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Applying Design Thinking to Support Education for Sustainable Development in Higher Education

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Abstract

Education for Sustainable Development (ESD) is a holistic concept that addresses the global challenges of our interconnected world in environmental, economic, and social terms. It aims to empower people to act responsibly for ecological integrity, economic viability, and equitable society, to recognize and evaluate problems of unsustainable development, and to apply knowledge about sustainable development. In this context, Gestaltungskompetenz (shaping competence), which is based on the OECD Competency Categories, is an important aspect in enabling sustainable development processes and facilitating the change of perspective from reaction to action. Therefore, prospective strategies are required. This is an essential link to the innovation methodology of Design Thinking. This article introduces the concept of Gestaltungskompetenz, the core elements of Design Thinking, and the relevance of its mindset. It also highlights examples of how Gestaltungskompetenz can be supported by Design Thinking in the context of ESD in Higher Education.

Keywords: *ESD; Gestaltungskompetenz; Design Thinking; Mindset; Higher Education*

1. Introduction

The UNESCO program 'Education for Sustainable Development (ESD): Achieving the Sustainable Development Goals' emphasizes the important role of education in implementing the global sustainability agenda (UNESCO, 2017). Gestaltungskompetenz (shaping competence)[1], the acquisition of competencies to design a desirable future, plays a key role in enabling sustainable development processes and facilitating the change of perspective from

[1]In the following, we refer to de Haan (2008 and 2010) who coined the term Gestaltungskompetenz, usually translated as shaping competence. The term is associated with a specific understanding. Therefore, we will use the German expression.

reaction to action (de Haan et al., 2008). This is an essential link to the innovation methodology of Design Thinking, which can be described as inventive thinking in multidisciplinary teams to develop solutions to complex challenges. This article presents key aspects of Design Thinking as well as the relevance of its mindset and provides examples of how Gestaltungskompetenz can be supported by Design Thinking in the context of ESD in Higher Education.

2. Education for Sustainable Development (ESD) and Gestaltungskompetenz

ESD is a holistic concept that empowers people to make responsible decisions in terms of ecological integrity, economic viability, and equitable society. It promotes participation, solidarity, future-oriented thinking, and action - these are key skills for shaping the sustainable development of our society (BNE-Portal, 2024). The concept of Gestaltungskompetenz, derived from de Haan and Harenberg (1999), has a significant impact here. According to de Haan, Gestaltungskompetenz means "[...] having the skills, competencies, and knowledge to change economic, ecological, and social behavior without these changes merely being a reaction to existing problems. Gestaltungskompetenz makes an open future possible that can be actively shaped and in which various options exist" (de Haan 2010, p. 320). Gestaltungskompetenz plays a key role in enabling the realization of sustainable development processes and facilitating a change of perspective from reaction to action. Due to the future-oriented nature of ESD, prospective strategies are required to develop creative hypotheses (de Haan, 2008). This is where the innovation methodology of Design Thinking comes into play: "Everyone designs who devises courses of action aimed at changing existing situations into preferred ones" (Simon, 1996, p. 111). According to this interpretation, design can be characterized as a practice of transformation and shaping the future (Mareis, 2016). Design Thinking takes up this view and aims to shape prospective development processes (Brown, 2019).

3. Design Thinking

Design Thinking can be described as inventive thinking in heterogeneous teams to develop creative solution ideas for complex problems (Plattner, 2009). This understanding of Design Thinking as a human-centered innovation methodology is largely based on the Hasso Plattner Institute of Design, founded at Stanford University in 2005 (Meinel et al., 2015). Meanwhile, Design Thinking has established itself internationally in teaching and research in the field of Higher Education and other areas of education (Lor, 2017). The core elements of this methodology are collaboration in a multidisciplinary team to broaden the horizon of possible solutions, a flexible working environment that stimulates creativity, and an iterative process flow (Plattner et al., 2009). In this article, the six-step Design Thinking process shown in

Figure 1 is explained in more detail. The starting point of every Design Thinking process is the problem definition, the so-called Design Challenge (Plattner et al., 2009). The formulation 'How might we...' helps to define the problem in more detail and facilitates a target group-oriented definition. (Lewrick et al., 2018).

As shown in Figure 1 the Design Thinking process can be divided into the problem space and the solution space. This separation is known as the double diamond and enables a detailed consideration of the problem without rushing into solutions (Design Council, 2007).

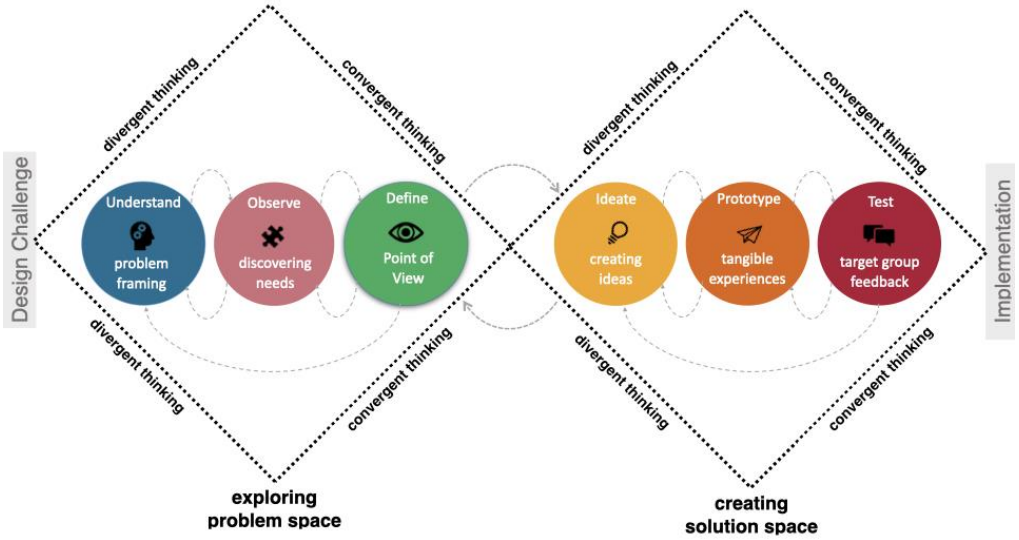

Figure 1. Problem Space and Solution Space in the Design Thinking Process (Source: Schmidberger & Wippermann, 2022, p. 40, translated by the authors).

In the beginning, the focus is on divergent thinking to explore the Design Challenge as openly as possible. Therefore, the first step relates to an in-depth understanding of the problem. This involves collecting existing knowledge and reflecting on one's assumptions about the Design Challenge (Plattner et al., 2009). In the next phase, qualitative research methods (e.g., semi-structured interviews or field studies) are used to get to know the target group's perspective (Lewrick et al., 2018). The results may raise the question of whether the problem has been correctly understood. This iteration, which is used also at all other stages, supports reflection on the process and the findings (Plattner et al., 2009). During the evaluation of the observations, the focus is increasingly on convergent thinking. The results are the basis for defining a common point of view, which marks the transition to the solution space. Now as many ideas as possible are generated in a short time by using various creativity techniques. Here again, divergent thinking is required to support creativity. To make an initial idea tangible as quickly as possible and ready for testing by the target group, a prototype is created

to get to know the strengths and weaknesses of the idea. This experimental development is essential for Design Thinking and learning from mistakes is seen as an opportunity for further development (Brown, 2019). Then, once again convergent thinking is required to concretize and implement the prototype. Design Thinking is an explorative process, which can lead to unexpected discoveries that require fundamental assumptions to be rethought (Brown, 2019). Therefore the connection to the problem space is maintained throughout the entire process.

4. Mindset

With the tools, methods, processes, and iterations described, the Design Thinking methodology provides a framework for developing specific solutions to Design Challenges. However, the team members need a particular mindset to unleash their creative potential successfully (Schmidberger & Wippermann, 2022).

The term mindset refers to individual attitudes, opinions, and beliefs about oneself and the world and represents a powerful framework of assumptions, enabling individuals to simplify and interpret the complex tapestry of the world. They are not just passive filters of reality, they actively guide decisions and shape expectations and behaviors (Primeau, 2021; Dosi et al. 2018). By distilling vast and intricate worldviews into manageable information, mindsets play a pivotal role in how we perceive and engage with our surroundings. “Mindsets can impact your outcomes by determining the way you think, feel, and even physiologically respond to some situations” (Primeau, 2021, p. 1). Dweck's research on mindset had a major impact on educational psychology and beyond and the significance of her findings was widely emphasized (Yeager, et al., 2019). She distinguishes between two general mindsets and the ability to change and adapt our belief systems: the fixed and the growth mindset. With a fixed mindset, it is assumed that all individual characteristics and abilities are given and cannot or only hardly be changed (Dweck, 2017).

The growth mindset, however, is different: it assumes that one's talents and attitudes can be actively changed through (learning) experiences.“This growth mindset is based on the belief that your basic qualities are things you can cultivate through your efforts, your strategies, and help from others. Although people may differ in every which way their initial talents and aptitudes, interests, or temperaments, everyone can change and grow through application and experience” (Dweck, 2017, p. 7).

It becomes obvious that mindsets influence the way we think and feel (Primeau, 2021). “The mind can therefore be understood as something that can be set rather than a set mind“ (Krohn, 2023, p. 18). In the context of Design Thinking, an innovation mindset plays an important role. The Stanford University Design Thinking Manifesto calls the mindset a set of “vital attitudes for the Design Thinker to hold” (Both & Baggereor, 2010, p. II). The Design Thinking mindset for innovation allows each team member to **think and act in a human-**

centered way, which is one of the greatest strengths of Design Thinking. This requires an open and non-judgmental attitude towards people with different backgrounds and perspectives. The ability to empathize with others allows one to change perspective and recognize the actual needs of the target group. Empathy affects also positively the **collaboration in a diverse team**, that values heterogeneity as an opportunity to develop innovative solutions. The mindset also plays an essential role in **exploring the problem space** and **learning through experimentation**. The aim is to understand the problem and its context as comprehensively as possible to uncover blind spots. Iteration loops continuously create the opportunity for reflection, where mistakes are seen as an important learning experience to leave paths already taken and explore new possibilities. **Uncertainty is embraced** and accepted as part of a complex challenge and used constructively to find solutions. This requires an optimistic mindset that allows the **envisioning of a radically new future** (Graves & Fuchs, 2022).

The full potential of Design Thinking can only be exploited when the framework conditions and the individual prerequisites of each team member work together (Schmidberger & Wippermann 2022). Regarding the different types of mindsets, it is obvious that the growth mindset is essential for the Design Thinking mindset.

5. Supporting Gestaltungskompetenz by Design Thinking

Gestaltungskompetenz is based on the three OECD Competency Categories ‘Using Tools Interactively’, ’Interacting in Heterogeneous Groups’ and ‘Acting Autonomously’, each of which de Haan (2010) divides into four sub-competencies. Table 1 provides an overview of the four sub-competencies according to de Haan (2010) regarding the OECD Competency Category ‘Interacting in Heterogeneous Groups’. It shows also examples of the support potential of Design Thinking in Higher Education as well as the key focus of the Design Thinking Mindset in this Competency Category.

Table 1. Sub-competencies of Gestaltungskompetenz in the Competency Category 'Interacting in Heterogeneous Groups' and the support potential of Design Thinking with the key focus of the Design Thinking Mindset (Source: Own presentation based on de Haan, 2010, p. 321).

OECD Competency Category	Sub-competencies of Gestaltungskompetenz	Support Potential of Design Thinking in Higher Education	Key focus of the Design Thinking Mindset
Interacting in Heterogeneous Groups	Co-operate in decision-making processes	Planning and acting together in a diverse team play a key role in Design Thinking. In addition, empathy positively influences teamwork to value heterogeneity as an opportunity to develop innovative solutions.	Think and act in a human-centered way. Collaborate in diverse teams.
	Cope with individual dilemmatic situations of decision-making	Iteration phases create space for reflection on action strategies to deal constructively with existing conflicts of objectives and with dilemmatic situations.	Explore the problem space. Learn through experi-mentation.
	Participate in collective decision-making processes	The definition of a shared point of view during the Design Thinking process is based on collective decision-making, in which all team members are equally involved.	Think and act in a human-centered way. Collaborate in diverse teams.
	Motivate oneself as well as others to become active	The Design Thinking mindset allows cooperation based on trust and enables an open exchange within the team. This helps to overcome uncertainties when dealing with complex challenges and to motivate oneself and others to take action.	Collaborate in diverse teams. Embrace uncertainty. Envision a radically new future.

6. Conclusion and critical reflection

This article focuses on the support potential of Design Thinking in Higher Education based on the concept of Gestaltungskompetenz according to de Haan et al. (2008) in the context of ESD. Design Thinking facilitates a change of perspective from reaction to action and is

particularly suitable for shaping the process of future-oriented and creative transformation. The example of Design Thinking's potential to support the Competency Category `Interacting in Heterogeneous Groups` shown in Table 1 is exemplary of the potential to effectively support all three Competency Categories through the use of this methodology. The full potential of Design Thinking can only be realized if, in addition to the core elements described above, an appropriate innovation mindset is practiced. The foundation of the innovation mindset is a growth mindset. It enables all team members to think and act in a human-centered way, collaborate in a diverse team, and explore the problem space. Furthermore, it allows them to learn through experimentation, embrace uncertainty, and envision a radically new future. Table 1 highlights the key focus of the mindset but all these aspects are necessary throughout the entire process. Further research should be conducted to empirically investigate the described theoretically related concepts of Gestaltungskompetenz and Design Thinking, the support potential of the competency categories, as well as strategies to promote an innovation mindset based on a growth mindset. Finally, Design Thinking is only one way to support Gestaltungskompetenz in the context of Education for Sustainable Development in Higher Education.

References

BNE Portal (2024). Das UNESCO Programm in Deutschland. https://www.bne-portal.de/bne/de/bundesweit/das-unesco-programm-in-deutschland/das-unesco-programm-in-deutschland (accessed on 04.01.2024).

Both, T.; Baggereor, D. (2010), Bootcamp bootleg, Design School Stanford, Palo Alto.

Brown, T. (2019). Change by Design. How Design Thinking Transforms Organizations and Inspires Innovation. Revised and updated edition. New York: Harper.

de Haan, G.; Harenberg, D. (1999). Bildung für eine nachhaltige Entwicklung, Gutachten zum Programm. Bonn: BLK. https://www.pedocs.de/volltexte/2008/218/pdf/heft72.pdf (accessed on 04.12.2023).

de Haan, G. (2008). Gestaltungskompetenz als Kompetenzkonzept für Bildung für nachhaltige Entwicklung. Bormann, I.; de Haan, G. (Hg.). Kompetenzen der Bildung für nachhaltige Entwicklung. Wiesbaden: Springer VS. S. 23-43.

de Haan, G. (2010). The development of ESD-related competencies in supportive institutional frameworks. International Review of Education, 56 (2), p. 315-328, DOI: 10.1007/s11159-010-9157-9.

de Haan, G. & Kamp, G. & Lerch. A. & Martignon, L. & Müller-Christ, G. & Nutzinger, H. G. (2008). Nachhaltigkeit und Gerechtigkeit. Grundlagen und schulpraktische Konsequenzen. Berlin und Heidelberg: Springer-Verlag.

Design Council (2007). Eleven lessons: managing design in eleven global companies. Desk research report. London: Design Council.

Dosi, C., Rosati, F., & Vignoli, M. (2018). Measuring Design Thinking Mindset. https://doi.org/10.21278/idc.2018.0493 (accessed 20.01.2024).

Dweck, C. (2017). Mindset. Changing the way you think to fulfil your potential. London: Robinson.

Graves, M.; Fuchs, J. (2022). Teaching the Design Thinking Mindset: A Practitioner´s Perspective. In: Schmidberger, I.; Wippermann, S.; Stricker, T.; Müller, U. (Hg.), Design Thinking im Bildungsmanagement. Innovationen in Bildungskontexten erfolgreich entwickeln und umsetzen. Wiesbaden: Springer VS. doi: 10.1007/978-3-658-36951-4

Krohn, M. (2023). Crucial Role of Mindsets in Innovation Efforts. Wiesbaden: Springer Fachmedien. doi: 10.1007/978-3-658-39970-2

Lewrick, M. & Link, P. v Leifer, L. (2018). Das Design Thinking Playbook. Mit traditionellen, aktuellen und zukünftigen Erfolgsfaktoren. München: Vahlen.

Lor, R. (2017). Design Thinking in Education: A Critical Review of Literature. Conference Paper. https://www.researchgate.net/publikation/324684320 (accessed 04.12.2023).

Mareis, C. (2016). Theorien des Designs zur Einführung. 2., korrigierte Auflage. Hamburg: Junius.

Meinel, C.; Weinberg, U.; Krohn T. (2015). Design Thinking Live – Eine Einfühung. In: Meinel, Christoph; Weinberg, Ulrich; Krohn Timm (Hg.): Design Thinking Live. Hamburg: Murmann, S. 11 – 23.

Plattner, H.; Meinel, C.; Weinberg, U. (2009). Design Thinking. Innovationen lernen – Ideenwelten öffnen. München: FinanzBuch.

Primeau, M. (2021). Your powerful, changeable mindset. Stanford Report. https://news.stanford.edu/report/2021/09/15/mindsets-clearing-lens-life/ (accessed 04.12.2023).

Schmidberger, I.; Wippermann, S. (2022). Die Innovationsmethodologie Design Thinking. In: Schmidberger, I.; Wippermann, S.; Stricker, T.; Müller, U. (Hg.), Design Thinking im Bildungsmanagement. Innovationen in Bildungskontexten erfolgreich entwickeln und umsetzen. Wiesbaden: Springer VS. doi: 10.1007/978-3-658-36951-4.

Simon, H.A. (1996): The science of the artificial. (3. Edition). MIT Press.

UNESCO (2017). Unpacking SDG 4. Fragen und Antworten zur Bildungsagenda 2030. Bonn: Dt. UNESCO.Kommission. https://www.unesco.de/sites/default/files/2018-01/Unpacking_SDG4_web_2017.pdf (accessed on 04.12.2023).

Yeager, D., Hanselman, P., Walton, G., Murray, J., Crosnoe, R., Muller, C., Tipton, E., Schneider, B., Hulleman, C., Hinojosa, C., Paunesku, D., Romero, C., Flint, K., Roberts, A., Trott, J., Iachan, R., Buontempo, J., Yang, S., Carvalho, C., … Dweck, C. (2019). A national experiment reveals where a growth mindset improves achievement. Nature, 573(7774), 364–369. https://doi.org/10.1038/s41586-019-1466-y.