

# BEHAVIOURS, PRACTICES, ACTIVITIES, DOINGS: MAKING THEM SUSTAINABLE THROUGH DESIGN

Wanjun CHU<sup>1</sup> and Renee WEVER<sup>2</sup>

<sup>1</sup>Department of Computer and Information Science, Linköping University, Sweden

<sup>2</sup>Department of Management and Engineering, Linköping University, Sweden

## ABSTRACT

The Design for Sustainable Everyday Life course aims to provide students with three theoretical lenses (behaviours, activities, and practices) to understand and develop design interventions that improve sustainability by impacting people's everyday doings. This paper reports on the result of and our reflections on the course over the past two years with a particular focus on identifying the challenges and benefits that the students faced in learning and employing the three different theoretical lenses in sustainable design. We found that facilitating students to apply theoretical lenses that are typically outside of their previous design education constitutes a challenging task in the course, let alone presenting students with three theoretical lenses on the topic of design for sustainable everyday life. However, results show that the three lenses supported students in choosing an appropriate unit of analysis and systematically developing sustainable design interventions at a target level. Moreover, the course also offered an entry point for students to (re)discover and align their existing understanding of design with new concepts introduced by the lenses. Furthermore, the analytical and design approach that the lenses advocate also enabled students to explore and experiment with different design intervention strategies to influence people's (un)sustainable daily doings.

*Keywords: Design for sustainable behaviour, design for sustainability, sustainable design education, activity theory, practice theory*

## 1 INTRODUCTION

The discussion around how to effectively design products and services to better promote people's sustainable behaviour has gained growing attention over the past two decades [1–3]. Researchers working on this topic have adopted and adapted different theoretical perspectives, especially from psychology and sociology, to understand sustainable and unsustainable doings in people's everyday lives [4]. However, to what extent these theoretical perspectives, from outside of the traditional design disciplines, can be employed in courses which focus on sustainable product design has been seldom explored.

Many existing studies argued that sustainable product design education should not merely focus on inserting a sustainability dimension into the existing design education curricula. Instead, it needs to offer students relevant knowledge and skills for them to identify, select, and apply different sustainable design approaches in their design projects and practices [5]. With this broader perspective in mind, we developed the Design for Sustainable Everyday Life course (hereinafter referred to as DfSEL). DfSEL is a new graduate course that we created in the Department of Engineering and Management at Linköping University. The course focuses on a design research perspective. It is more grounded in academic literature and research than the average design course. The objective of the course is to provide students with three theoretical lenses – a *behaviour-based lens* from *Design for Sustainable Behaviour Models*, a *practice-based lens* from *Social Practice Theory*, and an *activity-based lens* from *Activity Theory* – to better understand people's daily life doings and develop design-oriented interventions to improve the sustainability aspects of people's everyday lives.

However, from a teaching perspective, facilitating students to apply theoretical perspectives that are typically outside of the design discipline constitutes a challenging task in the course, let alone presenting students with three completely different theoretical lenses. The paper reports on how we approach this particular challenge in the DfSEL course. Specifically, we aim to identify the difficulties that students encountered in applying the three different theoretical lenses (behaviour models, practice theory, activity theory) in their design projects. The paper contributes to Design for Sustainability education by shedding

light on how to better guide students to understand, choose, and employ different theoretical lenses to promote people's sustainable doings in everyday life contexts.

## 2 COURSE SET-UPS

The DfSEL course (course code: TMKA10) officially started in the spring semester of 2020. The course is mainly offered for students from three programmes: Master of Science in Design and Product Development, Master of Science in Energy - Environment – Management, and Master of Science in Design. DfSEL runs throughout the entire Spring semester from January to June. It mainly comprises three modules (as shown in Figure 1). The first module of the course is focused on introducing the three theoretical perspectives – Design for Sustainable Behaviour Models (DfSB), Activity Theory (AT), and Social Practice Theory (SPT), and presenting different domain-specific case studies in which the theoretical lenses were employed. The domain-specific case studies mainly consist of sustainable energy consumption, sustainable food consumption, and sustainable mobility. The second module of the course centres around project implementation. In this module, students need to decide the specific sustainability problem and the application domain of their design projects, select a theoretical lens, and carry out the project. They can choose to either first conduct research and then propose sustainable design interventions or start with developing a design intervention and then evaluate the effects of the design intervention. In the third module of the course, students present the project and reflect on their application of the three lenses. The intended learning outcomes of the course are:

- Articulate the different approaches to designing a sustainable everyday life.
- Design research set-ups for studying everyday life interactions with designed interventions.
- Articulate design approaches based on insights from research into (un)sustainable everyday life.

Two features made the course distinctive. First, the course aims to enable students to explore and apply multiple perspectives on people's everyday life (un)sustainable doings. This is achieved by offering students with three different theoretical lenses – DfSB, AT, and SPT. Second, the course enrolls both design students, who take design as the context and explore sustainability of people's everyday life within the frame of their current design interests and practices, as well as sustainability students, who take sustainability as the context and explore how design can be used as a tool to achieve sustainability goals [6]. In the course, we aim to bridge the gap between the students coming from these two backgrounds by encouraging them to work in multiple-disciplinary.

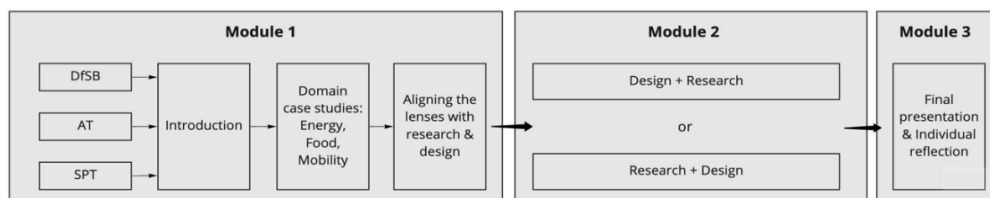


Figure 1. The three modules of the DfSEL course

## 3 BEHAVIOUR, PRACTICES, AND ACTIVITIES

DfSB, AT, and SPT are chosen in this course because they are currently three mainstream theoretical lenses being adopted in the field of Design for Sustainable Everyday Life. However, when used in design, they advocate different unit of analysis and approaches for investigating and tackling sustainability challenges (see Table 1). DfSB takes behaviours as the unit of analysis. It focuses on studying the interaction between an individual user and the specific attributes of an artefact. Design studies guided by DfSB often demonstrate clearly defined sustainable consumption goals (e.g., promote eco-friendly food consumption, raise awareness of energy consumption, reduce fridge door opening time, etc.). The fundamental question that DfSB aims to explore is how to help people make more informed consumption decisions to mitigate the underlying impacts or promote desired behaviour in the usage phase of products.

SPT, on the other hand, takes people's routinized practices as the unit of analysis. It views users of products as the carriers of socially constructed practices. In contrast to DfSB, design studies guided by SPT often take a bottom-up approach and ask the question: what can be a more sustainable way of carrying out the routinized practice? It focusses on reconsidering the status quo and bring more disruptive changes to people's existing unsustainable doings.

AT takes the middle group between DfSB and SPT. It takes activity as the unit of analysis and focuses on analysing how purposeful need-based human activity is mediated by the use of artefacts. From this

perspective, users of products are regarded as participants in activities. When applied in design for sustainable everyday life, AT can be used to help designers understand why and how sustainability problems take place in users' complex activity systems, and how to redesign the mediating artefacts (products that people use in their everyday activities) so that the whole activity system can evolve towards a desirable direction. Specifically, it emphasizes the importance of understanding the context of people's activity system before changing it. To facilitate the transition towards sustainability, design should take socio-cultural background, history development, subject-object relationship, and tensions and contradictions of people's activity system into consideration. Given the focus of this paper, we don't intend to present these theoretical lenses in detail. A comparison of the three theoretical lenses from a sustainable design perspective can be found in [7–10].

*Table 1. A brief summary of the theoretical nature of DfSB, AT, and SPT*

	DfSB	AT	SPT
Origin	Psychology	Socio-cultural background in psychology	Sociology
Unit of analysis	Individual behaviour in relation to the particular attributes of products	Purposeful need-based interaction between subjects (users) and the objects (world) mediated by artifacts	Routinized practices
The fundamental questions	How to make users become more willingly to mitigate the underlying product impacts, thus achieving pre-defined sustainability goals?	How to evolve the whole activity system towards a desirable direction	What can be a more sustainable reconfiguration of the existing practice?
Design approach	Help users make more informed behavioural decisions	A milder approach that seeks to re-mediate the user-goal (subject-object) relationship	Explore fundamental and disruptive reconfiguration of practices

## 4 MATERIALS AND METHODS

Data collected from the course mainly comprise student individual reflection documents and group project reports. Students submitted both documents after their final presentations. These documents can complement each other in terms of understanding students' learning outcomes. For example, information such as how the design project was conducted, what and how the theoretical lens was applied in the process, and what critical decisions and aspects of design were considered along the way, can be extracted from the group project reports. On the other hand, students' individual reflection documents also provide us with an in-depth view of why students are interested in a particular lens and what knowledge and understandings were generated from applying that lens in their projects.

Based on the qualitative nature of the data collected from this course, we performed a thematic analysis to identify, summarize, and report patterns within data. An inductive approach was used during the coding process. We adopted the six-step thematic analysis procedures suggested by Braun & Clarke [11]. Raw data, including project aims, rationales behind choosing a theoretical lens, data collection methods, and toolkits used in the project, design deliverables, reflections on the course and project, knowledge generated from the course, and collaboration within the project group were extracted into an Excel document. Then we collated data into different themes and refined the specifics of each theme. After that, all the themes were related back to the aim and research question of this study. Key results from the analysis are presented in the next section.

## 5 RESULTS AND DISCUSSION

So far, twenty-nine students have completed the course, resulting in twelve design projects addressing a broad range of social and environmental sustainability challenges in people's everyday life contexts. The theme of the projects covers energy conservation, sustainable food consumption, waste sorting, sustainable packaging, sustainable clothes, and household water usage. Nine students are from the Master Programme of Energy - Environment – Management. They have previously gained a sufficient knowledge on the topic of sustainability. Twenty are from the Master Programme of Design and Master Programme of Design and Product Development with expertise in product and service design.

### 5.1 Students' overall reflection on having three different theoretical lenses for design

As previously indicated, students enrolled in the course didn't have any prior knowledge of the three theoretical lenses. Therefore, we set up three teaching modules for students to get familiar with these theoretical lenses. The lecture module serves as entries for students to understand the background, key concepts, strengths, and limitations of each lens. In the project module, students need to select one lens, articulate their choice, formulate a project plan, and apply the lens in the project. Insights regarding the application and applicability of the lens are then reflected in the final presentation, group reports, and individual reflection documents.

Specifically, in the lecture module, we divided the introduction to DfSB, AT, and SPT into six lectures, each with a specific focus. The course started by introducing the background, fundamental concepts, theoretical models, and key constituents of each lens. After students gained an overview of these three lenses, we moved to present how the lenses have been previously applied in domain-specific and design-focused case studies. Then, we compared the three lenses and identified differences and overlaps between the lenses. Finally, we summarized the implications that these three theoretical lenses can bring to designing sustainable everyday life doings. Overall, most of the students appreciated this setup. For example, students indicated that *“the introduction offered a sufficient basis for setting one’s interests and delving into the most intriguing direction”* (P18), *“I learnt more in the first (theoretical) part of the course. Then to actually apply one of the lenses definitely gave me a deeper understanding of it”* (P21), and *“the lectures and the literature reviews gave us an understanding of both these approaches which could support the choice of lens that were used during the project”* (P16). Furthermore, students also emphasized that having access to different theoretical lenses can enable them to try *“different perspectives to see a same problem”* (P10) and *“broaden my scope of study from the basic use...to more complex, social and psychological questions”* (P10).

## **5.2 Articulate the different lenses to designing a sustainable everyday life**

As presented in the preceding section, after the lecture module, students need to select, articulate, and apply one theoretical lens in their projects. We found that two factors were frequently mentioned by the students when they articulated the rationales regarding why they chose a particular theoretical over the others. The first factor is students’ interests in relation to their study background – *“The psychology lens fit my desires and felt more fitting for my education”* (P2) and *“I became more interested in the social practice theory along the way as it shifts the focus from the individual to a routinized practice which is embedded in a whole societal context”* (P17). The second factor lies in students’ interpretation of how design should be used as a way to influence people’s everyday life. DfSB, AT, and SPT represent different approaches to intervening and influencing people’s (un)sustainable doings. These differences would inevitably influence the perspective and focus of the adopters of these approaches. It appears that some students tend to choose the lens that aligns with their perceptions of the meaning of design’s capability and designers’ responsibility. For example, one student chose SPT over DfSB and AT because *“A designer, in my opinion, should look to push boundaries within reason and frame a bold vision into a digestible, realistic proposal that both addresses a client or a group’s needs, but also speaks to the broader human condition. The social theory practice lens was an excellent tool in this respect”* (P13). Similarly, another student chose AT instead of other lenses as *“I believe designers can be of great value to help change behaviours and patterns, but we should be aware that this is what we do and what implications our actions might have. This was the main reason why I was interested in a milder approach to design for sustainability, as opposed to more forceful ways of steering with technology”* (P8).

Some students also took an explorative path and decided which lens should be adopted after they had figured out the benefits a particular lens might bring to their project. Students reported that the lens helped them locate the appropriate unit of analysis and develop sustainable design interventions at a proper level. For instance, one student pointed out: *“My primary focus was how details can make a great difference.... However, throughout the course, along with me learning about the lenses and implementing them in a case, my interest shifted to understanding systems and people as a mass rather than individuals”* (P16). In their project report, they further elaborated on the rationale for choosing SPT – *“it was a crucial step to understand the bigger picture of what people’s practices in the supermarkets look like and how meanings, competences and materials interrelate in them. This should support the group’s research for a solution that fits to the average people’s practice and thus ultimately reduces the amount of waste produced by packaging.”*

We also found that some students encountered difficulties identifying and understanding the differences between the three lenses. This problem became prominent especially in the project module of the course as students started seeking more support on how to better connect the chosen theoretical lens to the research and design process of the project. To address this, we believe that the course should provide a more in-depth comparison between the behaviour, activity, and practice perspectives. In particular, one student commented: *“I think that there was quite a lot to learn in a short time in the beginning of the course and I had some struggles with differentiating the lenses from each other. However, that became clearer after the lecture compared the lenses to one another which I appreciated a lot”* (P19). In particular, one student suggested that *“although they [referring to the lenses] were extensively discussed within the lectures, and that was already quite helpful, more visualizations (maybe even created*

together) in the lecture could have been helpful to grasp the differences in more depth” (P17). Therefore, from a teaching perspective, the characteristics, strengths, and limitations of the three lenses should be more explicitly articulated and presented to students for them to build up their confidence when applying the lenses in their projects.

### 5.3 Knowledge and aspirations that students acquired from the course

Four of the twelve project groups were mixed with students from both Design background and Sustainability background. Feedback from these students showed that they were able to complement each other’s knowledge and skillsets in a project setting – “*We had different and complementary things to offer during the group work*” (P21), “*We had different perspectives and qualities to contribute which improved the work*” (P23). Furthermore, the cross-disciplinary group collaboration also enabled students to learn from each other and adopt new ways to investigate and address sustainability challenges from a design perspective. In particular, one student noted that “*I feel like we all could bring what we have learned from before and “was good at” .... Thanks to the group, I feel like I have learnt new ways to find, investigate and solve problems, by finding and designing solutions*” (P4).

Regarding the most useful knowledge and aspiration that students acquired in relation to the three theoretical lenses offered in the course, we found that reflections from the Design students and the Sustainability students are slightly different. The design students stated that they developed a deeper understanding of the potential impacts of design on people’s everyday life doings – “*Before, I always made a design solution just based on requirements of the new product, but without thinking about the environment.... During the course I became more aware of the importance of sustainable design and how we can influence people to be more sustainable by making good designs*” (P11). They also highlighted that the different theoretical lenses and tools can be particularly useful for them to reflect on the sustainability aspect of design in their future projects – “*I will include the ‘design with intent’ cards in my own personal toolkit to use for future projects and I will definitely continue to read more about this area of design to develop my knowledge further*” (P1), “*Now I have more tools and knowledge about different approaches and lenses, I think the different design approaches and learnings will help me identify both problems and solutions in future projects*” (P20).

In addition, the different theoretical lenses also enabled the Design students to realize that real-life sustainability issues are wicked problems. The lenses can provide students with a systematic approach to uncovering the complexity of human doings and better framing sustainability challenges in the context of people’s everyday life. For example, many students noted that “*since climate change and creating sustainable solutions and changes is a complex problem and area, I think courses like this is very important to highlight the different perspectives and lenses within sustainability and design that needs to be discussed*” (P20), “*That you have to really understand the best way to design for the context and the people you design for, and not only make the design product itself sustainable, for a solution to truly be sustainable in the long run*” (P21).

On the other side of the spectrum, the Sustainability students pointed out that the course has broadened their views on sustainability as it introduces what design is capable of in shaping people’s daily life doings. For example, one student wrote: “*In my education, we learn a lot about industrial development and climate actions in a larger scale.... Therefore, I found this course interesting since it treats the subject through another perspective. I have learned a lot of new things about behaviour and psychology, and I think the knowledge will be useful together with what I have learned in other courses about sustainability*” (P27). Similarly, another student commented: “*I am happy that I took this course since it has broadened my perspective on sustainability and how people’s behaviours can be influenced to become more sustainable*” (P26). Furthermore, we found that the course also provided a complementary view to Sustainability students’ focus on technology and policy-oriented solutions by providing a user-centred design perspective into their existing knowledge and toolboxes: “*I have gotten a new way to look at behaviours, from something unpredictable and unknown to realizing it is actually something that can be studied and analysed. I think this perspective is a good one to have as an engineer to be able to see beyond technology and understand what possibilities and limitations that is caused by people*” (P19).

## 6 CONCLUSIONS

The DfSEL course aims to provide students with knowledge on how to select and apply three different theoretical lenses – a *behaviour-based lens* from *Design for Sustainable Behaviour Models* (DfSB), an *activity-based lens* from *Activity Theory* (AT), and a *practice-based lens* from *Social Practice Theory* (SPT) – to better understand and develop design-oriented interventions that improve the sustainability

aspects of people's everyday doings. In summary, the study shows that the three theoretical lenses (DfSB, AT, and SPT) can support students in choosing an appropriate unit of analysis and systematically developing sustainable design interventions at a target level. However, we noticed that students often encountered difficulties understanding and articulating the differences between different lenses. This is partially due to students not being used to the theoretical concepts from psychology and sociology in their previous education, let alone combining the theoretical perspectives with an array of research methods in their design projects. Keeping this limitation in mind, in the future, the course should put more focus on highlighting the unique characteristics, strengths, and limitations of different lenses to designing a sustainable everyday life, thus guiding students to make more informed decisions on which theoretical lens matches their project themes and long-term learning goals on sustainable product design. Furthermore, we found that the course offered design for sustainability aspirations to different groups of students. For students with a solid design background, we found that the theoretical lenses enabled them to take a more systemic approach to analysing and envisioning the potential impacts of design on people's everyday life. On the other end of the spectrum, for students with a strong sustainability background, the course broadened their view by encouraging them to incorporate a user-centred design aspect into technology and policy-oriented sustainability solutions.

Finally, drawing upon our experiences of teaching the DfSEL course so far, we believe that the perspectives of behaviour, activity, and practice, along with the theoretical lenses of DfSB, AT, and SPT, can offer an entry point for students to (re)discover and align their existing understanding of sustainable product design with new concepts introduced by the lenses. Based on the different theoretical nature and theoretical approaches to understanding and tackling sustainability challenges, students are able to explore and experiment with different design intervention strategies to influence people's (un)sustainable daily doings. As one student noted: *"I believe that the different ways of describing what I previously referred to as just "behaviours" in different ways - such as practices, activities, actions, habits and so on, was especially interesting. Looking at people's "doings" with different lenses is powerful and provides a lot of new insights and knowledge."*

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