

Available online at www.sciencedirect.com**SciVerse ScienceDirect**

Procedia Engineering 20 (2011) 389 – 396

**Procedia
Engineering**

www.elsevier.com/locate/procediaThe 2nd International Building Control Conference 2011

Developing Conducive Sustainable Outdoor Learning: The Impact of Natural environment on Learning, Social and Emotional Intelligence

Seyedehzahra Mirrahimi, N.M.Tawil*, N.A .G. Abdullah, M. Surat, I. M. S. Usman

Faculty of Engineering and Built Environment, National University of Malaysia

Abstract

This study propose that outdoor learning engaging with nature environment provide opportunities to improve academic achievement and social emotional intelligence for students; so, the features of landscape have influence to develop acquiring awareness in natural environment, training for sustainability and various green systems, learning in a number of subject areas such as science and Learning by smelling, feeling, tasting. Green schools support personal and social wellbeing at various students' levels. In addition, students can learn how to work together to take responsibilities such as planting by group learning. Access to nature was supposed to develop self- confidence, responsibilities, sense of pride, cooperate, solving problems in classroom, and relationships between students and teachers. This paper describe that a good design outdoor learning engaging with nature is an important role to promote student's abilities such as academic achievement and social behaviours.

© 2010 Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](http://creativecommons.org/licenses/by-nc-nd/3.0/).

Selection and/or peer-review under responsibility of Universiti Teknologi MARA Perak and Institute of Surveyors Malaysia (ISM)

Keywords: outdoor learning, social emotional intelligence, learning, nature.

1. Introduction

Researchers have been shown that Primary and secondary schools linking with nature has provided opportunities for enhancing personal and social behavior [3]. Green school can also connected with some subject matters o the program of study. The most significant impact on education in green schools comprise better self-confidence, inspiration towards learning, feel of responsibility and a greater

* Corresponding author: Tel:+6038921669; fax: +60389216691
Email address: nmatwil@gmail.com

connection between students and teachers [22]. Majority of the primary and secondary school environments, also often lack of natural environment in recent years [23]. Study has also proposed that every added hour of viewing television considerably enhance solving the problems of social and emotional as an example low self-confidence. In addition, rising realization of the positive effect of outdoor education is an increasing understanding that various opportunities for students in outdoor learning has reduced substantially [6].

Outdoor learning in natural environment is an attitude that objectives to supply experiential learning activities, working together and knowledge of nature, and integrated into subject such as science. Green school grounds have a potential to make possible formal, informal, and non-formal experience of outdoor education is well recognized [6]. Gardening activities can be positive elements of the outdoor learning that students have opportunities to learning nutrition, and also other school's subjects and significant abilities of life [10]. Educator state that outdoor learning in nature has provided for gardening, teaching, physical activity for a long time; however, but a increase global knowledge of outdoor education exist these days [25].

2. The impact of nature on learning

Majority of studies have connected experiences of learning in the nature to improvement of environmental awareness, approach and supporting behaviour of environment [1]. Recently, numerous studies state that environment impact on improvement learning. While natural environment obviously had the capability to motivate and encouragement results of range of valued learning [11]. In addition, natural environment have a significant role for students who have problem to training in the formal school ground, who are unwilling students, who have trouble concentrating or who experience from Attention Deficit Disorder (ADD) [7]. indeed a range of reliable investigates have showed that the advantages of contacting with natural environment in learning area included: encouraging language improvement, cooperation [11] enhancing academic achievement [2]; the improved the scores [23]; have opportunities for experimental learning environment; create new awareness, abilities and values, have a potential to share awareness, enable students to practice deeper learning of ecological systems, a positive setting for merging and delivering in curriculum of schools [3]; learning about interconnection [6], enhanced opportunities for learning [2]. and increased educational performance [2]; improved enthusiasm, creativity, engagement for student's learning [11]; motivation toward learning [22]; promoting awareness, observational capability and reasoning [23].

Natural environment is an essential element of curriculum at grade of each level (Azuma et al., 2001, p. 25). At green school, low protecting annual for replanting in place of plant helped the program of sustainability provided limited time abilities [20]. United Kingdom House of Commons Education and Skill Committee (2005) states that linking natural naturalized environments to education require renew current practice in learning. In fact there was most effective evidence that, where schools had been green and used as the merging environment for education, a great valued range results had been accomplished they also suggested that training in green school had outcomes that formal program of stud extended. [11]. Obviously, learning occurs not only through formal education on natural environment, the inducted investigation point to the advantages of student participation in the procedure of natural environment [6]. studies showed that informal learning can happen on natural environment. (Adams, 1993; Moore & Wong, 1997; Titman, 1994). Informal education is an important provided learning that occurs without teacher involvement [6].

Teacher working at green schools that have been reported unique opportunities program of study improvement [7]. as well as, when school involve in features of gardening, it is extended that the education which participates through greening will be more integrated into various aspect of program of

schools to comprise individual, social, course of learning [3]. Involving hands-on education activities integrated into subject are elements of experimental learning in which educating students have been indicated to enhance test results, concentration, and motivate for learning and reduce discipline subject in the formal classroom [13]. for instance, to know how light is mirrored, students make use of foil to mirror light onto some of the flora in a natural environment and contrast the rates of increase between those that received light in contrast of did not [20]. It is clear stress have a negative impact on students to learning; since, natural environment reduced stress in students. Natural environment are able to enhance relationship, team work activities could provide as the mechanism. Group work involving small groups of students of different capability level as education associates and supporting acknowledgment for team performance has been connected with better contact with higher academic achievement in the classroom [20].

Table1: The impact of nature on student's learning.

<i>The impact of nature on student's learning</i>	
<i>Improved</i>	Environmental knowledge
	Learning
	Solving problem in classroom
	Encouragement language
	Academic achievement
	Create new knowledge
	Abilities and values
	Learning of ecological systems
	Motivation toward learning
	Observation capabilities
	Test result
	Science, social, math, reading, writing, arts.
	Flexibility of diverse learning style
	Learning by smelling, touching, feeling
	Learning of sustainable waste management technical
	Skills for instance recycling and composting
Skills for instance recycling and composting	
Learning waste management systems and solar power.	

Natural environments seem to be usually used by schools to increase academic education through training subjects such as math, science, language arts, environmental studies, and nutrition with the integration of core program standards [10]; and also educators developed based program by garden to support training in social sciences, math, history and other subjects. For instance, math abilities are accomplish by drawing graphs the result of a research in which students can compare the result of researches. In addition, Rahm (2002) indicated that garden activities supply opportunities scientific investigation for naturalistic and “emergent” [20]. However, some researchers believe that garden school are used frequently for training some subjects, particularly physical education and science, but not as important for teaching language arts, teaching, geography, and mathematics [6]. In green school grounds the curriculum of science in which students are trained nutrition, foods, and cooking from various cultures [25]. Liberman and Hoody (2000) and National Environmental Education and Training Foundation

(2000) found that students accomplished better on result of academic achievement in social studies, science, writing, reading and mathematics in ten year United States [23]. Recently, there are expected over 2,000 in school garden of California being utilized for academic training in subjects such as science, nutrition, environmental awareness. Ozer 2006 and Seer 2000 indicated that students achievement better in 72 per cent of academic estimation in math, reading, science, value of attendance, and peak average of score than students study in traditional schools [4]. Furthermore, referring to Pranis 2004 states that observation of green school encouraging student's Achievement, psychosocial improvement (e.g., responsibility, self-esteem), teamwork with other students, inspiration to learn, behavioural engagement [20]. Graham et al 2005 demonstrated that outdoor learning can have a positive impact on act of standardized accomplishment tests, and also awareness and interest for learning [13]. Researchers indicated that students who involved in natural environment scored considerably advanced in general science attainment tests with the students who did not skill any gardening learning activities [3]. Leiberman & Hoody (1998) investigated of 40 schools in California that utilized green school ground included environment of learning with project based learning and practical built that student enhanced in grade of test standardized, enthusiasm to keep on task, flexibility of diverse learning styles and solving problem. Researchers believe that outdoor learning provide to learn not only by hearing and seeing but also by tasting, smelling, touching, and feeling; so, outdoor environments are a significant source of inspiration for process of creative learning and meaningful [23]. Ballantyne and Packer, 2002 offer that interacting and touching with nature is a more successful strategy [4].

Natural environment provide to stimulate and encourage students to learn by touching, smelling and even test materials who do not learn successful in classroom [6]. Research indicated that student can learn better math, language arts, science, and other skills that integrate their direct environment by use of five senses [13]. Moreover, nature practices teaching of sustainable waste management technical skills for instance recycling and composting [19]. Referring to 6 accomplished to interview by principals of some schools that outdoor learning provide pattern of sustainable practice regarding to design and facilities such as use of waste water management systems and solar power, and their concentration to recycling, composting; therefore, student could be concerned in learning how to examine energy usage and fertilizer natural [1]. Table 1 indicates that the impact of natural environment on learning.

3. Definition of EQ

The term “emotional intelligence “was first explained by Salovey and Mayer in 1990. The EQ connected to communication skills, time management, cooperation, leadership skills and business acumen [21]. Referring to Riemer 2003 states that Emotional intelligence (EQ) concludes a variety of abilities such as social skills, self- empathy, motivation, regulation and self-awareness. As well as EQ makes a significant effect on skills of communication, including that from a feature of intercultural, and on the students' learning abilities [21]. The evidence indicates that emotional and social intelligence is not fixed at birth, and also can be systematically enhanced in persons through learning and experience [9]. EQ is a learnable capability; so, it can be change. This shows that learning has a main role to improve the level of student's EQ that should developed student's abilities. Team work will improve make EQ qualities and are particularly important capabilities given the advanced environments [21]. Table 2 showed the element of EQ.

Table 2: The Element of EQ

The element of EQ	<i>The Element of EQ</i>
	communication skills time management Teamwork leadership skills business acumen Cooperation self-awareness self- regulation Motivation Empathy social skills intercultural awareness intercultural communication Flexibility Adaptability Self control

4. The impact of nature on EQ

Green school grounds are a significant atmosphere for learning social and improvement. , and can play a significant role in improving social health by preparing a different environment that greater responds to the necessity and interests by providing opportunities to cooperate and communicate among students, teachers, and parents towards shared aims [2]. The European Institute for Outdoor Adventure Education and Experiential Learning describe outdoor learning as including personal and social development, environmental learning and outdoor activities [23]. Referring to Duvall 2011 states that when individuals' sense of task is directly an important they can purposefully use interest- increasing strategies to assist them sustain inspiration and attach with the task.; Therefore, students frequently work together to get responsibilities such as planting and weeding by group learning [20]. Engagement with natural environment was believed a significant means of developing relationships between students and teachers, and creating renewed energy and excitement for student's ability [1].

Research on 90 Australian schools in Melbourne propose that participate access to nature can increase many aspect of student's social health, capability to cooperate with others, self confidence, concern for things of living, and approach towards school [11]. In addition, the skills of individuals and social groups

gain knowledge of behaviours was extensively identified [11]. (Wyman 2005 cited in Johnson 2007) Referring to Montessori (1964) indicated that green school grounds could be utilized beyond standard program to help to enhance responsibility, improve patience, and increase appreciation for relationship abilities and nature [3]. Student in nature can knowledge amazement, self-discovery; so, directs of practical suggest plan for program activities, interests of student of any ages and addressing the skills [26]. Natural environments are an important opportunities to play students, hence, students learn how to learn self-advocacy abilities and resolve conflicts, share, cooperate, negotiate [16].

Table3: The impact of nature on student's EQ

<i>The impact of nature on student's EQ</i>	
<i>Improved</i>	Social capital
	Social skills of life
	Social network
	Social wellbeing
	Encourage builds social networks
	self-concept
	self- discovery
	self- advocacy
	self-efficacy
	self- esteem
	Self- identity
	self-awareness
	Self-discipline.
	Self-regulation
	Communities
	Feel of tasks
	Sense of pride
	Enhance to get responsibility
	Improved patience
	teacher-student relationships
	Well being of individual and groups
	ability to concentrate
	working together
Ability to solving problem	
relationship between students and teachers	
Enthusiasm for student's abilities	
Solving management problem.	

Green activity in green school ground has tangible outcome, provide opportunities to increase sense of pride, self-confidence and responsibility and to feel good regarding accomplishments for students [2]; creating opportunities to make positive connections along with students, parents and staffs [14]. Student's enhanced self-esteem and self- confidence and academic performance [3]; encouraging qualities for example self-awareness and self esteem [23]. Increase sense of pride and high self-esteem.; helping to learn responsibility [3]. enhanced disposition for learning, interpersonal relationships and self- esteem. [2]; moreover, students lack of learning abilities increase self-esteem and self confidence and sense more valued like individuals. [3] Activities in outdoor learning utilized for personal and social improvement what can be learnt as of experiences; social development is involved with encouragement the process of

team working and is concerning interpersonal skills among students [23]. They can share time, values and interests among teachers, parents and other students and the society of members as they effort towards common aims. And also, they learn significant social skills of life, for instance cooperation, group work and persistence [2]. Waliczek et al 2001 indicated that school garden program in USA improved interpersonal abilities and attitudes for school [3]. The benefit of engaging with nature in outdoor learning including: Sustaining and encouraging self-awareness, self-identity, and social attachments [11] developing language improvement, teamwork and social relations [11]. Promoting emotional self-regulation and enhanced self-discipline [24]. Individuality benefits consist of improving self-concept and self-efficacy [26]. Improved the capability to solving problem and cope with new challenges [26] Improve problem solving capability and attention [12]. Increased social relations [7], Decreased classroom management problems. [13][6] makes social networks and increases social capital [12]. The effect of rising student teamwork and collaboration [11]. Encouraging the social networks, sense of connectedness, and abilities of the community [20]. reducing anti-social behaviour [18] Greater self-confidence, inspiration towards learning, a better responsibility and a more positive connection between students and their teachers [22] [14]. Table 3 indicates that the impact of natural environment on EQ.

5. CONCLUSION

The finding from this research suggest that Natural environment have a potential to promote for learning education, personal and social development where student can experience to learn sharing, communication, team working, self-awareness, self-confidence, self-regulation, self-discipline, improved solving problem in classroom, inspiration towards learning, social skills and a significant global issues. Students also acquire more opportunities to connect among their teachers, education, environment, lives, future lives. Furthermore, natural environment are designed to get a better result of learning that consist of enhancing student's information of natural systems, promoting learning of sustainability and recycling, use of waste water management and solar power, enhanced academic achievement and grade of score in each level, developed learning science, physical education, reading, writing, nutrition, and other subject; Hence, green school grounds give a chance to learn not only by hearing and seeing but also by tasting, smelling, touching, and feeling. Consequently, natural environment are a considerable source of stimulation for process of inspired learning and meaningful.

6. References

- [1] Ballantyne R, Packer J, Promoting Learning for Sustainability: Principles' Perceptions of the Role of Outdoor and Environmental Education Centers, Australian journal of environmental education, University OF Queensland, 2006, vol 22.
- [2] Bell AC, Dymont, JE, Grounds for Health: The Intersection of Green School Grounds and Health Promoting Schools. Environmental Education Research, 2008, Vol.14, No.1, p. 77-90.
- [3] Bowker R, Tearle P, Gardening as a Learning Environment: A Study Of Children's Perceptions and Understanding of School Garden as Part of an International Project. Learning Environ Res, 2004, Vol.10, p. 83-100.
- [4] Dillon J, Rickinson M, Teamey K, Morris M, Choi MY, Sanders D, Benefeld P, The Value of Outdoor Learning: Evidence from Research in the UK and Elsewhere, School Science Review, 2006, Vol.87 NO. 320, p. 107-110
- [5] Duvall, J, Enhancing the Benefit of Outdoor Walking with Cognitive Engagement Strategies. Journal of environmental psychology, 2011, Vol. 31, p. 27-35.
- [6] Dymont, JE, Green School Grounds as Sites for Outdoor Learning: Barriers and Opportunities, University of Tasmania, International Research in Geographical and Environmental Education, Faculty of Education, Launceston, Tasmania 7250, Australia, 2005, Vol. 14, No. 1, p. 27-45
- [7] Dymont, JE, Bell AC, Grounds for movement: Green School Grounds As Sites For Promoting Physical Activity. Health Education Research, 2008, Vol. 23, NO. 6, p. 952-962.
- [8] Dymont, JE, Bell AC, Lucas Aj, The Relationship Between School Ground Design and Intensity Of Physical Activity. Children's Geographies, 2009, Vol.7, No. 3, p. 261-276.

- [9] Elias MJ, New Roles For School Psychologists: Addressing the Social and Emotional Learning Needs Of Students, National Association of School Psychologists, 2002, Vol 31, No. 1, p. 45-52
- [10] Graham H, MS, RD¹, Bell DL, MS, RD², Lussier M, MPH, RD², McLaughlin, PHD³, Zidenberg-Cherr S, PHD, Use of School Garden in Academic Instruction, *Journal of nutrition education and behavior*, 2005, Vol 37, p. 147-151.
- [11] Johnson P, Growing Physical, Social and Cognitive Capacity: Engaging With Natural Environments. *International education journal*, 2007, vol.8, p. 293-303.
- [12] Leger LSt, Health and Nature- New Challenges for Health Promotion. Oxford University, 2003, Vol. 18, No. 3.
- [13] Lieberman GA, LL Hoody. Closing the achievement gap: Using the environment as an integrated context for learning. Ponway, CA: Science Wizards, 1998.
- [14] Maller C, M Townsend, Children's mental health and well being and hands-on contact with nature. *The international journal of learning*, 2005, 12:1447-540
- [15] Matsuoka RH, Student Performance and High School Landscapes: Examining the links. *Journal of Landscape and Urban Planning*, 2010, Vol. 97, p. 273-282.
- [16] McCurdy LE, MPhil, Winterbottom EK, MPH, Mehta SS, MPH, & Roberts RJ, MD, MPH, *Curr Probl Pediatr Adolesc Health Care*, 2010, p.102-117.
- [17] Mirrahimi SZ, Tawil NM, Abdullah NAG, Che-Ani AI, Utaberta N, Comparison how outdoor learning enhances EQ skills between Australia and Singapore education, International symposium on conducive learning environment for smart school, Faculty of Engineering and Built Environment, University Kebangsaan Malaysia, 2011.
- [18] Moore RC , Cosco, NG, Developing an Earth-bound Culture through Design of Childhood Habitats, Department of Landscape Architecture North Carolina State University, USA, 2003, [online] <http://www.naturalearning.org>.
- [19] Mygind E A, Comparison Between Children's Physical Activity Levels at School and Learning in an Outdoor Environment, *Journal of adventure education and outdoor learning*, university of Copenhagen, Denmark, 2007, Vol. 7, No.2, p. 161-176.
- [20] Ozer EJ, The effect of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Health Development, society for public health education, 2006, www.sagepublication.com.
- [21] Riemer MJ, Integrating emotional intelligence into engineering education, *World Transactions on Engineering and Technology Education*, 2003, Vol.2, No.2
- [22] Rickinson M, Dillon J, Teamey K, Morris M, Choi, Y M, Sanders, D, Benefield P, A Review of Research on Outdoor Learning, National Foundation for Educational, Research and King's College London, 2004. [23] Szczepanski A. Outdoor education- Authentic learning in the context of urban and rural landscape- a way of connecting environmental education and health to sustainable learning- literary education and sensory experience. Perspective of the where, what, why and when of learning. *Outdoor Environmental Education*, Linköping University, Sweden, 2009, p. 83-98.
- [24] Taylor F, Kuo F E, Sullivan.WC. View of nature and self-discipline: evidence from inner city children. *Journal of Environmental Psychology*, 2002, Vol 22, p. 49-63
- [25] Wagner C, Planning School Grounds for Outdoor Learning, National Clearinghouse for Educational facilities, , Washington, D.C. 20005-4905. 2000, www.edfacilities.org.
- [26] Wolf KL, Youth and Mental Health: Work Projects in Urban Green Space. In C.Kollin(ed.), *Engineering Green: Proceeding of the 11th National Urban Forest Conference*. Washington D.C. 2003.