knowledge of nature. When asking "Which is the tree that you think first of all?", young people living in mountain areas do not present grammar mistakes or imprecisions when answering. They think about trees which really exist in the nature they can directly experience, such as Walnut, Larch, Poplar, Spruce Pine, Ash, whereas young people living in urban areas mention trees they have read about, so that they tend to mention trees they do not have any kind of direct experience with, such as Baobab, Banana Tree, Blue Gum, including the term "Bonsai".

Generally, natural world stereotypes are common to all school levels: as Figure 1 shows, names of plants' varieties acquired in Elementary School do not increase so much throughout following years. In particular, in the Elementary School the most mentioned trees are Pine (21%) and Apple Tree (11%),



followed by Cherry Tree (6%) and Fir (9%). We can state that young people's knowledge of natural environment in general is very poor: when asking about the first bush and the first herb, figures of "Not Answered" reach a peak: 67%.

In conclusion, we asked Elementary school students some questions about their botanical knowledge acquired at school. We proposed some questions about every-day-life topics, such as vegetables, textile plants and usefulness of plants. We found that many respondents think that squash grow under the ground (41%); more than half of them (55%) think that cotton is not a plant and many think that chlorophyll is in the roots (30%). Our data led us think that a deep gap exists between children and nature and they confirm the separation of school learning from experience outside the school (Engeström 1991).

Discussion: Is IBSE A Possible Solution?

Children seem to feel nature far from them and from their lives; they see themselves as separate and not part of the natural world (White 2004) because they are used to behaving this way.

The National Trust properly argues how important could be the role of school in reconnecting children with nature: schools and educators should increase outdoor learning as it gives children *"direct experience of the subject, making it more interesting and enhancing their understanding [...] Children who learn outdoors know more, understand more, feel better, behave better, work more co-operatively"* (Moss 2012). Improving outdoor learning can also reduce the "encapsulation of school learning" (Engeström 1991).

As the Italian School system is rather based on frontal lessons, an approach as Inquire Based Science Education seems us to become an "instrument of reconnection". It proposes cooperative learning where direct investigation is fostered. This means that children are directly engaged in the activity and while investigating and evaluating they have direct contacts with the subject studied and they share an experience and an active learning process. Thus, IBSE activities let the children learn by constructing their knowledge while investigating, not by memorising facts.

When IBSE activities are proposed in outdoor setting, they can foster an ecological learning, reducing the gap between children and nature. Outdoor learning enables children to think, act, understand and possibly play in relation with nature.

And finally since, in our opinion, children's habits are the result of adult choices, we are considering developing educational activities relevant to this area.

Footnotes:

1. In 2009 we collected some important figures on our visitors and we presented a report during the BGCI 7th International Congress on Education in Botanic Gardens (Durban, November 2009).

2. The research was funded by Regione Lombardia and supported by Bergamo Botanical Garden.
3. Bergamo low-land is a very urbanized country. On the other hand, its mountain regions are composed by villages where nature has an important role. Thus, our findings found out that data collected in urban and country areas are closely similar, whereas data coming from mountain and urban regions present many differences .
4. Bergamo has a Protective area with trails in woods (Parco dei Colli) and its Alpine settings is very easy to reach.

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