





# Outdoor learning in science and sustainability

Presentation for Symposium  
ESERA 2015 Helsinki, Finland

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# Learning outside the classroom – a case study in a Swedish school context







## **Educational interests and demands regarding science and sustainability**

- UNESCOs global calls: DESD, GAP, etc.
- Re-thinking the character of learning
- Re-thinking the character of knowledge
- Re-thinking the importance of space and place in education.



# Research interest and aim

- Which learning processes do students engage in when striving for meaning making about sustainability in the outdoor environment?



# The case study

- Outdoor and in-formal learning activities in science and sustainability, one class in grade 6 (12-year old students)
- Mixed-methods of data gathering – a comprehensive picture
- Analyses based on Dewey's experiential learning theories



# Results

## 1. The character of the learning processes which students engaged in were interpreted as 'aesthetic' and categorized as follows:

- A: Prior experiences of personal character

*EX: "I'm used to making fire in our summerhouse, I know how to do it, it's fun!"*

- B: Immediate responses from environments and artefacts

*EX: "The student grasps some mosses and squeezes it with his hands, water pours out of the mosses and he laughs out loud when it happens. "It is wet" he says "we must look for mosses in wet places"*

- C: Social interaction

*EX: "The students talk and organize their groupwork with enthusiasm; they share ideas about where to find bugs and work together to find and sample them"*

- D: Responsibility, trust and independence

*EX: "It was fun to work with fire, I mean....you have to be in charge of the fire and it feels like fun to be responsible for a fire"*

# Results

2. Analysing the learning processes through three phases as described by Dewey (i.e. *start, activity, conclusion*)

The results reveal that aesthetic experiences function as *links*, making the processes continuous and progressive





# UK and Brazil studies

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# OUTDOOR LEARNING IN LONDON AND RIO

Project ran in London up to the London 2012 Olympic Games



Then moved to Rio ahead of the 2016 Games

...

## Project aim and research goals

- An exploration of students' sociocultural and environmental perspectives on mega sporting events in London and Rio
- Which kinds of evidence do 11-14 year old students value / draw upon in informal reasoning about sustainability of the Olympic Games?

# FIRST SCHOOL IN RIO

- Municipal elementary school
- The stimulus question: “What is sustainability?”
- Case study at Rodrigo de Freitas lagoon (3 teachers and 25 students)
- Took photos and asked about the construction, the conditions of the water and interviewed fishermen
- Back in school, groups discussed the outdoor visit



# Preconceptions: words associated with sustainability

Sustentar a  
humanidade

Sustentável (2)

Sustentação

Sustentar (3)

Sustento de  
habilidade

Capacidade

Melhoramento  
– melhorias (3)

## SUSTENTABILIDADE?

Força

Economia (2)

Proteção

Reciclar

Equilíbrio

Liberdade

Saudável (4)

Saúde

Compaixão

Amor

Paz

Positividade

Criatividade

Responsabilidade

Vida boa

respeito

-3

# 9TH GRADE OF ELEMENTARY SCHOOL





# RODRIGO DE FREITAS LAGOON



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# WHAT WILL HAPPEN IN THE RODRIGO DE FREITAS LAGOON IN THE OLYMPIC GAMES?

**LEGADO DO PAN** | ESTÁDIO DE REMO DA LAGOA



**CUSTO (REFORMA)**  
R\$ 13 milhões

**ESPORTES NO PAN 2007**  
remo e canoagem de velocidade

**NO RIO 2016**  
remo e canoagem de velocidade

**SITUAÇÃO ATUAL**  
falta de espaço para receber barcos e atletas

- Cost : 13 million R\$
- Rio 2016: rowing and speed boating
- Current situation: lack space for boats and athletes
- In 2016, about 550 rowers and 250 canoeists expected



# Panoramic view: 13th July 2015





# REMO STADIUM - pictures on site



# ILLEGAL WORKS AT REMO STADIUM FOR THE OLYMPICS ARE SUSPENDED BY THE FEDERAL COURT



## PRELIMINARY RESULTS

### Students draw on social evidence:

- The field visit will only be available to a small, higher socio-economic group, due to the cost of video input and lack of free access
- The construction of the stadium hinders fishing
- Needs more safety and cleanliness
- Everything at the lagoon is too expensive
- Workers need safety equipment

## Economic evidence:

- Arena's construction parts will be reused to build new schools after the Olympic Games
- It makes no sense for people to pay more for something that was built with taxes
- High prices for local trade-products sold around the lagoon
- A lot of money taken up in construction



## Scientific/ Environmental evidence:

- Dredger removing excess sludge floating on the surface
- The chemically-treated sewage (which goes into the lagoon) is worse than natural sewage
- Fish mortality, lack of oxygen
- Sewage, garbage from people
- Beautiful landscape, quiet place to stroll with the family, have ducks in the lagoon, vegetation and fish
- On the visit day the water was transparent



# ACKNOWLEDGEMENTS

- In London – teachers and pupils from 13 London schools (see SSR reference)
- In Rio - Mariane e José Claudio teachers from José de Alencar School Municipal elementary School

# REFERENCES

- Amos, R. & Robertson, H. (2012) The sustainable development of the London 2012 Olympic Park: a real controversy? 11- to 15-year-old students' perspectives right from the scene, *School School Review (Journal of the Association for Science Education)*, 94(345), 33-42.
- Loureiro, C.F.B. *Sustentabilidade e Educação* (2012) um olhar da ecologia política. *Cortez Editora*.
- Nielsen, J. (2012). Science in discussions: An analysis of the use of science content in socioscientific discussions. *Science Education*, 96(3), 428-456.
- Sadler, T., Barab, S., & Scott, B. (2007). What do students gain by engaging in socioscientific inquiry? *Research in Science Education*, 37(4), 371-391.
- Santos, W. & Mortimer, E. (2009) Abordagem de aspectos sociocientíficos em aulas de ciências: possibilidades e limitações. *Investigações em Ensino de Ciências*, 14(2), 191-218.



## Common conclusions

- Students' learning processes in outdoor environments focusing on science and sustainability issues involve emotional as well as cognitive elements
- The specific spaces encountered provide opportunities for meaning-making, social interactions and creative work
- Outdoor learning activities enrich learning for those students who often never leave school to study
- Students are more stimulated thinking about socio-scientific issues in the real world and feel that their critical participation is important

# Educational implications and discussion

- Inquiry science and SSI are explored more authentically in real world situations so ...
  1. How can teachers' and students' beliefs in the high value of outdoor learning in science be translated into sustainable practice across different international contexts and cultures?
  2. What can be learnt from educational systems where outdoor learning in science occurs on a regular basis?