


ESD effectiveness research :  
What are kids learning from ESD?

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 **Edubron**  
Universiteit Antwerpen  
Education Research with Impact


 **Edubron**  
Universiteit Antwerpen

The impact of eco-schools

**Who am I?**

- MA Biology with a PhD in educational sciences
- Biology teacher
- Exhibit / Exhibition development (RBINS)
- Communication and outreach officer for the NFP to the CBD
- Projectleader science education





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Universiteit Antwerpen


The impact of eco-schools

**Who am I?**

- PhD (2011) *Valuing the invaluable : effects of individual, school and cultural factors on the environmental values of children.*

*Psychology, sociology and psychometrics  
of environmental attitudes  
Attitudes-Behaviors  
Crosscultural issues  
Attitudes as a quality measure for education*

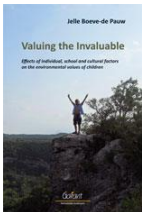


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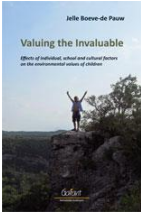


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The impact of eco-schools

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- Part time postdoc research focussing on effectiveness and measurement issues
  - *The impact of eco-schools (2012-2013)*
  - *Study choice motivations for STEM (2012-2013)*
  - *Safety & sustainability in traffic education (2013)*
  - *Selfevaluation in ESD for nature guides (2013-2015)*
  - *Global Education (2013-2017)*
  - *STEM@School (2014-2017)*



**What are kids learning from ESD?**

Results from two research projects  
Each with their specific goals (outcomes) and approaches

- 1. Wereldmeerdagse (in Flanders)**  
=> Intervention study at the crossroad between formal & informal education
- 2. ESD implementation in Sweden**  
=> cross sectional study in formal Education

## Impact study wereldmeerdagse Brasschaat

Jelle Boeve-de Pauw & Peter Van Petegem



## Impact study wereldmeerdagse Brasschaat



1. What is it?
2. Focus of the research
3. Methods (respondents & instruments)
4. Resultats
5. Discussion
6. What's next?

## Impact study wereldmeerdagse Brasschaat



### What is it?



**Mundio vzw**  
de kloof tussen rijk en arm

GROS Brasschaat (Mundio vzw)

Every two years, focus on global education, plus a theme

- 12-14 year olds
- 30 schools, 6000+ students
- "Experience" market
- Webquest with a "South buddy" and scenarios (co decision making)

## Impact study wereldmeerdagse Brasschaat



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- Webquest with a "South buddy" and scenarios (co decision making)

⇒ Pressure of accountability

⇒ But also, a strong will to grow

Our role (UA) : indepenent look at the educational impact

Cooperation through the Antwerp Science Shop



## Impact study wereldmeerdagse Brasschaat



### Central Research Question:

What is the educational impact of the Wereldmeerdagse on the participating students?



## Impact study wereldmeerdagse Brasschaat



### Central Research Question:

What is the educational impact of the Wereldmeerdagse on the participating students?

Longitudinal study with 2 measurement occassions

Edition 2013

1. Pre : focus on a baseline
2. Post : focus on differences

⇒ online survey within the webquest

### Impact study wereldmeerdagse Brasschaat

#### Respondents

- " 632 students
- " 10 schools
- " 33 classes
- " 355 students in grade 7 (56%) : 11-12 years old
- " 277 students in grade 8 (44%) : 12-13 years old
- " 551 students in stream A (87%)
- " 81 students in stream B (13%)

### Impact study wereldmeerdagse Brasschaat

#### Instruments (outcome measures)

- Selected in close collaboration with Mundio
- Scientifically validated and used in scientific publications
- Used in international research
- Cover the widths of the WMD
  - Global education
  - Climate change
  - Cognitive and attitudes
- " Likert scales (5 or 7) : completely disagree to completely agree

### Causes of Third World Poverty Questionnaire (Harper et al. 1990; Bolitho et al., 2007)

What are the causes of third world poverty?

#### Blame the poor (6)

De inwoners van zulke landen doen zelf geen inspanningen om hun situatie te verbeteren

De inwoners van zulke landen hebben een gebrek aan intelligentie

...

#### Blame nature (4)

Het land is niet geschikt voor landbouw

Het klimaat is er slecht

...

#### Blame complex issues (6) (conflict, overheid, uitbuiting)

De overheid is er corrupt

Andere landen buiten de derde wereld uit

...

### Just World Scale (Rubin & Replau, 1975; Uppius, 1991)

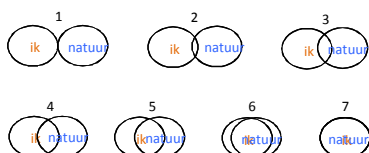
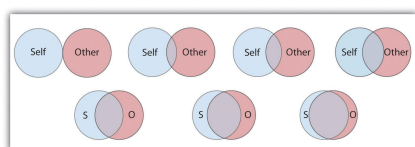
How just is the world?

1. mensen krijgen waar ze recht op hebben
2. iemand zich inspannt dan wordt die daarvoor beloond
3. mensen krijgen de straffen en beloning waar ze recht op hebben
4. mensen met ongeluk hebben dat aan zichzelf te danken
5. de wereld is rechtvaardig

Item	Noord	Zuid
1	1 - 2 - 3 - 4 - 5	1 - 2 - 3 - 4 - 5
2	1 - 2 - 3 - 4 - 5	1 - 2 - 3 - 4 - 5
3	1 - 2 - 3 - 4 - 5	1 - 2 - 3 - 4 - 5
4	1 - 2 - 3 - 4 - 5	1 - 2 - 3 - 4 - 5
5	1 - 2 - 3 - 4 - 5	1 - 2 - 3 - 4 - 5

### Inclusion of other in the self (Aron & Smollan, 1992)

### Inclusion of nature in the self (Schultz, 2001)



### 2-dimensional model of ecological values (Bogner & Wiseman, 2006)

What environmental attitudes do students hold?

#### Preservation (5)

Vuile industriële rook uit schoorstenen maakt me boos.

We moeten stukken natuur voorbehouden om bedreigde dier- en plantensoorten te beschermen.

...

#### Utilization (5)

Onze planeet heeft een oneindige voorraad aan grondstoffen (aardolie, steenkool...). De natuur is altijd in staat om zichzelf te herstellen.

...

### Belief in personal effectiveness (Kellstedt, Zahran & Vedlitz, 2008)

1. Mensen zijn verantwoordelijke voor de opwarming van de aarde
2. Ik geloof dat mijn keuzes en acties een invloed hebben op de opwarming van de aarde
3. Mijn acties tegen de opwarming van de aarde kunnen anderen in mijn omgeving aanzetten om zelf ook iets te doen voor het klimaat

### Results

- For each scale we compared pre and post, through simple repeated measurements, complemented with latent growth models
- Important concepts : *significance* and *effect size*

### What are the causes of third world poverty? CTWP

SCALES	alpha	pre	post	dif	p	d
6i Blame the poor						
4i Blame nature						
6i Blame complex issues						

Reliability  
> 0.65

Mean student  
score before WMD

Mean student  
score after WMD

Difference  
pre-post

### What are the causes of third world poverty? CTWP

SCALES	alpha	pre	post	dif	p	d
6i Blame the poor						
4i Blame nature						
6i Blame complex issues						

Significance  
<0.05

The difference is not a  
coincidence and can be  
generalizes to the  
population

Effect size

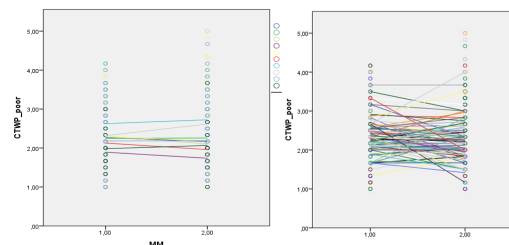
0.0 - 0.2 : small  
0.2 - 0.5 : medium  
Groter dan 0.5 : large

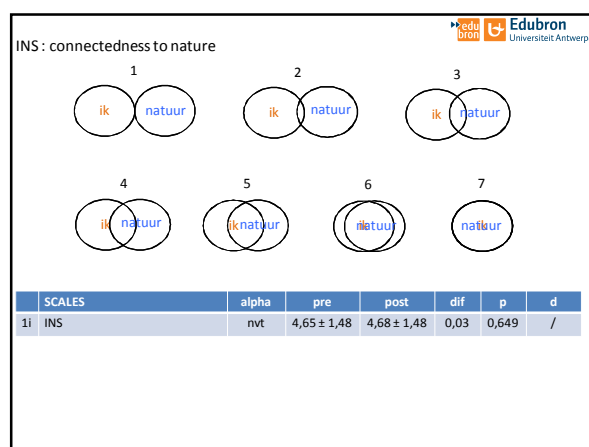
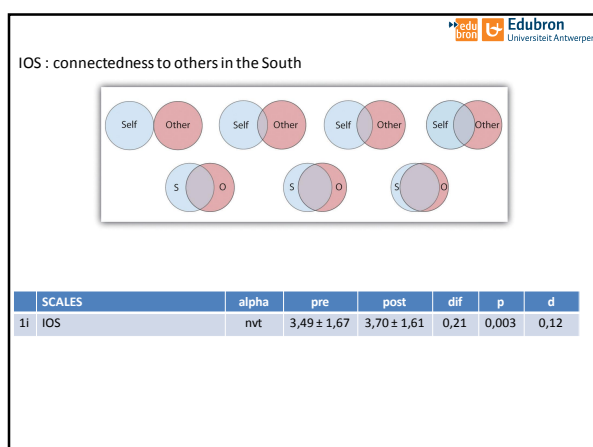
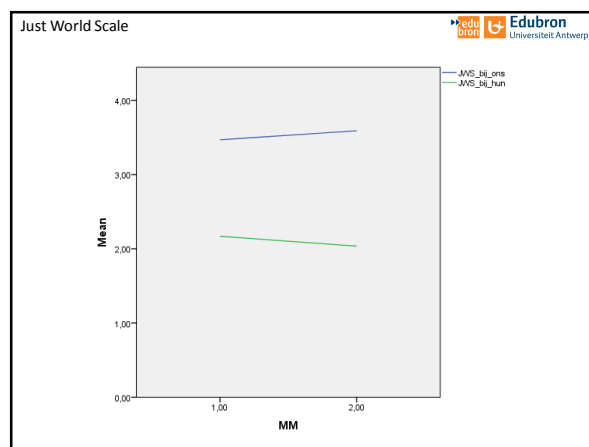
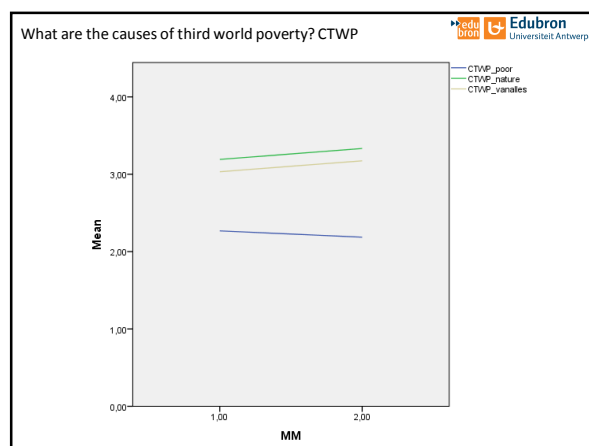
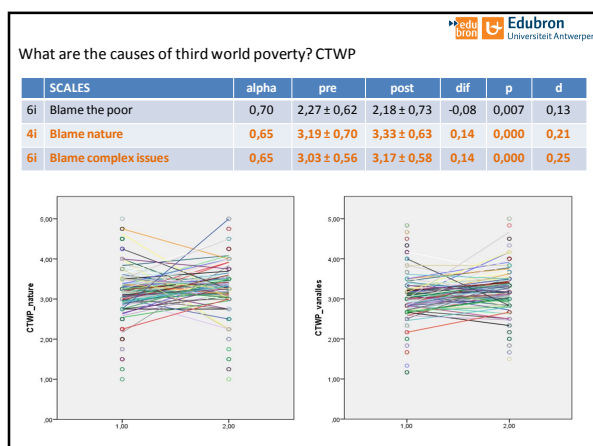
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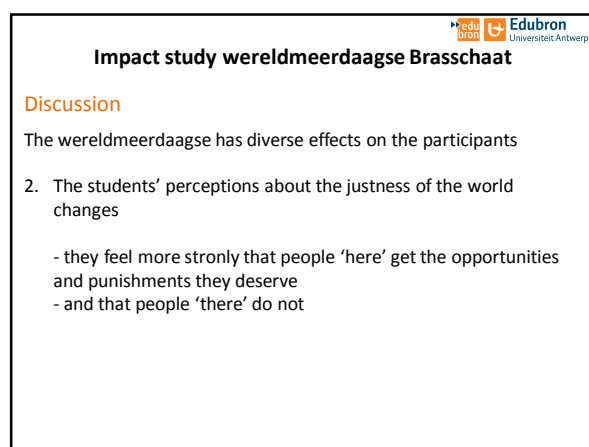
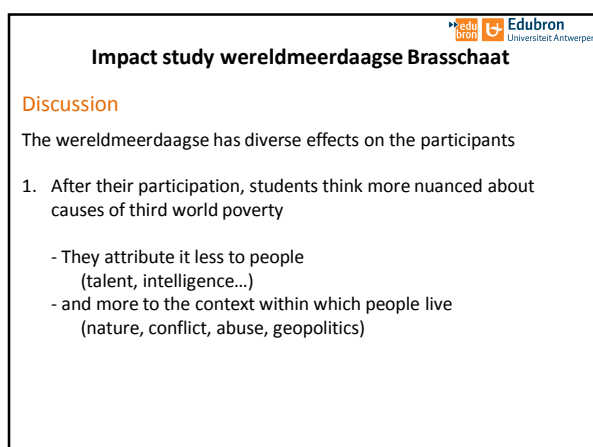
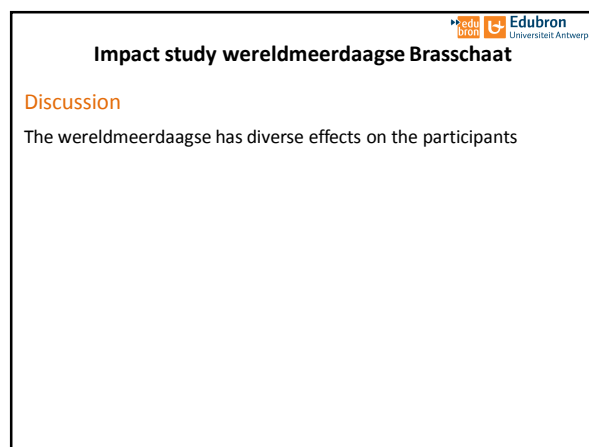
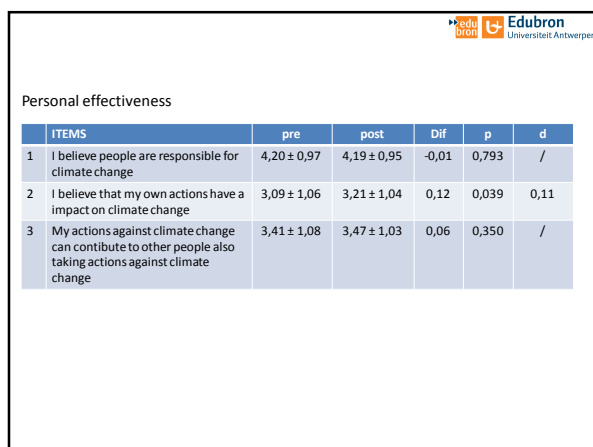
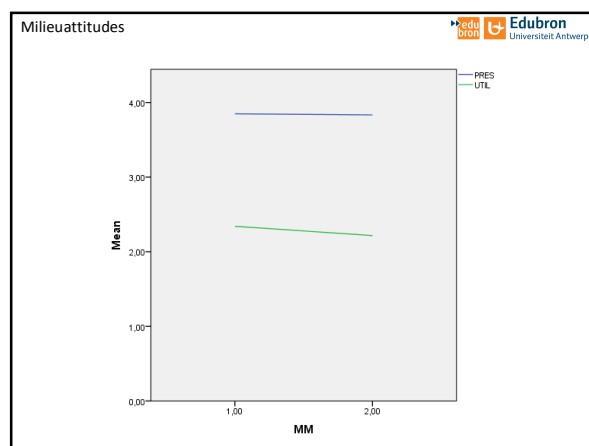
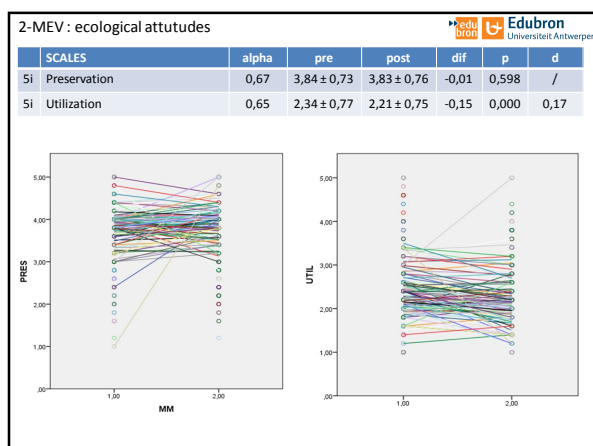
SCALES	alpha	pre	post	dif	p	d
6i Blame the poor	0,70	2,27 ± 0,62	2,18 ± 0,73	-0,08	0,007	0,13
4i Blame nature	0,65	3,19 ± 0,70	3,33 ± 0,63	0,14	0,000	0,21
6i Blame complex issues	0,65	3,03 ± 0,56	3,17 ± 0,58	0,14	0,000	0,25

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### Impact study wereldmeerdagse Brasschaat



#### Discussion

The wereldmeerdagse has diverse effects on the participants

3. Participants feel a stronger connection to people in the South
4. Participants do not feel a stronger connection to nature

### Impact study wereldmeerdagse Brasschaat



#### Discussion

The wereldmeerdagse has diverse effects on the participants

3. Participants feel a stronger connection to people in the South
4. Participants do not feel a stronger connection to nature
5. Participants' ecological attitudes change : they adhere less to the utilization of nature
6. Participants' personal efficacy changes : they feel stronger about their own contribution to tackle climate change

### Impact study wereldmeerdagse Brasschaat



#### Discussion

In general : These are the effects we would want to observe, so A+

But the effects are **small** (effect size <0.2) or moderate.

Biggest effect was : CTWP complex issues

Small effects can however be the beginning of a bigger impact. And small effects of a short intervention are valuable.

### Impact study wereldmeerdagse Brasschaat



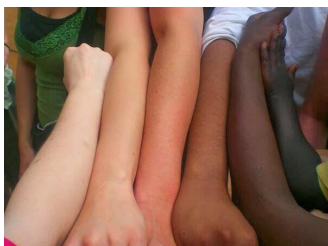
#### Discussion

Most students (classes and schools) evolved like the mean effect. But we did observe **exceptions** that showed a bigger or reversed effect.

Further research :

- Which schools, classes, students are the exceptions?
- Why are they different?
- Long term effects?
- Impact of the teacher (preparation, reflection)
- More diverse audience (edition 2015 : Brasschaat, Mechelen, Boom).
- All participants, not just the webquesters.

### Impact study wereldmeerdagse Brasschaat



Questions? Go ahead right now, or  
Contact me at [jelle.boevedepauw@uantwerpen.be](mailto:jelle.boevedepauw@uantwerpen.be)




### The effectiveness of Education for Sustainable Development

Jelle Boeve-de Pauw<sup>1,2</sup>, Niklas Gericke<sup>1</sup>, Daniel Olsson<sup>1</sup> & Teresa Berglund<sup>1</sup>


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<sup>1</sup> SMEER, Karlstad University, Sweden  
<sup>2</sup> Edubron, University of Antwerp, Belgium




 The Effectiveness of Education for Sustainable Development


**Context:** Investigating effects and possible success factors of ESD implementation in the Swedish school system




**Daniel Olsson**  
Teacher  
Karlstad municipality  
PhD-student  
Karlstad University




**Jelle Boeve de-Pauw**  
postdoc  
University of Antwerp &  
Karlstad University




**Niklas Gericke (PI)**  
Assoc. Prof.  
Karlstad University




**Hans-Åke Scherp**  
Assoc. Prof.  
Karlstad University




**Teresa Berglund**  
Teacher  
Karlstad municipality  
PhD-student  
Karlstad University



**Shu-Nu Chang-Rundgren**  
Prof.  
Karlstad University




**Anna Mogren**  
The Global School  
PhD-student  
Karlstad University

 The Effectiveness of Education for Sustainable Development

**Context:** Investigating effects and possible success factors of ESD implementation in the Swedish school system

Large National Swedish study investigating ESD-implementation at:

- “ Student level (outcomes and experiences)
- “ Teacher level
- “ School leader
- “ Cultural context (comparative studies with Taiwan)

 The Effectiveness of Education for Sustainable Development

**Background**

ESD is visioned as one of the keys to facilitating sustainable development

UNESCO (2006) describes ESD as

*... including key sustainable development issues into teaching and learning; for example climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning that motivate and empower learners to change their behavior and take action for sustainable development. Education for Sustainable Development consequently promotes competences like critical thinking, imagining future scenarios and making decisions in a collaborative way.*


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 The Effectiveness of Education for Sustainable Development

**Background**

ESD as an approach to content

↔

ESD as an approach to teaching and learning

 The Effectiveness of Education for Sustainable Development

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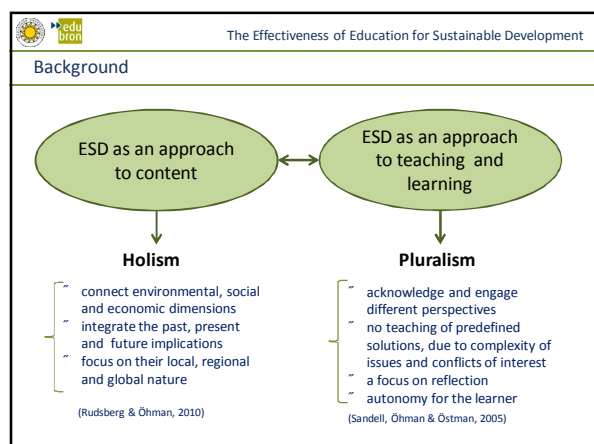
ESD as an approach to teaching and learning

**Holism**

- connect environmental, social and economic dimensions
- integrate the past, present and future implications
- focus on their local, regional and global nature

(Rudberg & Öhman, 2010)





The Effectiveness of Education for Sustainable Development

### Background

2005-2014 was the UN decade of Education for Sustainable Development

>> Sweden :

- Infusion into new curricula in 2011
- Part of all subjects; all teachers are expected to include sustainability issues in their teaching
- Several organizations support school with implementing ESD (Eco-schools, Keep Sweden Tidy Foundation, WWF schools on a sustainable way, the Global school)

>> Final report of the DESD (Shaping the future we want, 2014)

[The decade has lead to many ESD initiatives around the globe...] there is however ... *"the need for more research, innovation, monitoring and evaluation to develop and prove the effectiveness of ESD goods practices"*

The Effectiveness of Education for Sustainable Development

### Background

>> Effectiveness studies in the realm of ESD

- Often the focus is on (short) interventions such as field trips
- Only few large scale studies exist
- Often the focus is on a single dimension of SD
- The field is skewed towards environmental education
- Certification programs are often used as proxies for ESD implementation
- No conclusive effects (often no or even negative) of these programs can be found in the literature (Coertjens et al, 2010; Boeve-de Pauw & Van Petegem, 2011; Berglund et al, 2014; Olsson et al, 2015; Cincera et al, 2015)
- Often studies focus only on outcomes and not on what is happening in the schools to achieve these outcomes (Boeve-de Pauw, 2015)

The Effectiveness of Education for Sustainable Development

### The current study

Large scale quantitative study that focusses on outcomes (sustainability consciousness), on teaching (ESD, holism and pluralism), and on the contribution of certification programs, in the context of formal education in Sweden

The Effectiveness of Education for Sustainable Development

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Large scale quantitative study that focusses on outcomes (sustainability consciousness), on teaching (ESD, holism and pluralism), and on the contribution of certification programs, in the context of formal education in Sweden

>> **Research questions**

- To what extent is ESD (holism and pluralism) happening in the classroom?
- What is the effect of ESD (holism and pluralism) on students' sustainability consciousness?
- Is the effect of ESD (holism and pluralism) on students' sustainability consciousness grade specific?
- Do ESD-certifications facilitate ESD (holism and pluralism) in the classroom?

The Effectiveness of Education for Sustainable Development


### Methodology

**Sample**

2413 students from 51 schools across Sweden

Paper-and-pencil surveys with researcher present to provide instructions and facilitate data collection

	grade 6	grade 9	grade 12	total
#	934	841	638	2413
ages	12-13	15-16	18-19	
boys:girls	1.09	1.05	0.81	.99
response rate	86.6 %	89.7 %	65.7 %	80.7 %
missings	2.6 %	3.0 %	1.4 %	2.4 %

 The Effectiveness of Education for Sustainable Development

### Methodology

#### Variables


>> **Holistic approach to content** ( $\alpha=0.70$ )

H1. In school, we look at the interconnections between the past, the present and the future as regards various issues  
H2. In school, we look at both local and global problems and the connections between them  
H3. In school, we look at how economics, social issues, and environmental problems are connected

>> **Pluralistic approach to teaching** ( $\alpha=0.66$ )

P1. When we have class discussions, it is possible for many different views to emerge  
P2. When we read texts in school, we usually take a critical look at the content  
P3. In school, we are encouraged to take a stand and have our own opinion on the issues at hand  
P4. We decide what we study ourselves, with support of the teacher

Likert : (1) never, (2) seldom, (3) sometimes, (4) often, (5) very often or "I don't know"

 The Effectiveness of Education for Sustainable Development

### Methodology

#### Variables

Fit for CFA on 2-dimensional ESD model  
RMSEA = 0.054 CFI = 0.98 TLI = 0.98


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 The Effectiveness of Education for Sustainable Development

### Methodology

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>> **ESD-dummy** : Identifying schools that do (1) or do not (0) participate in ESD-certification program (eco-schools, global schools, WWF school)

 The Effectiveness of Education for Sustainable Development

### Methodology

#### Variables

>> **ESD-dummy** : Identifying schools that do (1) or do not (0) participate in ESD-certification program (eco-schools, global schools, WWF school)

>> **Sustainability consciousness** : knowingness (K), attitudes (A) and behaviors (B) in relation to the environmental (ENV), social (SOC) and economic (ECO) subthemes of the UNESCO definition of sustainable development (Berglund et al., 2014; Olsson et al., 2015)


*Sample items*

K-ENV "Sustainable development requires that we humans reduce all sorts of waste"

A-SOC "I think it is important that people in society exercise their democratic rights and become involved in important issues"

B-ECO "I avoid buying goods from companies with a bad reputation for looking after their employees"

Likert : (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree or "I don't know"

 The Effectiveness of Education for Sustainable Development

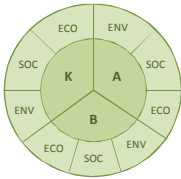
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Sustainability knowingness : 19 items ( $\alpha=0.84$ )  
Sustainability attitudes : 14 items ( $\alpha=0.80$ )  
Sustainability behaviors : 17 items ( $\alpha=0.80$ )



 The Effectiveness of Education for Sustainable Development

### Methodology

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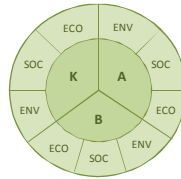
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Fit for multilevel higher-order CFA  
(Gericke et al., forthcoming)  
RMSEA=0.041; CFI=0.953; TLI=0.944

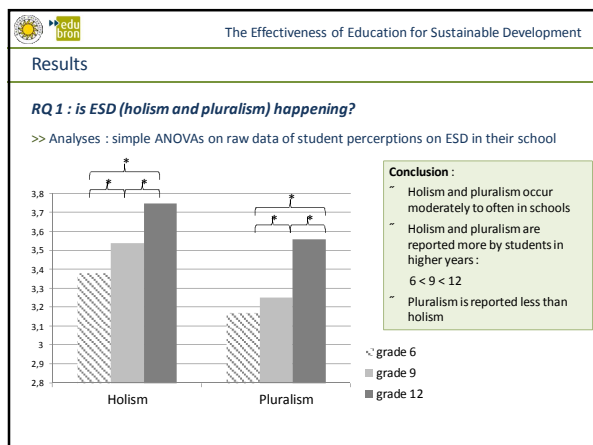
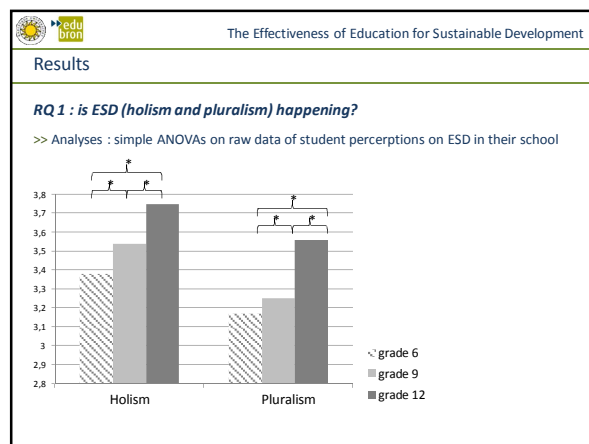
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**Results**

**RQ 1 : is ESD (holism and pluralism) happening?**

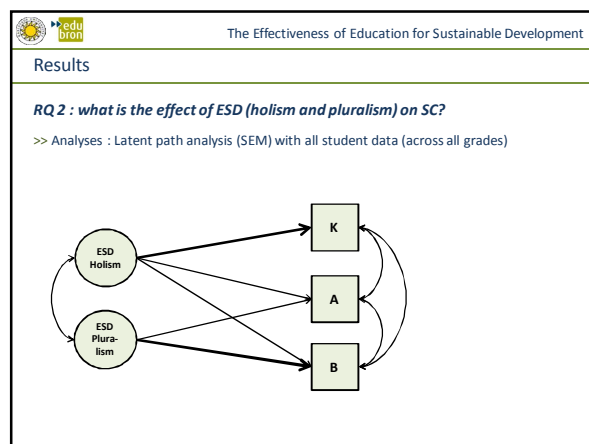
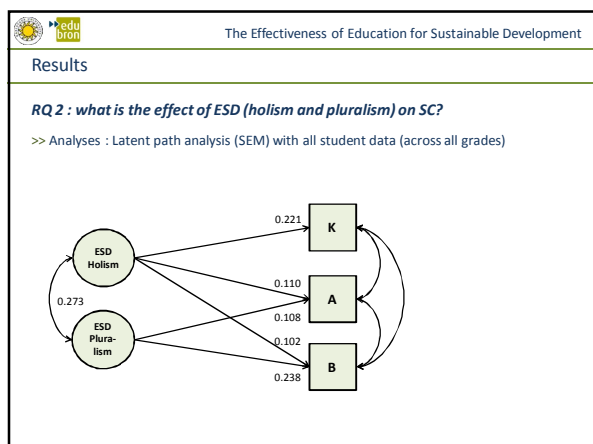
>> Analyses : simple ANOVAs on raw data of student perceptions on ESD in their school

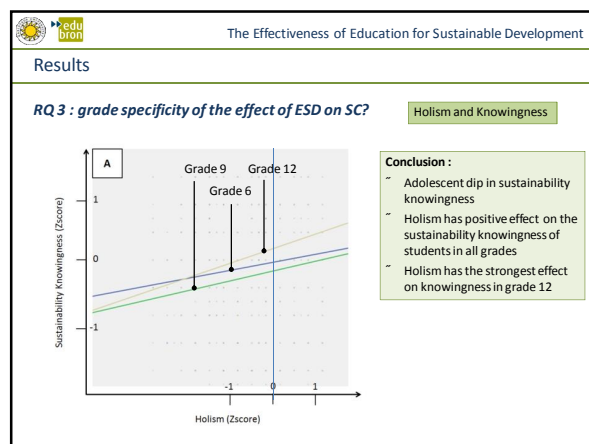
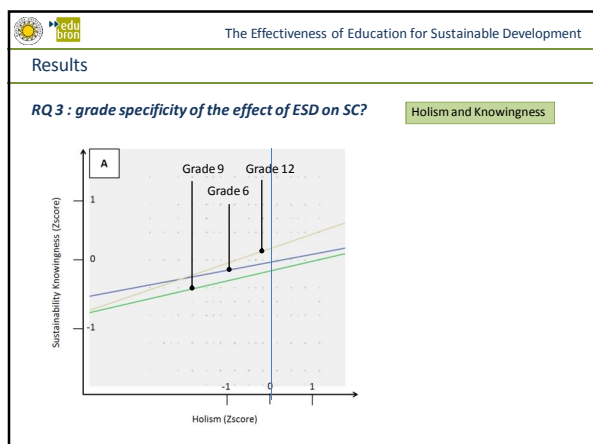
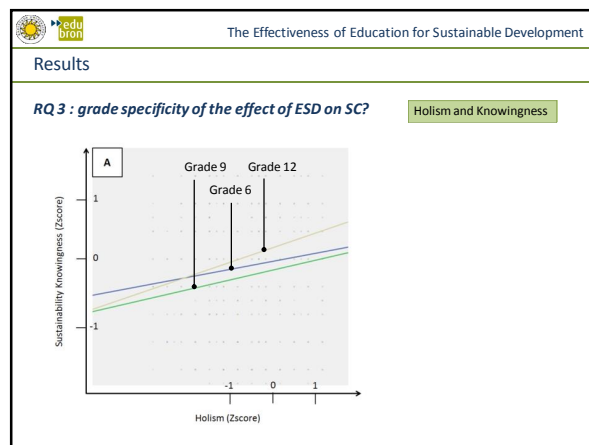
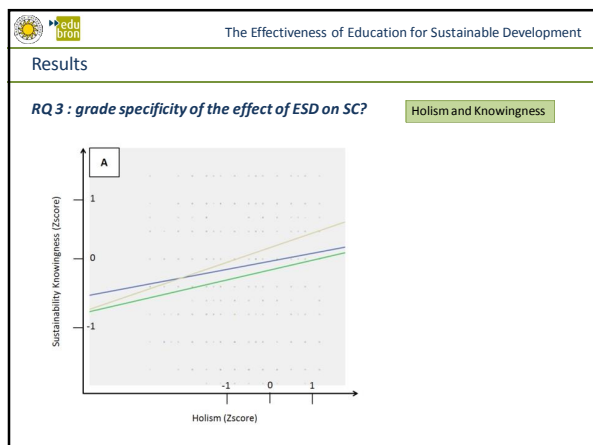
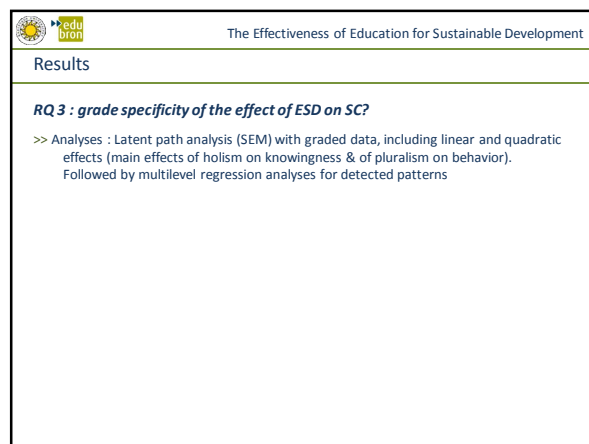
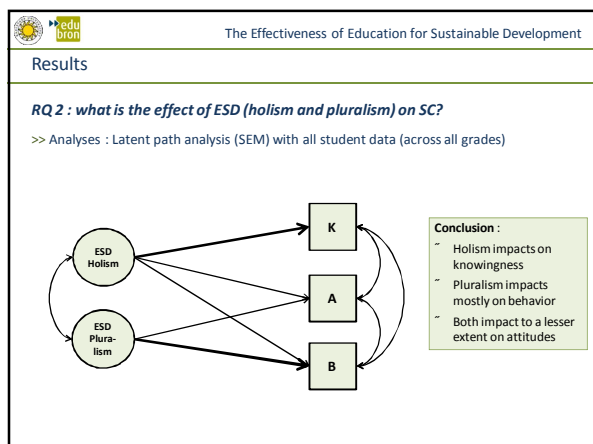


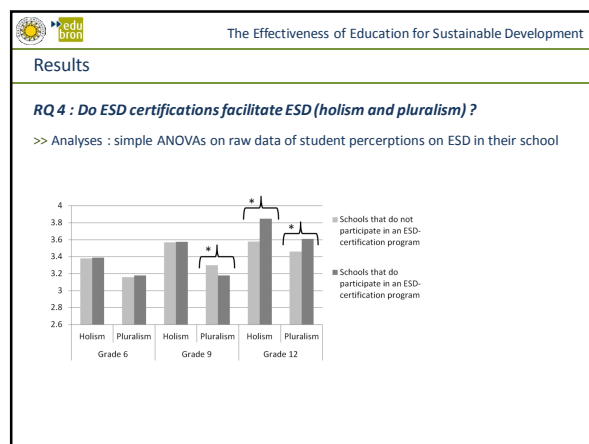
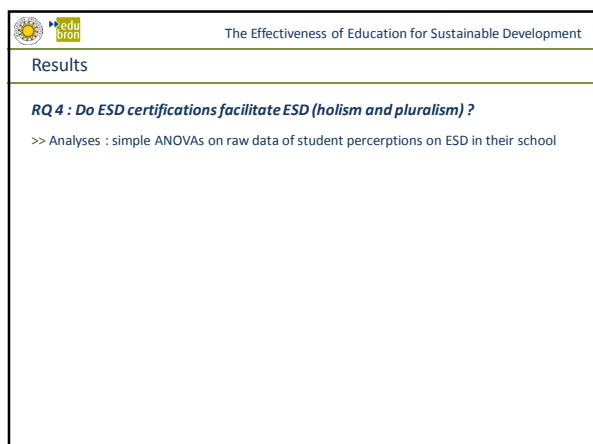
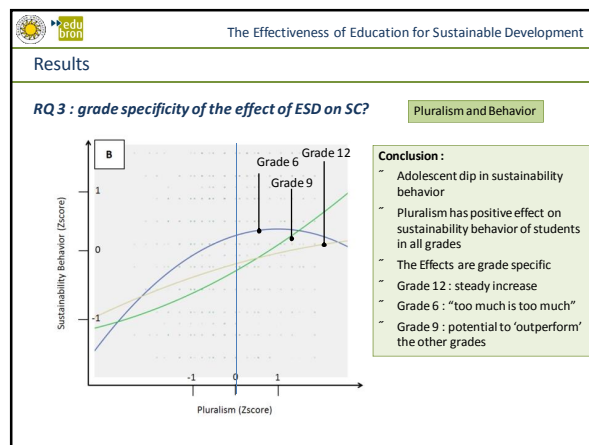
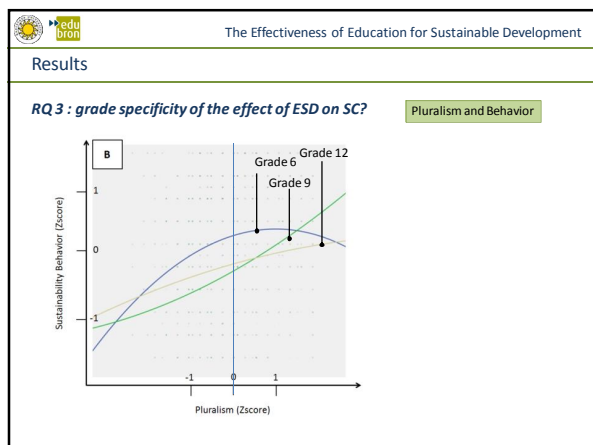
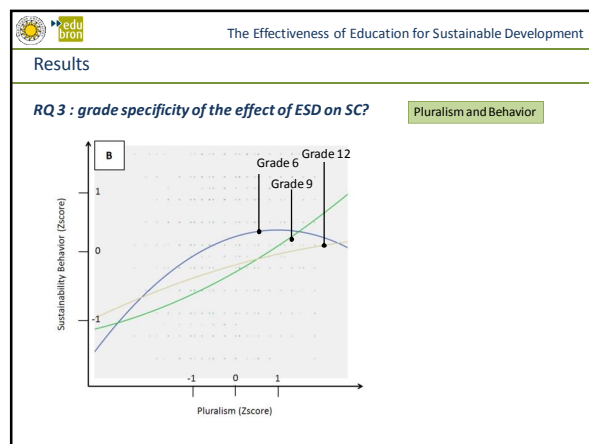
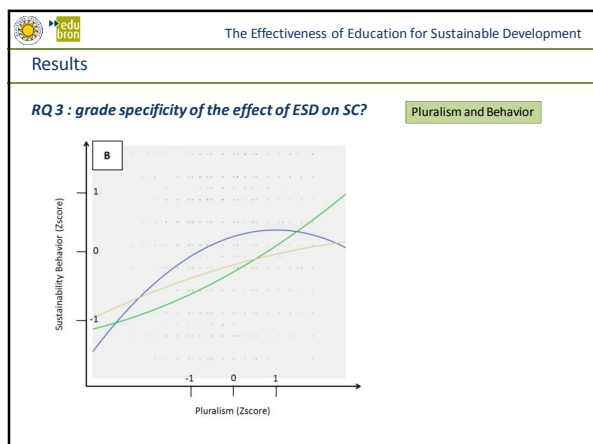
**Results**

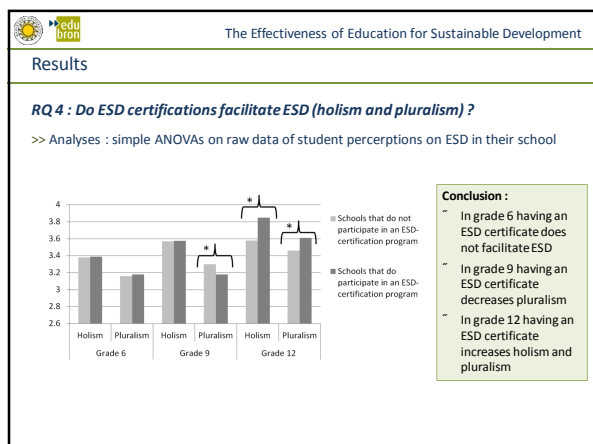
**RQ 2 : what is the effect of ESD (holism and pluralism) on SC?**

>> Analyses : Latent path analysis (SEM) with all student data (across all grades)









The Effectiveness of Education for Sustainable Development

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- " There is no fix-it-all solution: educational practices need to be attuned specifically to the target audiences
- " As suggested by the DESD final report, more research in more contexts is needed to determine the effects and success factors of the ESD

The Effectiveness of Education for Sustainable Development

### Thanks for listening

Published open access :

Boeve-de Pauw\*, J., Gericke\*, N., Olsson, D., & Berglund, T. (2015). The effectiveness of education for sustainable development. *Sustainability*, 7(11), 15693-717.

Questions ? Comments ?

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	The Effectiveness of Education for Sustainable Development
Publications	
<p>Gericke, N., Boeve-de Pauw, J., Berglund, T., Olsson, D. (forthcoming). Development and validation of the Sustainability Consciousness Questionnaire (SCQ).</p>	
<p>Olsson, D., Gericke, N. (2016). The adolescent dip in students' sustainability consciousness. <i>The Journal of Environmental Education</i>, 47(1), 35-51</p>	
<p>Boeve-de Pauw, J. Gericke, N., Olsson, D., &amp; Berglund, T. (2015). The Effectiveness of Education for Sustainable Development. <i>Sustainability</i>, 7, 15693-15717.</p>	
<p>Berglund, T., Gericke, N. (2015). Separated and integrated perspectives on environmental, economic, and social dimensions – an investigation of student views on sustainable development. <i>Environmental Education Research</i>, published online first.</p>	
<p>Olsson, D., Gericke, N. &amp; Chang Rundgren, S. N. (2015). The effect of implementation of education for sustainable development in Swedish compulsory schools - assessing pupils' sustainability consciousness, <i>Environmental Education Research</i>, published online first.</p>	
<p>Berglund, T., Gericke, N. &amp; Chang Rundgren, S. N. (2014). The Implementation of Education for Sustainable Development in Sweden: Investigating the Sustainability Consciousness among Upper Secondary Students. <i>Research in Science &amp; Technological Education</i>, 32(3), 318–339.</p>	