

The Relevance of Transdisciplinary Teaching and Learning for the Successful Integration of Sustainability Issues into Higher Education Development

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Abstract

The idea of transdisciplinary research is understood as a promising teaching method in the context of sustainability. Against the background of motivational research it will be argued that transdisciplinary teaching can act as a relevant motivational element for the sustainability learning processes.

Keywords

Transdisciplinary teaching · Higher education · Sustainability issues · Motivational research

1 Introduction

The relevance of transdisciplinary research within sustainability science (in addition to interdisciplinary research) is almost mainstream nowadays. In contrast to this, transdisciplinarity receives rather limited consideration within academic teaching and learning concepts. Accordingly, this paper intends to explore the chances and advantages of transdisciplinary teaching and learning within the field of sustainability programs. Transdisciplinarity includes the participation of society as a whole, whereupon in this article transdisciplinary teaching focuses on the participation of practitioner, e.g. experienced CSR manager.

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2 Specific Demands Due to Sustainable Development

Despite the huge variety of sustainability concepts and the ongoing debates on possible scopes of sustainability on a civil, legal, corporate and individual level, sustainability as a guiding principle is broadly established. Nevertheless, there are still many challenges regarding the implementation of sustainability. This is due to the nature of sustainability. Sustainability normally is linked to multidimensional, complex, inter- and transdisciplinary, ambivalent challenges with different time horizons (cf. Beermann et al. 2014). Consequently, teaching and learning in the context of sustainability necessitates specific competencies—as lecturer but also from the perspective of future sustainability managers (cf. Kopp and Martinuzzi 2013; Merck 2013; Nölting et al. 2013). Hence, specific demands result for teaching sustainability issues in higher education. Furthermore, the question arises, what kind of skills and competencies need to be acquired for a successful education of future sustainability managers.

2.1 The Imparting of Sustainability Specific Skills and Competencies

Looking back at the landscape of sustainability related research and science in the context of higher education certain shifts can be identified. Tilbury (2011) clearly shows that nowadays new demands towards sustainability related research arise (Table 1):

This shows that new claims concerning the role of sustainability related research have been raised. The self-image of sustainability related research as passive and mainly informing actor changed towards a new role as “change agent”. Research and science shall nudge changes towards sustainability by itself. This trend can be seen in research but also in the area of teaching and learning.

Table 1 Shifts in the sustainability related research landscape in the context of higher education

Shifts from...		...to be more inclusive of...
Research which is discipline focused		Research which is inter- and multidisciplinary
Research that has academic impacts		Research which has social impact
Research that informs		Research that transforms
Research on technological and behaviour change		Research that focuses on social and structural change
Researcher as expert		Researcher as partner
Research on people		Research with people

Source Tilbury (2011, p. 6)

According to the UNESCO report on education and skills for inclusive and sustainable development beyond 2015, one eminent trend is to recognize (...) “that learning is increasingly happening individually beyond formal educational settings, the role of teachers will have to evolve from dispensers of information and knowledge to facilitators and enablers of learning” (UNESCO 2012a).

Amongst others, the Bologna reform has induced such changes since 1999 due to the enhancement of competence development. It acts as a frame for competence based learning and initiates a shift from defining aims and objectives into learning outcomes. Although Schaeper (2008) clarifies that key competencies are not explicitly mentioned in the official statements on the Bologna process, competencies are closely related to an explicit objective of the main reform efforts: enhancing the employability of higher education graduates. Therefore, Schaeper (2008) states that key competencies are more an implicit or rather derived objective of the Bologna reform.

The indicated entitlement to a stronger focus of academic education on the labour market shows that also sustainability related graduation programs have to consider these requirements. Against this background a study carried out by Kopp and Martinuzzi (2013, p. 195) is of high interest. Based on analyses of current publications, which are based on interviews of leaders in middle and top-positions and their view on necessary sustainability competences, Kopp and Martinuzzi show the multifaceted profile of requirements for sustainability managers/coordinators, especially in business organizations (Table 2).

Subsequently, following questions arise for the implementation of sustainability into higher education: How can students be trained as promising future sustainability managers? Which barriers need to be taken into consideration? What are possible success factors taking into account the Bologna reform’s aim of enhancing employability? And which teaching and learning methods can be used?

According to the UNESCO (2012b, p. 25) nine forms of learning can be differentiated in the context of sustainable development. These had been identified as part of a global evaluation (GMES) (Table 3):

Table 2 Sustainability competences for sustainability manager/coordinators

Advanced comprehension of sustainable development	Handling of complexity	Balance between local and global perspectives	Diversity, respect for diverging perspectives
Comprehension of effects, risks and opportunities	Integrative approach	Innovation and creativity	Emotional intelligence and self-perception
Vision, power of persuasion, organisation of transformation	Understanding of interdisciplinary connections	Handling of insecurities, ambiguities and dilemmas	Perception of “shadow issues”
Systematic/holistic thinking	Long-term perspectives	Support in decision-making through dialogue and intuition	Learning and development

Source Based on Kopp and Martinuzzi (2013, p. 95)

Table 3 Various forms of ESD-related forms of learning (UNESCO 2012b)

ESD-related forms of learning (UNESCO 2012b)	Short description
1. Discovery learning	Learners are immersed in a rich context where they encounter some element of mystery; they become curious and begin to make sense of their experience through their own exploration
2. Transmissive learning	Using didactic skills (e.g. presenting, lecturing, story-telling) and supporting materials (e.g. workbooks, instruction forms, visuals) a body of knowledge, set of rules or code of conduct is transferred to the learners
3. Participatory/collaborative learning	Although not identical, both emphasize working together with others and active, not passive, participation in the learning process, which tends to focus on resolving a joint issue or task
4. Problem-based learning	Focused on solving real or simulated problems, to better understand the issue or find ways to make real-life improvements. Issues are either identified by the learners, or pre-determined (e.g. by teachers, experts, commissioning bodies)
5. Disciplinary learning	Taking questions of a disciplinary nature (e.g., geographical and biological) as a starting point, to better understand underlying principles and expand the knowledge base of that discipline
6. Interdisciplinary learning	Taking issues or problems as a starting point, then exploring them from different disciplinary angles to arrive at an integrative perspective on possible solutions or improvement
7. Multi-stakeholder social learning	Bringing together people with different backgrounds, values, perspectives, knowledge and experience, from both inside and outside the group initiating the learning process, to set out on a creative quest to solve problems that have no ready-made solutions
8. Critical thinking-based learning	Exposing the assumptions and values people, organizations and communities live by and challenging their merit from a normative point of view (e.g. animal well-being, eco-centrism, human dignity, sustainability) to encourage reflection, debate and rethinking
9. Systems thinking-based learning	Looking for connections, relationships and interdependencies to see the whole system and recognize it as more than the sum of its parts; and to understand an intervention in one part affects other parts and the entire system

Source Based on UNESCO (2012b, p. 25)

While some forms of learning can be considered as conventional (transmissive learning, disciplinary learning), others are much more innovative and novel such like multi-stakeholder social learning or systems thinking-based learning. It likewise makes the point quite clearly that there is no explicit relationship to transdisciplinary forms of teaching and learning. The specific relevance of this form of teaching and learning will therefore be examined below.

3 The Role of Transdisciplinary Teaching and Learning Within Sustainability Programs

Teaching sustainability issues necessitates sensitizing students for a realistic view on sustainability challenges as well as awareness-raising for potential discrepancies between theory and practice. The logic of science (objective establishment of the truth) on the one hand and the logic of economy (appropriateness) on the other hand can lead to imbalances and frustration for graduates. One challenge therefore is to actively reflect and discuss the necessary balancing act of the scientific preoccupation with sustainability issues and the economic reality. Against this background, the risk of a lack of motivation arises immediately. This is due to the fact that the examination of sustainability issues is often attended by complex deficits and rarely with positive success stories. Enhancing motivation instead needs to show that changes towards sustainability are possible. This is confirmed by motivational research (Deci and Ryan 1993; Bandura 1977). Transdisciplinary teaching is seen as a crucial success factor doing so.

3.1 Transdisciplinary Teaching Against the Background of Motivational Research

Motivational research has shown that physiological needs, emotions and psychological needs are essential drivers of human motivation. According to the self-determination theory by Deci and Ryan (1993), psychological needs are of extraordinary relevance for motivation. The authors thereby differentiate between three basic psychological needs for autonomy, competence and relatedness (BPNT—Basic Psychological Needs Theory). In this context Bandura's social cognitive theory, in particular his model of self-efficacy, is of high interest. According to Bandura, self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations". Self-efficacy thereby is influenced by primarily four sources: 1. Mastery experiences, 2. Vicarious experiences, 3. Social persuasions, 4. Physiological states (Bandura 1997).

In the following, the focus will be on the source of vicarious experiences, which Bandura describes as follows: "Seeing people similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities master comparable activities to succeed" (Bandura 1994, p. 72).

The authors argue that transdisciplinary teaching can alter the level and strength of self-efficacy due to a specific activation of the source "vicarious experiences". Whereas "conventional" teaching methods are hardly able to alter self-efficacy of the three other sources, transdisciplinary teaching can have a positive influence due to its inherent nature of vicarious experiences. This is of extraordinary importance in the context of sustainability programs with regard to the following circumstances:

- High level of discrepancies between logic of science and the logic of economy - due to a high (scientific) demand on sustainability approaches and understanding on the one side and a rather pragmatic and often limited and slow implementation process of sustainability in daily work on the other side
- High level of difficult tasks due to a high complexity, longsome circumstances, interdisciplinary problems and missing experience
- A resulting high potential for frustration and lack of motivation

4 Conclusion

Transdisciplinary teaching can have a positive influence on the motivation of graduates, especially in sustainability programs, and allows an active imparting of practice-based knowledge.

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