School grounds as a resource of green space to increase child-plant contact

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ARTICLE INFO

ABSTRACT

Children spend a considerable amount of their time in school and combined with the fact of limited availability of green open spaces due to increased urbanisation, school grounds could play a pivotal role as a recreational place for pupils. The literature devoted to school ground planting has contributed to realising the significance of the role of school ground planting for pupil school life. However the school ground planting in many schools is limited and does not offer opportunities for pupil-plant contact. In this study, pupils and teachers of secondary schools in Greece were addressed in a questionnaire survey to investigate their perceptions of the school ground planting, its use or related-with activities and preferences. The results showed that pupils and teachers had very little knowledge of the plant species present in the school ground planting and that plant material had very little use in school lessons and activities. In contrast both teachers and pupils expressed the desire to include plant material in school lessons and activities and with regard to this, a need for teacher training was identified. Pupils' main preferences in plants for use in school ground planting were based on functional characteristics such as the provision of shade. Flowers, constituted the most preferred plant part by pupils and amongst the various plant types, pupils preferred mainly woody plants and trees species. The results suggest the need to rethink school ground planting and provides a valuable insight to the potential of school planting to increase pupil-plant contact with the aim to increase pupils' knowledge about plants and the environment in general, creating opportunities to support educational outdoor activities and experiences through play and teaching of the school curriculum.

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1. Introduction

Increased urbanisation worldwide has led to urban population concentration, fragmentation of the landscape and reduced green spaces (United Nations' Department of Economic and Social Affairs, Population Division, 2014). The increase of urbanisation within a few generations has limited human-nature contact in people's daily lives (Maller et al., 2005). People spend more than 90% of their lives within buildings (Evans and McCoy, 1998). Built environments (offices, schools, homes, cars, restaurants, shopping malls, and many other) act as barriers between people and the natural environment in which they live (Schultz, 2002). The chasm between human and natural environment contact in people's lives has never been so great (Katcher and Beck, 1987; Shepard, 1996; Melson, 2001) with unknown consequences to humans (Katcher and Beck, 1987). The disengagement of human-nature contact could lead to a gradual decline in people's experiences with the natural environment (Kahn et al., 2009) as well as connectedness to nature i.e. the extent of people to identify themselves with the natural environment and the relationships they form with nature (Schultz and Tabanico, 2007; Restall and Conrad, 2015). Schultz (2002), states that the construct for connectedness to nature constitutes three components: cognitive (an individual's mental representation of self-interdependence with nature), affective (an individual's emotional bond with nature) and behavioural (an individual's commitment to protect the natural environment). Connectedness to nature increases by spending time in a natural environment (Schultz and Tobacino, 2007; Restall and Conrad, 2015) and an individual that feels connected to nature is more likely to care for nature and protect the environment (Schultz, 2002).

Nature contact could play a pivotal role in human health and wellbeing (Evans and McCoy, 1998). Several authors emphasise the necessity of nature contact during childhood for healthy human development (Dannenmaier, 1998; Tai et al., 2006; Wells

and Lekies, 2006; Louv, 2008; Dyment et al., 2009). Furthermore, Linzmayer et al. (2014) state that multi-sensory experiences with nature, motivate children to engage in activities that are pleasant, achieve an optimal level of arousal and interest and therefore support children's exploration of nature. It is during childhood that the relationship between a human individual and nature is established at its best and the foundations of environmental awareness and ecological sensitivity (i.e. empathy for the natural world) in adulthood are set (Moore 1997; Fisher 2002; Bell, 2006; Tai et al., 2006; Chawla, 2007; Aguirre-Bielschowsky, 2014; Hammond and Herron, 2014).

School grounds have the potential to constitute an important resource of green space. Daily, pupils spend a considerable amount of their time in school and their experiences in school could influence all aspects of human behaviour in adulthood (National Scientific Council on the Developing Child, 2004). A "green" school ground would increase child-nature contact and contribute positively to their education (Malone and Tranter, 2003; Tranter and Malone, 2004; Dyment, 2005; Havlic and Hourdequin, 2005; Burke, 2007; Akounianki-Ioannidou et al., 2009), as well as their physical, psychological and social development (Grahn et al., 1997; Dyment et al., 2009). Worldwide the design of school grounds varies along with the amount of green space provided for them (Grant and Littlejohn, 2001; Dyment et al., 2009; Gamson Danks, 2010). In many schools, the planting is limited and aesthetically poor (Cassios, 2003), hence pupils have limited opportunities to experience nature in school and as a consequence have reduced benefits in adulthood derived from child-nature contact (Tampoukou et al., 2014). There is limited literature to the reasons behind the lack of vegetation found in many school grounds. Among the many possible reasons are, wear and tear by pupil play (Gunnarsson and Gustavsson, 1989), planning, management and maintenance approaches (Jansson et al., 2014) as well the lack of space and the lack of engagement among school staff (Maynard and Waters, 2007). The latter could be due to teachers' lack of awareness of the benefits and potentials of the school ground planting which could be overcome with the support of training (O' Callaghan, 2005; Bebbington, 2005), as well as the pressure to deliver the education requirements (Atmodiwirjo, 2013).

Jansson et al. (2014) were the first to study pupil's perspectives (use and experience) in relation to the challenges of vegetation establishment and development in a school ground. They found that school ground planting offers a variety of experiences and uses to children that includes pretend play, running and chasing games and socialising. Damages to the planting are limited by the introduction of other elements that provide play opportunities such as hills with meadows and paths and the use of fences without hindering access (Jansson et al., 2014). Furthermore school ground planting offers the potential to be used for environmental educational learning as well as everyday learning. Havlic and Hourdequin (2005) with experience in teaching field-based environmental studies emphasise that for effective environmental education at a post-secondary school education level there is a need for a move towards the practical.

Particular benefits derived by planting in school grounds has been the object of study of many authors such as improving pupils' perceived restoration (stress, mental and physical health and quality of life) (Akpinar, 2016), improving academic achievement (Arbogast et al., 2009; Berezowitz et al., 2015), supporting a variety of play and physical activities (Dyment et al., 2009; Jansson et al., 2014), supporting out-of-classroom teaching (Dyment, 2005; Akounianki-Ioannidou et al., 2009) and environmental learning (Malone and Tranter, 2003; Tranter and Malone, 2004; Burke, 2007), improving pupils' nutrition knowledge and behaviour (Parmer et al., 2009; Robinson-O'Brien et al., 2009; Berezowitz et al., 2015; Utter et al., 2016), developing

environmental awareness (Moore 1997; Fisher 2002; Bell, 2006; Chawla, 2007; Aguirre-Bielschowsky, 2014; Hammond and Herron, 2014) and ameliorating the deficit and increasing the connectivity of urban green infrastructure (Iojă et al., 2014).

In general plants constitute the main element of planting schemes and although the benefits of school ground planting have been recognised little is known about pupils' perceptions of school ground planting and plants. Since the United Nations Convention, the Right of the Child in 1989, children's views in matters that concern them has received increasing attention. Pupils could be involved as active participants for the design of learning environments in school grounds (Burke, 2007). As Titman (1994, p. 110) states "There can be little doubt that where children are consulted, appropriately, about the design of provision for them, a better understanding of their needs is achieved and design outcomes are usually more successful". "Pupils", the primary users of school grounds and their perceptions on school ground planting and plants could provide valuable information that could be considered in the design of school ground planting. Understanding pupil-teachers' perceptions on planting and preferences in plant material use, could help design school ground planting that meets their needs more effectively, while concomitantly increasing pupil-plant contact.

A variety of research methods exist that can be used to assess children's perceptions (Greig and Taylor, 1999; Rezasoltani and Said, 2012). The use of questionnaires are usually a popular research tool used for evaluating children's responses to their outdoor environments (Graig and Taylor, 1999; Rezasoltani and Said, 2012) as they can be distributed quickly to many children and analysed easily.

In this paper, aiming to investigate the potential of school ground planting to constitute a resource of green space to increase pupil-plant contact, a questionnaire survey was undertaken to study both pupils' and teachers' perspectives of existing school ground planting, their perceptions on school ground planting as well as their preferences in plant material. With the above aim in mind, the main research questions of the study were:

– What are teachers and pupils perceptions on the present school ground planting?
– How is the school ground planting used and what activities take place in the school ground that potentially allow for pupil-plant contact?
– What plants do pupils and teachers prefer to have in the school ground?
– What could encourage pupil-plant contact in the school ground?

2. Methods

2.1. The study site and respondents

Secondary schools in Greece, comprises two stages: Gymnasium (years 7–9, ages 12–14) and Lyceum (years 10–12, ages 15–17). For the purpose of this paper Gymnasium is referred to as junior secondary school and Lyceum as senior secondary school. Both pupils' and teachers' perceptions of five secondary schools (3 junior and 2 senior level secondary schools) in the city of Trikala were studied. Trikala, populated by 81,355 inhabitants (2011) is located on mainland Greece, in northwestern Thessaly, approximately 331 km from the capital Athens and 215 km SW from the co-capital of Salonica and constitutes a city known for the implementation of innovative projects and actions (Anthopoulos and Fitsilis, 2010). The secondary schools selected for study were based on them being typical examples of secondary schools in Greece. In Greece individual secondary schools have either a separate or shared school