How do school green space and environmental educational programs affect children’s environmental attitude and proenvironmental behavior?

Wanlu LIU
2018.9.13 · Warsaw
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1.1 Nature-deficit disorder

 McKinsey & Co. report “Preparing for China’s urban billion” March 2009

- City children spent in outdoors in China: 2.74 hours
- City children spent in homework per day in China: 1.06 hours

《Blue Book of the Outdoor Activities of Chinese City Child》 (China Network, 2012)
1.2 “Prescription” for nature-deficit disorder

- **Parents bring child back to nature**
- **Join natural experience program**
- **Learning journey “open the book of nature”**

- Limitation: financial, time, system, outdoor place and logistics support (Dyment, 2005)
- Quality of natural education organization (Wang, 2016)
- Low demographic status
1.3 The role of School green space (SGS)

City green space has similar “green benefits” as forest and other natural landscapes do. (Kaplan, 2001; Hand et al, 2017)

School green space may provide important compensation for the shortage of children’s natural experience

- Many subjects can be taught outdoors (Bell, 2001);
- School garden can help children to understand nature (Blair, 2010);
- School green space can provide children with variety of play opportunity (Titman, 1994).
Global scale initiatives

- The Boston Schoolyard Initiative
- Eco-School
- Learning through landscape
- Evergreen
- Iran (Meiboudi et al 2016)
- Australia (Izadpanahi and Elkadi, 2014)

Green school
(1996- )

Eco-school
(2009- )
Informal place-based learning in schools

Teaching Green Buildings (Cole 2013)

research has focused on:
air quality,
daylighting,
energy performance.
1.4 The impact of SGS on children

Physical health
(Fjirtoft, 2004)

Social skill
(Maller, 2006)

Cognitive development
(Dadvand et al, 2015)

Academic performance
(Matsuoka, 2010)

School green space

- Various types of play
  - (Boldemann, 2006)
- Amount
- Window landscape
- Lack
- Natural experience
- Environmental attitude (EA)
- Environmental behaviors (PEB)

School garden

- Plant diversity
- Landscape type
- Plants in buildings

The impact of SGS on children

Various types of play

(Boldemann, 2006)
1.4 Related researches——SGS and children’s EA and PEB

- Eco-school
  - (Beove-de Pauw, 2013)

- Sustainable school
  - (Tucker, 2017)

- School green space

Impact or not? How?

Students activity intervention

EA and PEB

Activity in environment
- Emotional preference
- Environmental awareness

(Aiello et al, 2010)
2.1 Scientific questions

1. What are students’ perceptions about school green space (SGS)?
2. Whether SGS and green activity can influence student’s EA?
3. If so, how do they work?
2.2 Study design

Chongqing, China. 20 primary schools in city, stratified random sampling

- School environment characters quantify
  - Amount of green area
  - Plant biodiversity
  - landscape forms
  - Sustainable facilities
  - Sports facilities
  - Entertainment facilities
  - Pots in classroom
  - Corridor green area
  - ... 

- Questionnaire with students (5 graders in primary school)
  - Perception of school environment
  - Initial natural activity within school
  - Environmental attitude (Preservation, Utilization)
  - self-reported pro-environmental behavior
  - EE activity out of school

- Teachers interview & Archives reading
  - School green activity conducted in last 2 years
2.3 Questionnaire sampling

- **Sex**
  - girl: 51%
  - boy: 49%

- **Age**
  - 9: 30%
  - 10: 68%
  - 11: 1%
  - 12: 1%

- **Years stay in the current school**
  - 1: 3%
  - 2: 4%
  - 3: 3%
  - 4: 3%
  - 5: 3%
  - 6: 3%
  - 7: 3%
  - 8: 4%

**Total sample:** 1597 students
3.2 Green activity held by school

![Graph showing the amount of green activity held by each school.]

Figure 3.1 Amount of green activity held by each school (total 223)

- These 20 schools have big differences in green space and amount of green activities.

![Pie chart showing the percentage of each kind of green activity.]

Figure 3.2 Percentage of each kind of green activity

- Unpublished data
3.3 Q1: What are students’ perceptions about school green space (SGS)?

In general, students’ perceptions about SGS is positively related to the objective nature of SGS.

Figure 3.4 Students’ perception of school green space (n = 20)

Unpublished data
3.3 Q2: Whether SGS and green activity can influence student’s EA?

Unpublished data

Figure 3.5 the impact of CGS and green activity held by school on student’s environmental value (n = 20)

➢ Students’ perception of green space and green activity held by school had significantly positive impact on student’s environmental attitude.
3.4 Q3: How did SGS and green activity influence student’s EA?

Green activities held by school had a significant impact on students’ EA; school green space can affect students’ EA through perception.

Unpublished data
4.1 School campus – “hidden curriculum”

This study indicate: the better the campus green environment, the more green activities organized by the school, the better the students' environmental attitude will be. Consistent with previous research (Samborski, 2000; boeve-de Pauw and Van Petegem, 2013).

How to define “good” ?

• On the one hand, campus with enough green area, rich in plant diversity, and various landscape which can support different kinds of play of students, can be a “good” green campus.
• On the other hand, school should hold colorful green themed activity
Students' natural activities within school had significant impact on their environmental attitude and pro-environment behaviors, and this influence was greater than that of EE activity out of school.
4.3 Suggestions for campus design and using

1. Avoid to pursuit the green coverage without considering the interactivity of the environment. It is recommended to use woods, small gardens, single trees and other modules which can provide rich environmental carrying capacity;

2. Schools should pay attention to the development and utilization of outdoor environment in teaching activities;
3. Strengthen the training of teachers' outdoor teaching skills to increase the use of outdoor environment in formal classroom;
4. On the premise of safety, do not restrict the activities of the students on campus.
4.4 What can BGs do?

School garden in Xiaojie Primary School

- Promote project
- Guide Construction
- Provide seedlings
- Guide daily maintenance

Constructed by Xiaojie Primary School, XTBG, and BGCI
4.4 What can BGs do?

Students studying in school garden
### 4.4 What can BGs do?

Lectures for 4th graders every two month

<table>
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<tr>
<th>Theme</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>The wonder of diversity</td>
<td>He HE</td>
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<tr>
<td>The story of the invasive plants</td>
<td>Guangyu LIU</td>
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<tr>
<td>Biodiversity protection in BG</td>
<td>Ximin WANG</td>
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<td>Climate change in my eyes</td>
<td>Zhen YANG</td>
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<td>How to do nature observation?</td>
<td>Yanhong GENG</td>
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<td>Biodiversity in Yunnan</td>
<td>Dan LI</td>
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<td>Biodiversity of insects</td>
<td>Jie ZENG</td>
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<tr>
<td>Horticulture basics</td>
<td>Yonghong LIU</td>
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<tr>
<td>Protect plant biodiversity</td>
<td>Alison Wee</td>
</tr>
<tr>
<td>How to do nature note?</td>
<td>Yonghong LIU</td>
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<tr>
<td>Why we are here?</td>
<td>He HE</td>
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<tr>
<td>Birds in Xishuangbanna</td>
<td>Bojian GU</td>
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4.4 What can BGs do?

Nature observation club activities in Xiaojie Primary School
4.4 What can BGs do?

Science education and nature education training class for primary school teachers.
4.4 What can BGs do?

What would your ideal campus be like?
Contact me: liuwanlu@xtbg.ac.cn

THANKS