

Implementing SDGs in a product design curriculum, or: the value of tap water



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Abstract

How can universities in the field of product design anchor a sustainable, future-oriented approach in their curricula? How can they do it in a long-term way that goes beyond individual current topics and can be communicated well both internally and externally? How is a sustainable attitude compatible with a discipline born out of industrialisation?

In the context of a curriculum development in the years 2020 to 2022 at the Lucerne School of Art and Design, the opportunity arose to include the Sustainable Development Goals (United Nations Department of Economic and Social Affairs 2015) in every single module description of our product design bachelor's degree course. The project discussed in this paper served as an important reference in this development, as it succeeded to combine a structural attitude based on the SDGs with the most diverse aspects of product design education, such as design goals, manufacturing techniques and external partners.

This paper has been written to gain an overview of how other schools and programmes in the field of design and art deal with the demand for sustainable and future-proof education and to learn from the methods they use. The aim is to exchange experiences and discuss collaborations for exchange programmes or collaborations, but as well to find out how independent the path we have chosen is.

Author keywords

Product Design; Sustainable Development Goals; SDG; Curriculum Development; Glass; Water; Digital Fabrication; Gastronomy

How to include sustainability into a product design education?

Product design surrounds us everywhere - almost everything we touch during our daily routines has been designed as a serial product.

As a discipline, product design emerged with industrialisation and is closely linked to it. Currently, product design needs to emancipate itself from industrialisation: how can we define our attitude and values in such a way that the side effects of industrialisation do not stand in the way of a future

worth living? Nowadays, there is probably no product design education at Bachelor or Master level that does not talk about sustainability. Sustainability, however, is an extremely elastic term - is there a structure that we can follow without losing sight of our core competence of product design?

Our department at the Lucerne School of Art and Design currently offers 13 courses at Bachelor level. Over the past two years, the department has been engaged in curriculum development across the entire Bachelor level (Holzer 2023a), starting with the new curricula in September 2022. While this curriculum development aimed at facilitating new transdisciplinary modules and transdisciplinary skills by aligning structures, it provided an opportunity for the individual programmes to revise their offerings. We, as a bachelor programme in Object Design, wanted to use the curriculum development to anchor sustainability in all modules - but how could we do this beyond lip service, without losing our focus on product development?

In the search for a guiding structure for our programme, the following factors were important:

- » a broad establishment and recognition
- » an understanding of sustainability that includes social, ecological and economic aspects
- » the coordination within the various product design programmes at the Lucerne School of Art and Design as well as with the sustainability lecturers at our department.

We decided to orientate ourselves according to the Sustainable Development Goals (SDG), which the United Nations General Assembly published in 2015 as political goals to be achieved by the year 2030: from the autumn semester 2022 onwards, each module of the Object Design curriculum will focus on one or more SDGs, which will be communicated at the beginning of the module. For the basic modules in the first semester, the SDGs are the same in each year; for the advanced modules, the SDGs are chosen according to the respective design tasks. (Fig. 1) For the Bachelor thesis, the students themselves specify the SDGs for their self-chosen topic (Fig.2).

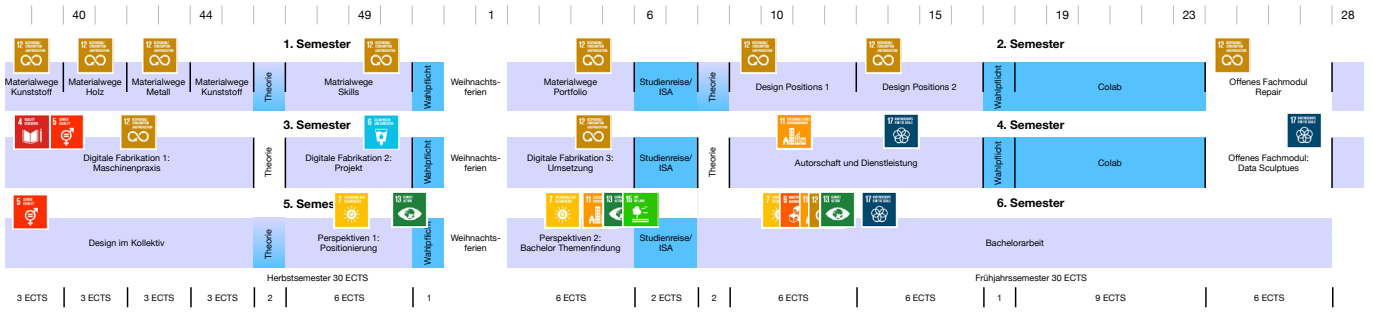


Figure 1. The Object Design Curriculum of the academic year 2022/23 with the SDGs (colored squares) year with the SDGs assigned to the respective modules: Basic modules in the first year (upper line) focus on SDG 12 “Responsible Consumption and Production”, while in the modules in the 2nd and 3rd year the range grows and changes annually depending on the chosen topic. Bachelor students in the sixth semester choose the SDGs of their final project themselves.

Studienrichtung OBJEKTDISIGN
Bewertungsbogen 2023

Bachelor-Arbeit künstlerisch-gestalterisch, Projekt (A) und Präsentation (B)

Name Mentor:in oder Kommission: _____

Name Student:in: _____

A PROJEKT (21 ECTS, 70% der Gesamtnote)

MK 1 | Konzept (Mentor:innen, Kommission) 1-5 Punkte (ungenügend) 6 7 8 9 10

Personliche Zielsetzung, Einbezug eines oder mehrerer Sustainable Development Goals SDG, Schlüsseligkeit der formulierten Aufgabenstellung, Formulierung geeigneter Fragen und Methoden zur Lösung der Aufgabenstellung, Formulierung der projektspezifischen Anforderungen an die Ergebnisse, Begründete Definition einer Zielgruppe, Wert des Projekts für die Zielgruppe, Aufzeigen eines dem Projekt angemessenen Experimentierfeldes und gestalterischen Potentials
Punktzahl (Bitte Position 1-10 ankreuzen)
Konzept

M 2 | Prozess (Mentor:innen) 1-5 Punkte (ungenügend) 6 7 8 9 10

Positionierung der eigenen Arbeit im Feld bestehender Referenzen, Nutzung der zur Aufgabenerfüllung verfügbaren Zeit (Zeiteinteilung, Gliederung der einzelnen Arbeitsschritte), Anwendung von Methoden und Tools, Entwurfsmodelle, Variantenbildung, Reflexion des Arbeitsfortschrittes und ggf. Anpassung der Aufgabenstellung, Nutzung der Erkenntnisse aus dem Prozess, Nutzung der Erkenntnisse aus der schriftlichen Bachelor-Arbeit, Vorbereitung der Themen und des Materials für die Mentoringgespräche
Punktzahl (1-10)
Prozess

MK 3 | Umsetzung (Mentor:innen, Kommission) 1-5 Punkte (ungenügend) 6 7 8 9 10

Bezug zu den projektspezifischen Anforderungen aus der Aufgabenstellung, Sorgfalt und Qualität der Ausführung, Angemessene Wahl der Fertigungstechnik bei der Umsetzung (Handwerk, Maschine, Informationstechnik und deren Kombination), Umgang mit und Nutzung von Werkstoffeigenschaften, Aussage der Modelle (Funktionsprototypen, Designmodelle)
Punktzahl (1-10)
Umsetzung

MK 4 | Autorschaft (Mentor:innen, Kommission) 1-5 Punkte (ungenügend) 6 7 8 9 10

Schlüsseligkeit und Angemessenheit der gewählten Produktsprache (Farbe, Material, Form, Detail), Erkennbarkeit einer persönlichen Haltung und Position, einer Autorschaft, Künstlerische und gestalterische Aussagekraft der Arbeit, Innovation, Eigenständigkeit der Arbeit
Punktzahl (1-10)
Autorschaft

HSLU Hochschule Luzern

K 5 | Zukunftsfähigkeit & Kontext (Kommission) 1-5 Punkte (ungenügend) 6 7 8 9 10

Umgang mit den im Vorhaben genannten Sustainable Development Goals (SDG), Benennung und Auseinandersetzung mit der Auswirkung der Arbeit, Anwendung von Nachhaltigkeitsstrategien (z.B. Suffizienz, Kreislauffähigkeit, Demontage, biolog. Abbaubarkeit), Ausrichtung der Ergebnisse auf die Bedürfnisse einer Zielgruppe, Verhältnis Aufwand/Wert für die Zielgruppe im Feld best. Referenzen, Einbettung und Relevanz des Projekts in Kultur, Wirtschaft und Gesellschaft
Punktzahl (1-10)
Kontext

K B PRÄSENTATION (3 ECTS, 10% der Gesamtnote, Kom.) 1-5 Punkte (ungenügend) 6 7 8 9 10

Auswahl und Qualität der Zwischen- und Endergebnisse zu einer schlüssigen visuellen Präsentation, Wahl der darstellerischen und erzählerischen Mittel (z.B. Visualisierung, Modell, Film) und Skizzen der Ausstellungsstände, Aufbau, sprachliche Prägnanz und Argumentation des mündlichen Vortrags, Umgang mit Rückfragen (Reflexion), Schlüsseligkeit der Antworten, auflegende Projektdokumentation: Nachvollziehbarkeit des Prozesses, Gestaltung
Punktzahl (1-10)
Präsentation

C BACHELOR-ARBEIT SCHRIFTLICH (6 ECTS, 20% der Gesamtnote) wird separat von den Mentor:innen der Bachelor-Arbeit schriftlich bewertet

Abschließender Kommentar (Ausformulierung eines positiven und eines negativen Punktes)

Luzern, den _____ Unterschrift _____

A = Hervorragend. Ausgezeichnete Leistungen und nur wenige unbedeutende Mängel
B = Sehr gut. Überdurchschnittliche Leistungen, aber einige Mängel.
C = Gut. Insgesamt gute und solide Arbeit, jedoch mit einigen grundlegenden Mängeln.
D = Befriedigend. Mittelmässige, deutliche Mängel.
E = Ausreichend. Die geleisteten Leistungen entsprechen den Mindestanforderungen.
F = Nicht bestanden. Es sind erhebliche Verbesserungen erforderlich.

A = 10 Punkte, entspricht Note 5.8
B = 9 Punkte 5.3
C = 8 Punkte 4.8
D = 7 Punkte 4.3
E = 6 Punkte 4.0
F = 5 Punkte < 4.0

Figure 2. The SDGs are an integral part of the Bachelor's thesis without being the main focus: The SDGs are carefully but unmistakably integrated into the evaluation form of the Bachelor thesis at the points marked in pink. At the top left of the assessment criterion “Concept”, the students select a “Personal objective, inclusion of one or more Sustainable Development Goals SDGs, conclusiveness of the formulated task”. In the assessment criterion “Sustainability & Context”, the “Handling of the Sustainable Development Goals (SDG) as mentioned in the draft” is assessed as well as the “application of sustainability strategies (e.g. sufficiency, recyclability, dismantling, biodegradability)” in general.

In parallel, the SDGs were integrated into the Textile Design programme, who had initiated the discourse about integrating SDGs into the new curricula (Holzer 2023b). This, in turn, built on a strategy of the department's Products & Textiles Research Group, which has been embedding the SDGs in its research proposals since 2017, referring to the Swiss Federal Department of Foreign Affairs “2030 Agenda for Sustainable Development” (Agenda 2030). Back in 2019, Object Design and Textile Design had already developed together the voluntary training “Sustainability for Lecturers in Design and Art” (Perret and Zimmermann 2020).

Since November 2022, the reference to the SDGs is stated on our website: “All modules in the Object Design programme focus on one or more goals of the United Nations Sustainable Development Goals (SDG). For their Bachelor's thesis, Object Design students define one or more of these goals.” (HSLU ObjektDesign SDG 2022).

An essential quality of a paper is to situate one's own teaching in the context of other universities. We investigated the integration into other product design programmes on four levels:

ChatGPT

This is 2023, and initially we started with ChatGPT: "Which Bachelor's or Master's programme in product design integrates the United Nations Sustainable Development Goals (SDGs) into its curriculum?" To which ChatGPT replied the following on 31/01/2023: "I'm not aware of a specific Bachelor's or Master's program in product design that integrates the United Nations Sustainable Development Goals (SDGs) exclusively into its curriculum. But many universities and institutions offer courses and programs that cover sustainability and the SDGs as part of their product design curriculum. You may want to check with specific universities or institutions for more information on their offerings."

SDGsUNI

While the SDGsUNI initiative (WASD 2023) lists a few schools in the arts, only a few of them address SDG 12 'Sustainable Consumption and Production', none of them related to product design: the Sibelius Academy in Finland (a music school), the University of The Holy Qur'an and Islamic Sciences in Sudan, and the Ghana Institute of Journalism. However, as we are not listed there ourselves, we must not assume completeness of these lists.

she ji Study

One of the reviewers of this paper kindly drew my attention to a comparative study on "Sustainable Product Design Education" published in she ji (Watkins 2021). It compares curricula from six universities in different countries. All of them teach sustainability, e.g. in studio projects, final projects, elective and compulsory modules, some of them refer in these modules to the SDGs (Nottingham Trent University, Technical University of Denmark, TU Delft). However, the study does not give any indication of a continuous implementation of the SDGs in one of their curricula.

Internal Study HSLU

Thanks to an internal, unpublished and therefore non-quotable comparative study carried out in our department last year, we got an up-to-date overview of design and art courses offered worldwide at design and art colleges in the field of eco-social innovation at BA, MA and PhD level, as well as in the field of further education. Of the 26 Bachelor's programmes,

15 could be assigned to the field of "Design", eight to the field of "Fashion and Textiles" and three to the field of "Art and Liberal Arts". Of the 15 programmes in the area of "Design", one specialises in visual communication, six focus on product design and two have a very open curriculum. For the purposes of this paper, I have only examined the six universities in the field of product design in more detail. A browser research with ChatGPT and Google brought the results in Table 1, see links in the references at the bottom of this paper.

Even by contacting these schools directly via email and explaining the purpose of this paper, none of the six schools answered to the request. Until the moment of the publication of this paper, we could not find evidence of a structural integration of the SDGs into a product design education in any of them. Despite today's possibilities of an investigation, we are far from making a claim to its completeness and thus to a unique selling point of our curriculum. Nevertheless, seven years after the presentation of the SDGs in 2015, this is a surprising interim result for an education that has such a big impact on our use of resources.



Figure 3. Glass blowing at the Open Glass Studio with help of a digitally milled mould
Images: Raisa Durandi

Table 1. Overview of product design schools related to the SDGs based on internal study

Product design school	use of SDGs	reference
Universidade de Trás-os-Montes e Alto Douro	lists the school's activities related to SDGs on its website since 2019	UTAD SDG 2019
Hochschule für angewandte Wissenschaften Coburg	lists the SDGs as a focus of the "ERIC - Entrepreneurship Track for Regional Impact on Global Challenges" programme	HS Coburg SDG 2022
Ecosign	no specific mention of the SDGs	
Häme University of Applied Sciences	lists SDGs as part of their "Sustainable Development Programme"	Häme SDG 2017
Falmouth University	claims to be ranked as a Top 10 Institution by the 2021 and 2022 SDG Teach In	Falmouth SDG 2021
Linnæus University	lists publications from Linnæus University that are connected to the SDGs	Linnæus SDG 2022

Case Study: 'Value of Tap Water' Project

Institutions that use the SDGs in their corporate communication are required to substantiate these goals with concrete measures if they do not want to be accused of greenwashing. In the case of our curriculum, we would like to show what role the SDGs play in a specific module. Our case study is the module "Digital Fabrication" from the 3rd semester of Object Design:

In a country like Switzerland, we take it for granted that water of the best quality is available free of charge. Switzerland is a country of wells. Globally, this is an exception. Nevertheless, Swiss people afford themselves the luxury of buying bottled water; in 2021, for example, sales amounted to 903.5 million litres (Statista 2021). This behaviour leads to a burden on the environment, through transport, packaging and production. What does a glass container have to look like to make tap water seem more valuable than a bottle of San Pellegrino? Within four weeks, 3rd semester students designed fourteen counter-position to the culture of branded water. This resulted in fourteen glass vessels for an event of experimental gastronomy in interaction with digital tools and a

glass blower – see four examples in a project video on <https://vimeo.com/771902070>. The project 'The Value of Tap Water' aims to bring together five different perspectives:

1. We envisaged the appreciation of tap water as a design objective and sustainable meta-theme, closely linked to the SDGs 6 Clean Water and Sanitation, but also SDG 3 Good Health and Well-Being and the obligatory SDG 12 Responsible Consumption and Production.
2. For alumni, it is important that as many school projects as possible achieve a visual quality that can be presented in a portfolio. In case of this project the design aim was to explore the formal, narrative and functional aspects of glass carafes and vessels for water.
3. The project was developed in the module 'Digital Fabrication' in the curriculum of our programme. Students learned about three-dimensional drawing, the creation of data for the CNC milling machine as well as its handling by means of mould making for glass blowing.
4. The linking of digital woodworking with archaic glass blowing at the professional Open Glass Studio exemplified the diverse and unexpected areas of applying of digital fabrication. The contextualisation with the SDGs, as well as the application of Digital Fabrication goes beyond earlier examples of glassblowing in product design, see for instance Glanzmann L. (2012) and Scott de Martinville, A. (2015).
5. With its experimental gastronomy, our Dutch project partner steinbeisser.org offers an expressive platform for presentation, discussion and sale of the objects. Steinbeisser scheduled a prominent event with Vegan Michelin-cook Zizi Hattab and Karime Lopez in September of 2023 at the Merian Gardens in Basel (Steinbeisser 2023), where the submitted objects will be used as part of an experimental gastronomy. Following the event, the glass objects will be offered as individual pieces at their online store on www.jouwstore.com.

While the material experience of glassblowing and the collaboration with the partner steinbeisser.org were enormously appreciated by the students, there was hardly any feedback for the establishment of the SDGs in the curriculum.

Lessons we learned

As we considered the implementation of the SDGs a major step for our curriculum and perception, we started a digital



Figure 4. Connecting vessels with a tube: Zita Fahrländer's project illustrates the interrelations of drinking water resources
Movie still: Raisa Durandi

survey of all object design students on the following questions:

- » Has anything changed for you since we embedded the SDGs in the Object Design curriculum - and if so, what?
- » Did the SDGs mentioned at the beginning of the modules influence your design decisions - and if not, why not?
- » Do you have any advice for us regarding the introduction and embedding of the SDGs in the following academic year?)

First of all, it should be mentioned that despite repeated requests, there was only little feedback from the students. Participating students of all study years stated that sustainability would have been a priority in their lives even before they started their studies. Nevertheless, they were not or only little aware of the SDGs and they would like to have a more profound, also critical examination of the SDGs. One person wrote that projects could also be based on the SDGs, instead of a later classification. Another person stated that her project research had to do with drinking water and was therefore connected to the SDGs, but rather in an unconscious way.

For the first time in 2023, the fifteen Bachelor candidates in Object Design were asked to refer to one or more SDGs in their outline of their Bachelor project (cf. Fig. 2). Although this was only done marginally in their project drafts, we noticed a considerably deeper engagement with sustainability in the topics chosen by the students.

The most concrete student feedback we received during the presentation of the SDGs in the first year, while introducing a text by Rutger Bregman on moral ambition: we had not been consistent with the gender-inclusive word endings in the German translation, and thus students told us that the presentation did not meet our own requirements of SDG 5 "Gender Equality". As a consequence, we organised a discussion on gender-inclusive language with all the lecturers of the first year and reviewed our use of language.

A little surprised, we note that the effects of the SDGs in the curriculum are only indirectly experienced by the students. At the same time, we as a study programme - as lecturers -



Figure 5. The variety of different moulds produced at the wood workshop of Lucerne School of Art and Design: most of them on the CNC milling machine in massive beech, others in plaster or even sand
Image: Andri Stadler

are aware that this step helped us enormously to integrate a sustainable attitude consistently and in all its diversity into our teaching.

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