**HEADLINE:** Revising Creative Sustainability-competencies in Design Educations  
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Recent research demonstrates design-students have gaps of competencies when they interact in complex, social or sustainable design-process’. (Bason, 2013, Mulgan, 2014, Norman, 2010, UNESCO, 2017, Ostergaard, 2018)

Other studies also show how the conditions in which developing key competencies for social and sustainable development (CSD’s) in Higher Education (HE) could develop and what key competencies are required in order to enable students to handle complex social and sustainable challenges. HE’s are challenged when implementing new methodologies for educations to develop CSD’s. A new competence-oriented didactic with a focus on students-outputs and informal learning in opposition to a traditional knowledge based formal learning approach focusing on the teacher’s inputs is emerging. (Ellen MacArthur Foundation, 2019, Frisk & Larsson, 2011, Biberhofer, et al. 2019)

**Structural challenges**  
Teaching at design-schools and universities are shaped by disciplinary structures and silos. Faculties and educations are often created from traditional disciplines connected to a specific expected “employable” status of the future graduates. Educators still practice “knowledge teaching” believing this will encourage change-action from the students. But, research in CSD’s has shown this has very little effort. (Frisk & Larsson, 2011, UNESCO, 2004 & 2017)

The reports points at series of gaps in knowledge, skills and competencies amongst employees in large as well as small and medium sized companies in function-specific process’ trying to implement sustainable changes or even circular economy. They propose a change from knowledge based to competency-based learning in Sustainability Education (SE). According to these reports, there is a need to integrate social, environmental and ecological basic vocabularies, awareness of the personal responsibility, material-science, didactics and learning-settings with norms, worldviews, beliefs and behaviour in HE’s, aiming to develop an overall educational approach in accordance with behavioural science and core competencies for sustainability build on trans-disciplinary design-solutions.

In order to change the educational system, success in acquiring sustainability competencies extends beyond memorization and requires educational institutions also to provide new informal learning settings. But, trans-disciplinary learning settings, real-life sustainability, circular or social challenges or collaborations with “real-people / cases / challenges”, supporting the development of the required competencies are still rare in some universities and design-schools. In Europe progress has been made within the implementation of ESD in HE (Barth, M. et al 2007, UNESCO, 2004 & 2017) and a new research discourse on sustainability education has emerged, asking how we can provide learners with values, norms, knowledge and motivation to encourage economic, social and sustainable development. Thus, SE’s also aim at facilitating the development of competencies needed for dealing with (un)sustainable development (Barth, M. et al 2007, UNESCO, 2004 & 2017)

**Which competencies do we need?**  
Competencies relies on an interlinked complex of knowledge, skills, and attitudes that enables the performance of successful tasks and problem solving (Wiek, et al 2011). When applied to competencies in sustainability, these are interlinked trans-disciplinary skills with relevance to solving real sustainability challenges and opportunities (Barth, M. et al. 2007). Competencies should be differentiated from learning outcomes (e.g., for curriculum development). Competencies should also be differentiated from key competencies, as the competencies which are considered important for sustainability haven’t had the desired attention, in traditional education, (Weinert, F., 2001, Wiek, et al 2011). Still, some of the traditional competencies (i.e. communication skills / critical thinking) are of huge importance to the creation of overall competencies. These key competencies ‘require a high degree of individual reflexivity’ (UNESCO, 2017) rather than domain-specific competencies; i.e.; mathematical competencies, geographical competencies, etc. In 2011 Wiek, et al. defined five key competencies for SE. These competencies are connected to the complex, uncertain, diverse, socially and rapidly changing context of sustainability and requires new settings for students, which enables them to solve problems ‘with respect to real-world sustainability problems, challenges, and opportunities’. The five sustainability key competencies are described as: systems thinking, anticipatory (or future)
thinking, normative (or values) thinking, strategic (or action-oriented) thinking, and interpersonal (or collaboration) competencies. A sixth competency: integrated problem-solving competency, described as a ‘meta-competence of meaningfully using and integrating the five key competencies for solving sustainability problems and fostering sustainable development’ has been added. (Wiek, et al 2011).

**Emancipatory versus knowledge-based learning**

According to UNESCO, ESD should become the key area of education. Instead of promoting a knowledge-based approach; (i.e. certain behaviours or ways of thinking) UNESCO stresses developing an emancipatory frame for developing ESD with a definition of the development of eight competencies. It is crucial to provide possibilities for creating educations which enable the students and institutions to have a “critical reflection on expert opinions”, “testing possibilities of sustainable development” and “exploring the trade-offs of a sustainable lifestyle”

By having a focus on the emancipatory approach of developing “cross-cutting” competencies it will provide not only “the knowledge to understand what the SDGs are all about, but also the competencies to make a difference towards a more sustainable society”. (UNESCO, 2017, Biberhofer, et al., 2019)


**What if...**

Research in ESD promotes enhancing the focus on personality development, thus enabling a person to cope with complexity, uncertainty, act upon own reflection and responsible, ethical decision-making. A “New Learning Culture” is characterised on the basis of three needs: (Biberhofer, et al., 2019)

**A: Competence-orientation:** The focus of the learning processes should be on providing relevant key competencies to the students. This requires a normative defined competency framework, -like the DECS project, or the 8 sustainable key competencies from UNESCO. Providing an open and involving didactic framework is necessary offering reflection possibilities for developing personal competencies and can help to identify possible personal and collaborative learning assets.

**B: Societal orientation:** Learning for SD is fundamentally a societal learning, which should take place in and with real case-collaborations and include systemic teaching and understanding.

**C: Individual centring:** Individual learning is considered to be an asset in a societal orientation. In formal contexts of learning it changes the role of the teacher towards being a facilitator of learning with the students.

In addition to this, the HE’s needs to find ways of innovating new methods which can integrate and use the knowledge and competencies developed in informal learning settings, as students not only learn in formal settings. Some 70 % of all learning derives from informal learning. (Barth, M. et al 2007) Experiential learning can facilitate developing action-competencies and has a special importance for developing “life competency”, meaning the capacity to act on; plan and implement individual or common life-projects. Experiential learning is described by the following; (Kolb, D., 1984), 1. The involvement of the whole person (intellectual and sensory faculties as well as emotional responses); 2. An active use of all previous relevant life and learning experiences; 3. Reflection upon earlier experiences so as to allow an evolution of thought and hence a deeper understanding.

As such, the DECS project (B. Martinez-Villagrana, et al., 2018), provides both a vocabulary, a method for construing the ten competencies and a relatively non-curricular informal tool for a continuing personal development proposing elements of the informal, “experiential learning” - developing a life competency - using intellectual, sensory as well as emotional responses in the assessment of the individual and the group in the process. On the other hand, as the DCT tool is a powerful competency facilitator, as it suggests a combination of the “regular” design competencies, such as “Learning”, (curiosity + knowledge internalization), Critical Thinking, (questioning + proposing), Oral Communication, (planning + charisma) Autonomy, (self-management + initiative) and Social and Ecological Sensitivity, (awareness + compromise) in a sustainability context. In a SE view, the DCT tool could help enhance the design-student’s self-awareness in relation to the UNESCO proposed competencies and add aesthetics and material-knowledge and science to the SE competencies.
FIGURE X: A mapping of similarities different sustainability competencies in a comparison of the DECS creative competencies with the UNESCO competencies for sustainable development. The DCT tool and the DECS vocabulary can enhance the designer’s self-awareness, material-knowledge and encourage the development of collaborative, ecological competencies. But this knowledge focus also needs to be assisted by the competencies from the SDG’s and a supported entrepreneurial interaction with the real-world.

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