A Care-Oriented Design Process Model for Sustainable Design Education

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ABSTRACT

In the unsustainable development of commodity production and resource consumption, designers are both part of the root of the problem and the agents of its solution. Cultivating designers' awareness of sustainability is as important as creating sustainable products. This research developed a care-oriented design process model that can be specifically applied to design education. An experimental design course is organized by using the design process model and the derived story canvas. The design process model was comprehensively evaluated by observing the whole process of the course, analyzing the design results, collecting feedback from participants.

Keywords: Care, Education for sustainable development, Design process

INTRODUCTION

Education for sustainable development (ESD) has become the main concern of environmental education since the 1990s (United Nations 1992). David W. Orr calls for an education system shift: 'Against the test of sustainability, our ideas, theories, sciences, humanities, social sciences, pedagogy, and educational institutions have not measured up' (1992, p. 83). The UN Decade of ESD (2005–2014) highlighted 'integrating the principles and practices of sustainable development into all aspects of education and learning, to encourage changes in knowledge, values and attitudes with the vision of enabling a more sustainable and just society for all' (UNESCO, 2005, p. 9).

The evolution of *Design for Sustainability* has mobilized design education to create a wide array of teaching methods and tools, such as Service Design (Miso, 2020), Design Futuring (Fry, 2009), Transition Design (Jones, 2014), Systemic Design (Irwin, 2015), Design for Behaviour Change (Bhamra & Dewberry, 2007) and Ecology of Care (Coxon, 2017). The continuous improvement of sustainable design education helps designers to conceive a number of different conceptual solutions as a whole. However, the focus of curriculum education is more on creating sustainable products, rather than raising students' sustainable awareness and behavior. Therefore, strengthening the correlation amongst sustainable thinking, doing and being is imperative. By understanding the concept of *care*, I intend to build a care-oriented design process model and teaching tools, which can instruct students to improve sustainable design capabilities in design projects. The concept of *care* implies
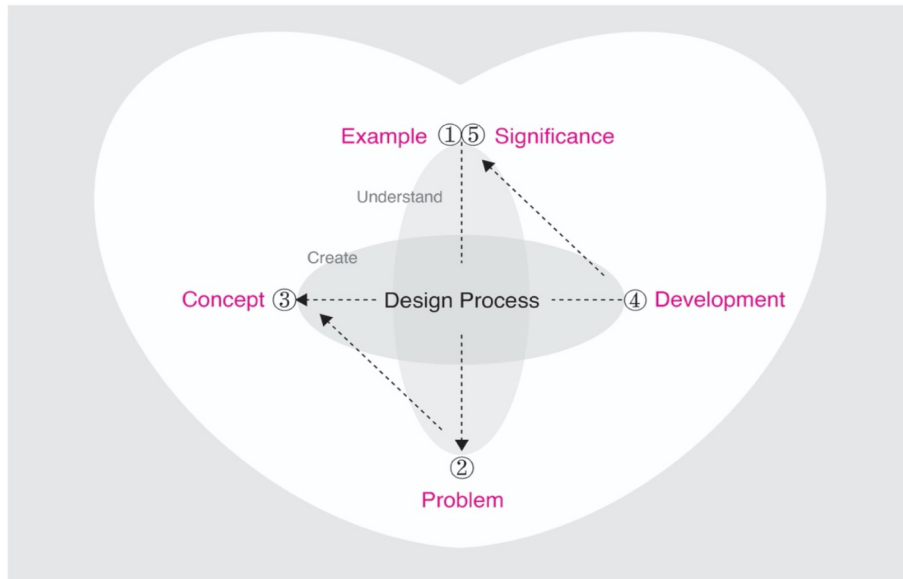
Figure 1: The care-oriented design process model.

that designers, things, and clients all play positive roles in care for the environment. The designer cares for the client and products. Things are used to care for the environment. Clients can become care-givers to affect their environment to make it sustainable (Jiang et al., 2020).

THE DESIGN PROCESS MODEL

Based on Dewey's inquiry theory, a design process model with five phases was proposed (see Figure 1). The design process moves from observing care examples in daily life (why) towards analyzing current problems (whether), proposing future design concepts (what), along with the design development (how) before moving to the significance (why). This is a reciprocating dynamic design process. The five stages are as follows:

① Example: Students can recall and observe typical care examples in their daily life. Learning ideal care examples can be taken as a starting point of designing *care*.
② Problem: A stakeholder network has to be constructed. Students can reveal conflicting relationships between clients and their environment (other people and things).
③ Concept: Students need to put forward the design concept to repair the conflictual relationship and rebuild a care-relationship between clients and the environment.
④ Development: A concrete and detailed product design should be delivered.
⑤ Significance: This phase evaluates final design results and proposes suggestions for further improvement. By comparing with the care examples learned in the first stage, students can generate new understandings on the concept of *care*.

Figure 2: Storytelling canvas.

In order to operate the care-oriented design process model in design projects, a set of canvas as a supporting tool was developed. Storytelling is applied as the method of designing canvas. Good stories can transmit sustainable knowledge, attitude, and values, which could provide practical solutions. Since the mid-1990s, sustainability-themed storytelling has been used in a planetarium in Germany to introduce the potential of scientific mitigation strategies in the field of climate change (Storksdieck, 2006). Thomas Berry claims: 'The deepest crises experienced by any society are those moments of change when the story becomes inadequate for meeting the survival demands of a present situation' (2015, p. xi). The storytelling canvas unfolds five layers corresponding to the five-phase design process (see Figure 2): example canvas, problem canvas, concept canvas, development canvas, and evaluation canvas. Each canvas includes two working areas.

(1) Example canvas: to learn about care examples by collecting stories related to care. The two working areas include story collection (left) and verb extraction (right).

(2) Problem canvas: to analyze problems by identifying stories of care-lessness. The two working areas include system analysis (left) and relationship extraction (right).

(3) Concept canvas: to propose design concepts by creating new care stories. The two work areas include relationship reconstruction (left) and story scripting (right).

(4) Development canvas: to deliver product prototypes. The two working areas include prototype conceptualization (left) and scenario boards (right).

(5) Evaluation canvas: to optimize the design results. The two working areas include radar evaluations (left) and suggestions (right).

AN EXPERIMENTAL COURSE

An experiemtal course was organized to promote students' awareness and behaviour of sustainability by employing the design process model and canvas. The theme of the design project is 'Care on Campus', allowing students to experience *care* in their familiar environment. They have to consider how to encourage clients to care for their immediate-environment and to create green products. On the campus, other students can be viewed as 'clients'; the whole campus can be seen as the students' immediate-environment.

The first stage encourages students to recall care stories they have personally experienced (see Figure 3). Discovering the problem is the second stage of the design process. Students were guided to visualize all stakeholders and define the conflicting relationships among them. The third stage is to propose design concepts. Students shift from understanding the concept of *care* into creating *care*. Students need to conceive a care story to promote clients caring for their immediate-environment. The development of product design is the fourth stage. The function and form of a product are visualized according to the care story. The fifth stage is significance. This part is to evaluate the design results. As a result of the project, students can understand the meaning of care more deeply.

RESULTS

Seven design projects were completed in the course (see Figure 4). 'Gracord' is a set of fashionable accessories made from recycled waste materials. By wearing these accessories, students may remind themselves to self-regulate in environmental behavior. 'Postcards' encourage students to discover and care for all the beautiful things on campus. When postcards are given to other friends and relatives outside of school, other people are invited to appreciate the people and things in their immediate-environment. 'Succulents Cones' is a cylindrical device that can be used to divide, branch and present succulents to others as a gift. This idea encourages more people to care for plants and connects people to each other by sharing succulents. 'Copyboard' can be used to encourage students to care for other readers' special needs in library, so as to provide help and convenience. 'Campus Map' collected and marked important activities in campus life which will assist students to find new

Figure 3: The whole process of Group no. 4 using the storytelling canvas.

friends, resulting in having opportunities to help each other. Green tailor' is a bag that can be used to recycle and store garbage that is not immediately thrown away. This concept calls on everyone to take away the rubbish around them and develop the habit of maintaining good hygiene. 'Empathy Game' is a game that encourages students to empathize with other people's needs. Students can play it with friends or families.

In order to obtain a holistic view of using the design process, the researcher designed a set of questionnaires to collect students' experiences and feedbacks. The questionnaire was sent to 23 students, all of which were effectively received. Questions mainly investigated whether the care-oriented design process can help students learn sustainable design and what are the advantages and disadvantages of each stage. From a comprehensive analysis, the average score of 10 scale questions is 4.6, indicating that the design process can effectively guide students to understand sustainable design and to propose creative design ideas.

DISCUSSION

Based on the analysis of students' conceptual design, it is clear that not only the topic of 'clients care about immediate-environment' can be realized,

Figure 4: Students' design proposals.

but also caring about the exo-environment can be achieved. For example, the Postcard design encourages customers to pay attention to the beautiful moments and things on campus, thereby inspiring them to love and preserve

the campus environment. When postcards are given to other people, *care* can be spread to more stakeholders beyond the scope of the immediate-environment. In the design of succulents, clients will distribute plants to other friends in the exo-environment.

This discovery shows that the immediate-environment does not have a closed structure, but an open one. *Care* can be spread by the act of giving across the borderline from one environment to another. When the care-receiver transforms into a care-giver in the exo-environment, *care* is brought into this environment to continue its development. In addition, products could unite stakeholders from various backgrounds into a care-network.

CONCLUSION

The care-oriented design process can help students develop their creativity and find great opportunities to influence complex systems. *Care* can be used as the concept at the core of sustainable design courses to educate young designers. When the notion of *care* is interiorized by the students, design activities that embody *care* will naturally occur.

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