Teaching Sustainability in European Higher Education Institutions: Assessing the Connections between Competences and Pedagogical Approaches

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December, 2019
Introduction

• There has been considerable progress in the incorporation of sustainable development (SD) into the curricula of Higher Education Institutions (HEIs) (Capdevila, Bruno, & Jofre, 2002; Desha, Hargroves, & Smith, 2009; R. Lozano, 2010; Sammalisto, Sundström, Von Haartman, Holm, & Yao, 2016), where European HEIs have been leaders (Disterheft, Ferreira da Silva Caeiro, Ramos, & de Miranda Azeiteiro, 2012; Karatzoglou, 2013; R. Lozano et al., 2014)

• This has included research on competences for SD (Barth, Godemann, Rieckmann, & Stoltenberg, 2007; Lambrechts, Mulà, Ceulemans, Molderez, & Gaeremynck, 2013), and how to develop such competences through pedagogical approaches (Hopkinson & James, 2010; Yanarella, Levine, & Dumreicher, 2000)); however, there has been limited research on the connection between how courses are delivered (pedagogical approaches) and how they may affect sustainability competences
Incorporation of SD into curricula

• There has been increasing research on competences for sustainable development (e.g. Barth, Godemann, Rieckmann, & Stoltenberg, 2007; Ceulemans & De Prins, 2010; Lambrechts, Mulà, Ceulemans, Molderez, & Gaeremynck, 2013), and some peer-reviewed articles have proposed pedagogy to deliver SD and some on how to deliver SD through pedagogical approaches (e.g. Fortuin & Bush, 2010; Hopkinson & James, 2010; Yanarella, Levine, & Dumreicher, 2000)
Pedagogy and competences for SD

• **Pedagogy** and **competences** generally have been studied separately, though there have been some exceptions, for example:
  • Case-based approaches for sustainability science (Sprain & Timpson, 2012)
  • Effectiveness of different pedagogical approaches in engineering courses for improving student awareness of sustainability (Segalàs, Ferrer-Balas, & Mulder, 2010)
  • Connections between pedagogies, knowledge domains and four key competences in primary and secondary education (Frisk & Larson, 2011)

• There have been **limited attempts to link** competences and pedagogical approaches, with the exceptions of Sprain & Timpson (2012), and Sipos et al. (2008)
Methods (1)

- A survey was developed to investigate teaching SD competences in European Higher Education Institutions. The survey consisted of six sections:
  1. **Background questions about the respondent’s HEIs, the respondent characteristic, and her/his teaching (in general and SD)**
  2. **Self-assessment of SD criteria taught, based on the STAUNCH® criteria, and on a four scale (not covered, mentioned, described, and discussed)**
  3. **Pedagogical approaches used, on a five scale (never, seldom, from time to time, often, and all the time)**
  4. **Competences covered in the course, on a five scale (not at all, mentioned, discussed, complementary to the course, and integral to the course)**
  5. **Types of learning, on a five scale (never, seldom, from time to time, often, and all the time)**
  6. **Open ended questions about the incorporation of SD in courses**
Methods (2)

• The survey was applied using the online survey tool SurveyMonkey (2019) and open for three months from September to December 2018

• The survey was sent to a database of 4,099 contacts in Europe

• From these, 392 total responses were obtained (9.85%) for the self-assessment of SD part
Methods (3)

- The contribution to sustainability was analysed using STAUNCH®, which was developed with the aim of assessing holistically and systematically how university curricula contribute to SD (i.e. the SD issues’ coverage, depth and breadth) (R. Lozano, 2010; R. Lozano & Peattie, 2011).

- Two new variables, **Strength of the competences** and **Strength of the pedagogical approaches**, were created. These were calculated dividing the sum of the all the items divided by the number of items that had a 1, 2, 3, or 4 for the competences and pedagogical approaches.

- The responses were analysed using descriptive statistics, Friedman test to rank the competences and pedagogical approaches (at p<0.01), and Spearman correlations. These were done using IBM SPSS 24 (IBM, 2015).
Results
Ranking of the sustainability competences covered
STAUNCH® results (2)

Economic
27%

Environmental
27%

Social
18%

Cross-cutting themes
28%

Strength

Economic 27%

Environmental 27%

Social 18%

Cross-cutting themes 28%

Frequencies

ALL 45,45% 45,84% 68,44% 45,53%

Economic 25,01% 26,03% 21,61% 29,33%

Social 29,53% 28,13% 25,14% 9,94%

Environmenntal 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Ranking of the pedagogical approaches used
Correlations between Strength of competences, Strength of pedagogical approaches, and Contribution to sustainability model

(Lozano, et al. 2019)
Correlation between the sustainability STAUNCH® dimensions and competences

<table>
<thead>
<tr>
<th>Systems thinking</th>
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<tbody>
<tr>
<td>Inter-disciplinary work</td>
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<tr>
<td>Anticipatory thinking</td>
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<tr>
<td>Justice, responsibility, and ethics</td>
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<tr>
<td>Critical thinking and analysis</td>
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<td>Interpersonal relations and collaboration</td>
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<td>Empathy and change of perspective</td>
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<td>Communication and use of media</td>
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<td>Strategic action</td>
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<td>Personal involvement</td>
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<td>Assessment and evaluation</td>
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<td>Tolerance for ambiguity and uncertainty</td>
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Conclusions

• The research underlines the relations between: 1) the competences and sustainability; and 2) the pedagogical approaches and the competences

• The paper empirically tests and updated the framework to provide a much more ‘real’ picture on how the pedagogical approaches are being used to develop sustainability competences

• This paper demonstrates that to achieve sustainability it is necessary to cover the competences ‘Full Monty’ through a combination of pedagogical approaches
Conclusions (1)

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• The paper empirically tested and updated the framework to provide a much more ‘real’ picture on how the pedagogical approaches are being used to develop sustainability competences
Conclusions (2)

• Traditional pedagogical approaches (such as lecturing and case studies) need to be rethought and redesign to be able to better develop the competences and, ultimately, sustainability education.

• Another viable approach is to generate capacity building to connect the pedagogical approaches having a better potential with the proper competences.
To better develop the mind-sets and actions of future generation, we must provide our students with the ‘full monty’ of sustainability competences through pedagogical approaches.
What next?

• Project with 15 universities worldwide (in Africa, America, Australia, and Europe)

• Similar survey but now to all HEI teachers (whether they teach sustainability or not)

• Objective: Synthesising the learnings from each HEI and provide recommendations to on how to better incorporate sustainability into their teaching and develop sustainability competences
Thank you!

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