

- (d) A gene is a sequence of amino acids (in the DNA) that is responsible for the transmission of a trait from one generation to the next.
3. The accuracy of the DNA replication process is due to:
- The presence of genes in the DNA molecule.
 - The pairing between the DNA nitrogen bases.
 - The sequence of the DNA nitrogen bases.
 - The sequence of the DNA nucleotides.

Outdoors Environmental Education for the Service of Peace: Lessons From a 2-Year Youth Program for Reconciliation in Cyprus

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Abstract

This paper examines the merits of the proposition that outdoors environmental education can be used as a means to promote reconciliation, and in essence peace, among communities in Cyprus. It does so through an examination of an outdoors youth program called CAFE (Camping, Fitness, and Education) that aimed to promote the awareness of members of two conflicting communities, Greek Cypriot and Turkish Cypriot, about local environmental issues. More specifically, the objectives of this program were to determine whether a specially-designed outdoors environmental program can assist in bringing the two communities together. In this paper we describe the nature of the program activities and provide some participant perspectives as anecdotal support for the program's success. The evidence suggests that the outdoors environmental activities provided the participants with opportunities to view socially constructed "realities" and "truths" from the other's point of view, while concurrently developing an understanding of local environmental issues.

In 1976, The Belgrade Charter: A Global Framework for Environmental Education (UNESCO-UNEP, 1976) summarized the goal of environmental education as to develop a world population that is aware of, and concerned about, environmental and associated problems and that has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. These goals were better defined 20 years later by five objectives outlined in UNESCO-UNEP (1996). These objectives are to improve:

- *Awareness.* To help social groups and individuals acquire awareness and sensitivity towards the environment as a whole, and issues, questions, and problems related to the environment and development.
- *Knowledge.* To help individuals, groups, and societies gain a variety of experience in, and acquire a basic understanding of, what is required to create and maintain a sustainable environment.
- *Attitudes.* To help individuals, groups, and societies acquire a set of values and feelings of concern for the environment, and the motivation to actively participate in protection of the environment.
- *Skills.* To help individuals, groups, and societies acquire the skills for identifying, anticipating, preventing, and solving environmental problems.

- *Participation.* To provide individuals, groups, and societies with an opportunity, and the motivation, to be actively involved at all levels in creating a sustainable environment.

These goals are pursued today by national and international organizations such as IUCN, UNEP, UNESCO, and the US Environmental Protection Agency, which have played a critical role in defining and promoting environmental education.

In 1974, Project Environment presented a model of environmental education that included three different dimensions that should be considered in any environmental education program:

- Education *about* the environment. This dimension is concerned with discovering the nature of the area under study.
- Education *from* the environment. This second dimension uses the environment as a resource in two main ways: (a) As a medium for discovering and (b) as a resource of material for authentic activities.
- Education *for* the environment. This dimension emphasizes the development of an informed concern for the environment and aims to develop positive attitudes. (Dobson, 2003)

We argue that in the above conceptualizations for environmental education, the need for developing a heightened awareness about local environmental issues is not emphasized sufficiently. In addition, the social dimension of environmental education, and specifically how environmental education could be used as a vehicle to build trust and collaboration among different communities for the purpose of co-existing productively in peace, has not received much attention within the field of environmental education. An approach to this challenge, we argue, lies within the design of intercultural instructional practices that place an emphasis on learning outdoors and pay particular attention to local environmental aspects that different communities have in common. In attempting to address this challenge, we designed and implemented a 2-year outdoors environmental education youth program in Cyprus. A detailed description of the program follows.

An Outdoors Environmental Education Youth Program in Cyprus

This section is devoted to sketching the details and characteristics of a model for an intercultural framework for environmental education for young people (18- to 35-year-olds) that was implemented over a 2-year period in Cyprus. The purpose of the project, called CAFE (Camping, Fitness, and Education), was to engage participants in a series of activities designed to provide them with knowledge about local environmental issues while at the same time aiming to build trust between the two main communities living in Cyprus: Greek Cypriot and Turkish Cypriot. The activities of the project essentially took the form of an environmental awareness campaign.

Context. The youth program was implemented in Cyprus, a small island of area 3,572 square miles and population 759,000 strategically situated in the far eastern end of the Mediterranean at the crossroads of Europe, Africa, and Asia (Press & Information Office of the Republic of Cyprus, 2000).

Since 1974, the island of Cyprus has been divided, with the two main communities being forced to live separately; Greek Cypriots in the southern part of the island and Turkish Cypriots in the northern part. Until 2004, there was absolutely no interaction between the two communities, as nobody was allowed to cross to the other side of the island. In that year, in an unprecedented

development, selected check-points in the buffer zone were opened, allowing people from the two communities to visit the “other” side and face each other after a 30-year separation. Despite this development, Cyprus remains divided and separation based on ethnic background persists. Even though older generations had the opportunity to interact with each other in their everyday lives, young people born after 1974 have not been able to develop relationships and, in many cases, prejudice about people of the other community has developed. Furthermore, the concept of Cyprus as a unified environment, belonging to all the country’s people, was not developed.

Rationale. The rationale for the project described in this paper was built on the idea that activities relating to, and taking place within, nature could promote environmental awareness, tolerance, and mutual respect. The wider aim of the project was to bring together young people from both Greek and Turkish Cypriot communities, through engagement in a variety of outdoors activity-based tasks in Cyprus, in the cause of promoting awareness about their common environmental assets and the natural resources of the island. Viewing Cyprus as a unified environment, with similar ecological characteristics in the north and south, could contribute towards the appreciation of the environment as common heritage that could be better protected through cooperation. At the same time, the project aimed to build tolerance and respect between the young people of the two communities.

Outdoors learning. Given these purposes and the significance of informal social interactions in achieving them, the project incorporated a series of activities to support outdoors learning. Outdoors learning is generally described under the umbrella of theoretical perspectives of informal learning, which is “the most commonly applied term for the science learning that occurs outside the traditional, formal school realm” (Dierking, Falk, Rennie, Anderson, & Ellenbogen, 2003, p. 108). The term informal learning is based on the belief that learning occurs from various experiences and “is an organic, dynamic, never-ending, and holistic phenomenon of constructing personal meaning” (Dierking et al., 2003, p. 109). In 1999, the National Association for Research in Science Teaching (NARST) formed an Ad Hoc Committee in Informal Learning with the charge to clarify what constitutes informal learning (Rennie, Feher, Dierking, & Falk, 2003). According to the committee, the characteristics of informal learning include the following:

- Informal learning occurs out of school, is self-motivated, and is guided by learners’ needs and interests.
- It is strongly socio-culturally mediated.
- It is a cumulative process involving connections and reinforcement between the variety of learning experiences a person encounters in life (Rennie et al., 2003).

However, while we borrow this definition, we also use it in combination with the model proposed by Koliopoulos (2005) to refer to learning that occurs outside any physical context of schooling, which could include formal instructional activities, real-world activities, and/or the combination of both, defined as non-formal learning. According to this model, non-formal activities are organized outside the formal system and they also relate to extra-curriculum activities that “might become part of the curriculum and in a way that enhances the teacher’s role” (Koliopoulos, 2003, p. 86).

The CAFE program takes into consideration these fundamental characteristics of informal learning and places special emphasis on the ideas of Sharp (1943), one of the earliest advocates of camping education, for outdoor education: “That which can best be taught inside the schoolrooms should there be taught, and that which can best be learned through experience dealing directly with native materials and life situations outside the school should there be learned” (p. 363). Built

on these theoretical underpinnings, the program included a number of instructional components that are now described.

Participants and instructional components. The project involved a series of youth camps and field trips in the northern and southern parts of the island, where the habitats, fauna, and flora of the areas visited were presented to participants by environmental experts. The project comprised seven major, funded activities conducted at the seven different locations shown in Figure 1. Each activity was advertised to the public, through the media, some time before it happened and participants were volunteers selected on a first-come, first-served basis, while at the same time selecting for an approximately equal number of males and females. Forty individuals participated in most of the activities. However, for some activities we were able to accommodate up to 50 individuals. For reasons associated with equal access, in all activities an equal number of Greek Cypriots and Turkish Cypriots were selected. Also, in all activities, priority was given to individuals who had not previously participated in any of the activities.

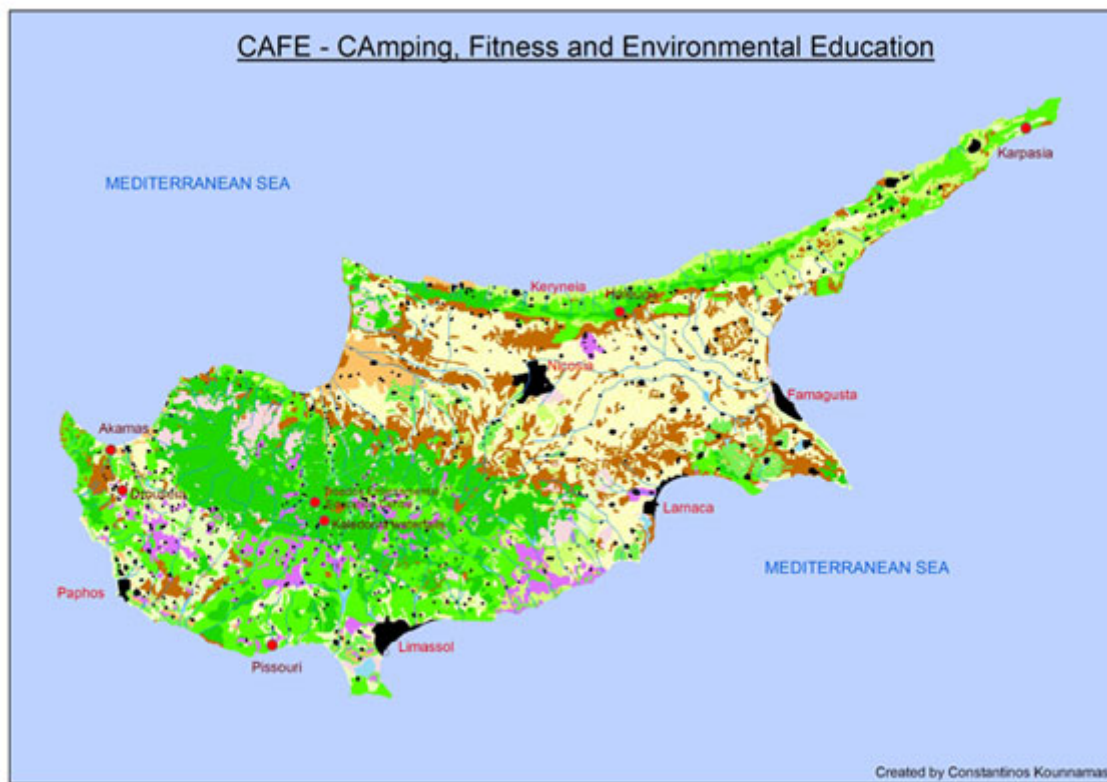


Figure 1. The different locations of the seven activities that comprised the project are indicated by red pins.

The socioeconomic status and experiences of the participants varied, but the majority had attended university or were currently students at a university. The majority of the participants were also refugees, with some of them, or their parents, having suffered directly from the conflict. Present at all activities were the coordinating team comprising a project manager, 3 Greek-Cypriot university professors specializing in environmental education and physical education, and 2 Turkish-Cypriot university professors; one specializing in biology and the other in physical education. All members of the coordinating team were involved in the design of the framework of the program and its activities and had previous experience with bi-communal projects.

The project included several practices to help achieve its multiple goals of educating on environmental issues (i.e., habitats, flora, and fauna), promoting nature-related exercise/sports, and encouraging tolerance and mutual respect. Given that the majority of the participants--both Greek Cypriot and Turkish Cypriot--were able to speak and understand English well, this was the language of communication. However, 2 of the participants were able to speak Greek, English, and Turkish and were therefore able to help with translations when problems of communication did occur.

The project's program of activities included the following events:

- One 3-day camp on Karpas peninsula, which is situated in the north-easternmost part of Cyprus. It is one of the few remaining coastal areas of the island that has not been developed for tourism and keeps its natural character. It is also one of the most important nesting sites of the endangered turtle species *Caretta caretta*. Project participants stayed in wooden bungalows and attended a lecture on the environment of the area, walked in nature trails, learned about the peninsula's history and nature, and cycled on the nearby area.
- One 3-day camp in the Paphos area (south-west part of Cyprus). The wider area of Paphos preserves its natural character and it is of great ecological value. Participants stayed in hotel apartments, attended a lecture on the environment of the Paphos area, walked through a gorge, and were trained in climbing.
- One 2-day camp on Akamas peninsula. The Akamas peninsula is situated in the westernmost part of Cyprus and is one of the most important areas for the biodiversity of the island. The ecosystem of the Akamas area presents similar characteristics to the Karpas peninsula in the north. The participants stayed in hotel apartments, attended a lecture on the use of products that are friendly to the environment, and had a guided tour along natural trails of the area.
- One field trip focused on the forest habitats of Cyprus, with emphasis on flora species found within these habitats. The field trip took place within Troodos National Forest Park, one of the 13 "Plant Diversity Hot Spots" in the Mediterranean. The participants had the opportunity to see and learn through a lecture and outdoors learning about the different forest habitat types existing in Cyprus, the areas with high plant diversity, the richness of the Cyprian flora, and the endemic, rare, and threatened plants of the island.
- One field trip focused on the avifauna of Cyprus. The event took place at Larnaca Salt Lakes, which is one of the well-known wetlands of Cyprus and an area that hosts a considerable number of water birds. Larnaca Salt Lakes are designated as a Barcelona Convention Special Protected Area (UNEP Directory) and as a Ramsar site. They have also been characterized as an Important Bird Area by Birdlife International.
- One field trip combined with nature-related sports activities. The participants visited Pissouri coastal area at the southern part of Cyprus and were trained in kayaking.
- One field trip in the Five Finger Mountain Range (Pentadaktylos) in the northern part of Cyprus, which hosts a great variety of habitat types in excellent conservation status.

As stated earlier, these activities took place during a period of 2 years. The main outcomes of the project, in terms of participants' participation and perspectives, are described next.

Outcomes

The participants felt that the project met their expectations and contributed towards creating positive feelings about members of the other community. This is supported by a large-scale quantitative report prepared by RAI Consultants Public Ltd (RAI, 2006) about the participants' perspectives on the project. According to this report, 80% of the participants rated the overall experience at the camp as *excellent* and 20% of them as *good*. A description of the statistics and detailed results are beyond the scope of this paper, which focuses on the design framework of the program. However, at this point we would like to provide some data collected from semi-structured interviews with participants in order to mainly provide a sense of the participants' general reaction to the program.

First, participants noted that they were satisfied as they felt that the project met their expectations and offered them unique experiences through learning about the local environment. For example: "An excellent experience . . . a combination of relaxation, exercising with nature-related sports, and assimilation of knowledge for our country and our environment." In fact, the majority expressed the desire to participate in similar events in the future. As another participant said:

A unique event, which began timidly, with many kinds of concerns and doubts [about the other community], and which, through a wide spectrum of feelings and experiences, ended with laughs, hugs, joy, and minds free of prejudice and hatred. They were 3 of the most unique days in my life . . . that ended with a tear and a promise; the tear of separation and the promise of rejoining.

Moreover, project participants claimed that they enjoyed the project's activities and gained valuable knowledge about the nature of Cyprus. At this point, it is important to note that many of them had the opportunity to visit some of the most ecologically important areas of their country for the first time. "The camp activities were, in many ways, a very educative experience; and an experience worth having. Relaxation, socialization, entertainment, and environmental education were its major characteristics." Along similar lines, another participant stated:

This camp was a combination of discovery, acquaintance, enjoyment . . . The camp's activities provided me the opportunity to discover Cyprus, to make new friends, and enjoy the natural environment of Carpas peninsula, a beautiful place that I visited for the first time in my life.

Furthermore, a number of participants decided to continue exercising in the nature-related sports that they experienced, for the first time, during the project.

Kayaking and climbing were two sports that I knew very little about, and had never thought I could do. Trying them though, I found how enjoyable they are, how they increase your adrenalin, exercise the body, and bring you close to nature.

In general, the participants described as positive the feelings that they developed during their interaction with members of the other community while realizing that the two communities have many things in common. The following representative quotes that reflect such feelings provide evidence for this claim:

I was amazed at the spectrum of similarities between the two communities. Opinions, looks, education, food, and words we use in everyday speaking.

I would like to think that the time I had in the camp was a sign of the times to come; that as time passes the fanaticism on language, religion, and nationality lessens as the bond between the people of the two communities is made stronger.

People from both communities participated with great enthusiasm in the organized events, such as mountain biking and nature walks, and formed relationships at a personal level. They interacted with each other a great deal at the dinner table, where they sang Greek and Turkish songs, played Tavli [a traditional game for both Greek and Turkish Cypriots], and engaged in various conversations only to realize the numerous commonalities in the two cultures! All in all, the camp at Karpas proved to be an engaging, emotional, and growing experience for all of us, no matter what our role was in the project.

Having participated for the first time in a bi-communal project, and even though I have had brief contact with other Turkish Cypriots in the past, this was a completely different experience now, as I was living for 3 days with two Turkish Cypriots in our own private space, and spending nearly every minute with them. As you spend time with people, whilst doing events like cycling, swimming, enjoying some Scotch with good conversation, some good food, and some pretty tough Tavli tournaments, you learn new things; namely, that we are not much different, both sides want peace and both sides want everybody else to leave them alone so that they can live harmoniously together.

Of interest to us is the fact that the majority of the participants stated that they made new friends and they exchanged contact details with young people of the other community so that they could keep in touch. Moreover, some of the participants have continued, because of their participation in this project, to organize common activities outside the framework of this project.

A Closing Word

In this paper we have described an outdoors environmental education program that provided participants from two conflicting communities with opportunities to view socially-constructed “realities” and “truths” from the other’s point of view. This, however, is no easy task, as our experiences as the coordinators have shown. Perhaps the most problematic aspect of the program was the language of communication, which was set to be English. Even though there were only a few cases of individuals who were not fluent speakers of English, some problems of miscommunication did occur. Language was also a barrier in expressing personal feelings and having more meaningful conversations. Additional issues are associated with the fact that the participants were not in frequent communication with each other, even though there were many instances where meetings and outings outside the program occurred. We believe that designing and providing mechanisms for frequent communication between the participants would better build trust between the two communities.

In essence, this project provides an example of an instructional approach to peace-building between Greek Cypriots and Turkish Cypriots through a series of environmental education activities that took place in various parts of the island. This is the main contribution of the project to the literature, considering that very limited information can be found about the idea of using environmental education as a means for promoting peace. Implications of the outcomes of the project are associated with paving the path towards exploring the role of such programs in keeping the public abreast of current issues in environmental education, supporting them in constructing visions of reconciliation, and helping them implement innovations and essentially refine their visions for peace.

Note

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Readers' Forum

Inquiry (Continued)

I think you have the inquiry discussion well in hand, and have covered the problems with Yager's response fully; unguided inquiry is not the same as open inquiry, and so on. The world of online science labs has evolved in the last several years. Now, you can find many students working with large online scientific databases (DNA, etc.) as scientific investigations ("labs"). MIT (with iLabs) and others are producing remote, real-time access to fancy, programmable equipment. Of course, I continue with what I now call prerecorded real experiments. We have also created over 140 integrated instructional lab units, and many either are entirely hands-on (and at-home) or combine the prerecorded experiments with at-home experiments.

Harry Keller, ParaComp, Inc., CA, USA <http://smartsience.net>

Laboratory Safety Guidelines

This section presents a series of 40 laboratory safety guidelines kindly provided by Dr James A. Kaufman, President, The Laboratory Safety Institute (LSI), USA. Please visit <http://www.labsafety.org> for further information, products, services, and publications.

#6 of 40. Provide Incentives to Students and Staff for Safety Performance

Everyone likes to receive a reward for good performance. It can be a merit raise, good grades, a promotion, or praise from a superior. Good performance deserves to be recognized and rewarded. Safety performance is no different. When it's done right, it should be recognized.