

The *Values Clustering* Teaching Activity – a Case Study on Two Teachers’ Appropriations of Open Educational Resources for Teaching Values in Design

Elisabet M. Nilsson
Malmö University
Sweden
elisabet.nilsson@mau.se

Wolmet Barendregt
Eindhoven University of Technology
The Netherlands
w.barendregt@tue.nl

Eva Eriksson
Aarhus University
Denmark
evae@cc.au.dk

Anne-Marie Hansen
Malmö University
Sweden
anne-marie.hansen@mau.se

Rikke Toft Nørgård
Aarhus University
Denmark
rtoft@tdm.au.dk

Daisy Yoo
Eindhoven University of Technology
The Netherlands
d.yoo@tue.nl

ABSTRACT

Currently, we see an increased focus on the social and environmental responsibilities of designers when designing technologies. There are however few academic examples describing how to teach students to become responsible designers and engineers who are attentive to values in design. We are therefore developing teaching activities as open educational resources for teaching values in design to students in different kinds of engineering and design courses and programs. The activities address values in different phases of the design process. This case study article reports on the appropriation of a teaching activity by two university teachers. The aim is to provide the reader with an insight into how a teaching activity that we have developed can be appropriated in different educational settings, what the teachers’ perceived effectiveness of this activity is, and what kind of adaptations individual teachers may need to make to fit them into their particular course.

CCS CONCEPTS

• **Human-centered computing** → **HCI theory, concepts and models.**

KEYWORDS

values, design, teaching activities, experiences, higher education

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1 INTRODUCTION

Through the design of socio-technical systems, products and services, design and engineering professionals play an important role in shaping society, but without always being explicitly aware of this. Ethics and values are embedded in all technologies and affect our society regardless of whether the designer has an explicit intention to do so [18]. Design never derives from nowhere, and the designers are never value-neutral [22, 23]. Many scholars have thoughtfully considered values in design, including value sensitive design [11, 12], values in design [20], values at play [15], values-led participatory design [14], and value centred design [6]. However, not only the professionals but also the students who are training to become designers and engineers need to develop knowledge and skills to consciously work with values in design, to challenge established ways of doing things, and to explore and offer ethical alternatives in design [5]. Unfortunately, many design and engineering education programs fail to explicitly address and incorporate values in a structured way. To contribute to filling this gap, we have initiated a cross-European project aiming at developing open educational resources for teachers to educate students about the role values play in design. Such educational initiatives may support students in the process of “coming to know”, “becoming able to act” and “obtaining an identity” [1, 2] as ethical, responsible and caring developers of future technologies in digitally transforming societies.

We acknowledge the theoretical and practical directions for teaching about values that can be found in existing approaches and methodologies that are mainly developed for research and development purposes. Furthermore, we are aware that there are many methods and tools available online that could potentially be used for teaching purposes. The purpose of our project is thus to bring together these various sources of knowledge and provide teachers with a range of teaching activities in such a way that they can adapt them to their ambitions and courses.

This case study article presents the experiences of two teachers, who have appropriated the *Values Clustering* teaching activity developed as part of our project. Their experiences provide insight into the types of teaching activities we will offer teachers as the result of our project, as well as reflections on the usefulness of these activities and how they can be appropriated to accommodate

teachers' specific needs. We tested the teaching activity at two universities in a bachelor level course and a master level course respectively. To gain insights into how the teaching activity was appropriated in these two different educational settings, we will first present the original teaching activity with its learning aims. Thereafter, the following questions will be considered:

- (1) What specific modifications did the teachers make to fit the teaching activity to their particular courses?
- (2) In what ways did the teachers think the teaching activity reached the original and/or adapted learning goals?
- (3) What advice can the teachers offer for others wanting to use this particular teaching activity in their own courses?

2 BACKGROUND

2.1 Teaching values in design

While Value Sensitive Design has become an established approach for conducting HCI research [12], there are relatively few examples of how designing for values can be taught to design and engineering students. However, identifying ethical and social dilemmas is currently becoming a part of the explicit learning goals in a growing number of university courses. Frauenberger and Purgathofer [10], for example, have developed a curriculum that invites entry-level informatics students to engage with computer science problems from a broad societal perspective. They argued that computer science "is inherently social and no social aspects can be meaningfully separated from CS" (p. 60) [10]. Particularly, they emphasized the need to explore CS problems through multiple modes of thinking including critical thinking and responsible thinking. Grosz et al. [13] have also reported on a computer science curriculum that embeds ethical and moral reasoning throughout.

Another example of an initiative for teaching values in design is Nissenbaum's Values in Design (VID) Council [20]. The VID Council proposes a process containing three steps. The first step is to discover the values relevant to the project. The second step is to translate those values into specific design features. The final step is to systematically verify that the target values have been successfully implemented in a given system [9]. Flanagan and Nissenbaum [19] have taught a course on Values Embodied in Computer and Information Systems. This course is mainly a reading course consisting of two parts: I) the students read about the social, political and moral dimensions of technology in general, and II) the students focus on information and communications technology specifically.

The Values at Play curriculum [3], which is the outcome of one of the projects performed by the VID Council, is meant to be incorporated in any game design course as a four-week module. Students participate in four activities, one for each week, with accompanying readings. Examples of tools or activities used during the four weeks include the Grow-A-Game cards activity [16], preparing a video clip of a game in which values are at play, creating a prototype of a game, and play-testing and critiquing the games.

2.2 Development of teaching activities for teaching values in design

We are interested in providing teachers with relevant teaching activities to address values in a wide range of design and engineering

courses. This means that we do not intend to develop one dedicated course on values in design. Instead, we want to present teachers with both longer and shorter teaching activities that they can incorporate in their existing courses and curricula. When developing these teaching activities, we strive to pilot them in more than one course with different target groups and structures. Eventually, the complete collection of teaching activities developed within our project will be shared as an online open educational resource.

In order to support teachers working across multiple disciplines (e.g. industrial design, interaction design, computer science, educational technology), engaging with students on different levels (e.g. bachelor and master), and dealing with different sets of constraints (e.g. time, location, person power, budget), the teaching activities and materials have to be made accessible in different ways. First of all, we have identified three content related pillars: 1) Ethics and Human Values, 2) People and Stakeholders, and 3) Technology and Design. These pillars were determined by clustering the topics that students need to understand before being able to successfully use the methods that are often advocated in value sensitive design. Building on these three pillars, we aim to further structure how a learner's understanding of values can develop from a simple to a more complex level. However, teachers also need to determine the level of complexity of their own teaching activities. We have therefore categorized our activities according to the SOLO taxonomy [4], presenting them as primarily focusing on either uni-structural, multi-structural, relational, or extended abstract skills. Furthermore, teachers need to decide the kind of competency they want to focus on. Thus, we have structured the teaching activities according to whether they aim to engage with values as "coming to know", "becoming able to act" and "obtaining an identity" [1, 2].

In the remaining part of this paper, we will focus on two teachers' experiences gained from using the same teaching activity in two different educational settings. We will first describe the teaching activity including its learning aims, and how it was categorised. Thereafter, we will describe the educational settings in which the teaching activity had been carried out, and how we gathered the data to understand these appropriations and the teachers' experiences.

Further on, the teachers' appropriations of the teaching activity will be described and reflected upon, as well as whether the teaching activity fulfilled its aims or not. We will end by providing advises for other teachers that are interested in using this particular teaching activity in their own courses, and discuss how it can be put into play in various educational settings.

3 METHOD

This case study involved the teaching activity *Values Clustering*, which was appropriated and tested by two teachers in two different educational settings. The teachers were also part of team that developed the teaching activity, where one of the teachers took the lead in drafting the activity, and the other teacher iterated on it together with the research team responsible for developing the forthcoming open educational resource.

3.1 Data gathering

The data gathered for this paper consisted of the original description of the teaching activity, teaching materials created by the teachers for their teaching activities, as well as materials generated by the students during the teaching activity. We also asked the teachers to keep field notes and write reflections, and complemented these with an interview.

3.1.1 Ethical procedure. We obtained informed consent from the students before and after collecting data. One of the teachers used a written consent form that follows the university's ethical standards. The other teacher gained oral consent.

3.2 Data analysis

To understand how the teachers modified the teaching activity to fit their particular course, we analyzed their written reflections, the interview transcript, and teaching materials.

To address the second research question on how the teaching activity helped the teachers to fulfill their learning goals, we analysed the teachers' written reflections, the interview transcript and the materials generated by the students during the teaching activity.

To answer the third research question on what advice the teachers could give to other teachers wanting to use this particular teaching activity in their own courses, we analysed teachers' written reflections and the interview transcript.

3.3 Contexts

The teaching activity was used in a bachelor level course in Sweden and a master level course in Denmark.

The bachelor-level course was an elective course providing an introduction to interaction design. The course ran for 15 weeks, and was provided in English to both international and native students. The course consisted of two parallel elements. The first element is a design project, and the second element focuses on interaction design and social change. The *Value Clustering* teaching activity was conducted in the idea sketching phase of the course projects. Students were given the task to work on five different design cases inspired by Cottam's descriptions of five cases on the British welfare system [7]. The cases deal with social issues, such as ageing well, family life, good health, and good life. In total, 28 students participated in the course. The majority of the students came from bachelor level design programmes such as Media and Communications and Graphic Design and took this course as an elective. The teacher in this course has a background in interaction design, and has 10 years experience of teaching at university level. Results stemming from this context will be referred to as "Teacher 1" in the rest of this paper.

The master level course was a mandatory course offered in the second semester of a master programme in Information, Communication and Technology-based Educational Design. The course ran for twenty weeks, providing an introduction to design theories and processes in the context of education. The overarching aim of the course is to teach students how to create educational designs through employing design theories and methods. The course was given in the teacher's and students' native language. During the

semester when the *Values Clustering* teaching activity was implemented, the course had a specific focus on value sensitive design and value-led design processes in education. The students were working together on group design projects with the aim of creating valuable and responsible designs for future education. The groups' projects ranged from nurturing "experiential wonder" in online science education, to designing for educational values of the visual arts within the new subject of Technological Understanding in the primary schools in Denmark, and to promoting "intercultural dialogue" between exchange students at university level. The teacher of this course had a background in pedagogy and design, and had eight years of experience of teaching at university level. The results stemming from this course will be referred to as "Teacher 2" in the rest of his paper.

3.4 The teaching activity

The teaching activity that was introduced to the teachers is titled *Values Clustering*. The rationale for the development of this teaching activity was that when working with values in design, students sometimes lack a nuanced and elaborate vocabulary for communicating about values. Students may find it difficult to work with and talk about values in a holistic and multifaceted way. By expanding their value vocabulary, the students can gain a more nuanced understanding of the values they are working with, and in effect creating better designs. If students lack a nuanced value vocabulary, values can easily become superficial, one-dimensional buzzwords lacking depth or situated meaning.

The learning aim of the *Values Clustering* is thus to expand the students' value vocabulary when thinking and working with values in design. In this activity the students will gain a broader knowledge about values through identifying and naming associations, synonyms, connotations and denotations for specific value words. They will also gain deeper knowledge about values by sorting and grouping value words to create value clusters. Specifically in order to create value clusters, first, students will identify and name one or more values that are prominent in a selected design project (the project can be either their own or that of others). Next, the teacher will introduce relevant resources, thesaurus, online dictionaries, value vocabularies that may help students broaden and deepen their vocabulary for and understanding of values. Examples of such materials include the HuValue Wheel [17] and Schwartz's value theory [21]. Finally, the teacher will ask students to visualise and document the value clusters in a way that makes the most sense to the students. For example, value clusters can be expressed as a list, a mind map or as a mood board. Afterwards, the value clusters are shared and reflected upon in an open discussion.

This teaching activity aims to support the students' abilities to "become able to act" as responsible designers. According to the SOLO taxonomy, the first part of the teaching activity addresses uni-structural levels by asking students to identify and name values that are relevant to their designs. The second part of the teaching activity addresses multi-structural levels by asking students to generate associative words and synonyms to the identified value words, reflect upon the situated meaning, and generate value clusters.

4 RESULTS

The results are structured around the different research questions, divided into the two different courses.

4.1 Q1: What specific modifications did the teachers make to fit the teaching activity to their particular course?

4.1.1 Teacher 1. In the interaction design introductory course, the teaching activity was introduced to the students under the name "A Thousand Words for Snow" meaning that some phenomena (here value) can be addresses with many different words. The teaching activity was introduced as part of a broader sequence of an interaction design process. The first step for the students was to identify a general problem statement and a design case that they should work on throughout the 15-week course. The second step was to identify project values that should be prominent in their design concepts. The third step was to manifest these project values in their visual materials. The teaching activity was part of the second step where the students jointly identified, reconsidered and articulated what core project values their design concepts should build upon.

The *Values Clustering* teaching activity was implemented as a "warm up" exercise to (a) have the students reconsider the project values that they had identified in the previous teaching activity, and (b) use their broadened vocabulary of values and deepened understanding of each value word as an entry point for the idea sketching phase in their project. Prior to this activity, the students had been introduced to the value sensitive design methodology [12], and done a stakeholder values mapping exercise.

During the activity, first, the students were asked to put all the value words that they associated with their design projects and stakeholders on a whiteboard. Next step was to make clusters of the value words that should serve them as an inspirational framework for the process of starting to manifest the project values in visual materials. The teaching activity ended with a whole-class discussion where the student groups commented upon each others' lists of identified project values clusters. The project values clusters were used in the subsequent teaching activity where student groups created mood boards with visual materials to manifest their project values.

4.1.2 Teacher 2. Prior to running the *Values Clustering* teaching activity, the students had participated in a value workshop where they worked in small groups to identify their core designers' and stakeholders' values, and then merged those values into a value framework for their educational project. As part of that value workshop they were introduced to Schwartz's value theory [21] and the HuValue Wheel [17] tool. In the follow-up exercise the teacher wanted the students to gain a deeper understanding of the value words prominent for their project, and also to start thinking about those values from a theoretical perspective.

The aim of this teaching activity was to get the students to reflect upon the breadth and depth as well as the implications of the identified value words; Why this specific value word and not another? What semantic vocabulary goes with the value word? What is the landscape of synonyms and connotations surrounding the value word? What is the meaning of the value word? And what

possible undesired meanings, connotations or semantics might be part of the value cluster that the design team needs to take into consideration when communicating with stakeholders about their design?

In addition, the students were given the task to look up relevant case studies, research literature or concepts to anchor their value word in the richness of existing thinking, theories and investigations. In this way, the teaching activity functioned as a stepping stone to the next phase in the design process, which involved workshops with stakeholders to communicate about their design ideas. By building on knowledge and definitions from the literature, the students were expected to gain a scholarly substantiated vocabulary for speaking about their design values, and develop an academic ethos for discussing and writing about values in design with other academics and/or stakeholders.

All teaching activities were conducted online via a video conference platform. When introducing the *Values Clustering* teaching activity, the teacher asked the students to think of their values clusters as being structured like an onion with layers. The students were told to imagine placing their core value word in the inner core of the onion. For the second layer of the onion, the students were asked to use online thesauruses (or other online tools to look up synonyms) and place all synonyms and associated words. The students were asked to keep "chasing the connotations of their value word" until they had fully explored the breadth of the value word and no significant new synonyms could be identified. Finally, for the third layer of the onion, students were asked to add references and links to external resources and literature that would enable them to get a deeper, more substantial knowledge about the value. By establishing the three layers of the values cluster, which was visualised through a mind map tool, the students explored the breadth and depth of the value word.

When the activity was completed, the students presented their mind maps to each other as well as gave and received feedback. In conclusion of the exercise, the students reflected in a whole-class discussion about their broadened understanding of the value words, the implications and significance of the chosen value words, and whether they had discovered any undesired connotations or semantic areas connected to the value words. If so, important clarifications and demarcations had to be made in order to communicate clearly about the design values to stakeholders as well as in their final exam project.

4.2 Q2: In what way did the teachers think the teaching activity fulfilled its learning goals?

4.2.1 Teacher 1. Teacher 1's aim with the *Values Clustering* teaching activity was to get the students to re-consider and deepen their understanding of the project values they had previously identified. The project values clusters developed by the students were expected to serve as a basis for the following teaching activity where these values should be manifested in visual materials. According to the teacher, the part of the teaching activity where the students were asked to write value words on the whiteboard did not go very well. The process of writing value words became messy, making it difficult for the students to effectively cluster the value words. The activity ended with a whole-class discussion addressing the value

words presented on the whiteboard. As described by the teacher, the discussions between the students became too superficial and there was not enough in-depth reflection on what each of these words meant in their particular cases. For example, one student group working with parents of children living with a mental diagnosis, emphasized the importance of trust in strangers who they imagined would help the parents with practical tasks to give the parents more time to connect with their child. However, this group was not able to identify the criteria for what trust constitutes in this particular situation.

Contrary to this, in their written project reports and verbal milestone presentations, the students were able to naturally discuss values in relation to the design cases and the stakeholders that they worked with. They based the choice of project values on academic literature and theories about values and social change. For example, working with welfare society issues, several student groups shared value words such as community, trust, sense of belonging and identity (or shared identity).

4.2.2 Teacher 2. According to the teacher, there were two main aims of the teaching activity. Firstly, the aim that corresponded to the original aim of the *Values Clustering* teaching activity, and secondly, the aim that the students should take some first steps towards a deeper theoretical understanding of the value words at the centre of their design projects.

During the activity itself, it became visible through the groups' mind maps and following value reflections that the students expanded their value vocabulary, and they suddenly saw a whole landscape of connotations and synonyms to their project's core value. As a consequence, one of the student groups switched their core value because they discovered that their initially identified value word did not properly convey their design vision. Through the *Values Clustering* mind maps they discovered a value word (one of the synonyms in their value cluster) that more accurately captured their design intentions. Another student group gained an expanded vocabulary in a slightly different way. They generated many value connotations and descriptions during the exercise, which made it easier for them to talk about their design value in a more nuanced way so they could better communicate about their design project with their stakeholders. By adding links and references to the third layer searching for literature, students gained insight into relevant value-oriented knowledge and previous research conducted in the field, and this created an awareness of where to go to create a better grounding of their design projects and values.

Since the course is on a master level, the students not only needed to learn how to practice design but also to develop an academic grasp of their values and previous research conducted within the field in relation to those values. By engaging in the *Values Clustering* activity it became clear to the students that there are a lot of studies, research and projects on a given value within their field that they can draw inspiration and gain knowledge from. This, furthermore, made them realise that they needed to define and demarcate what they meant by their value words (so as to not drown in literature), be attentive towards undesired connotations connected to their values (so as to be able to communicate clearly), as well as avoid working with irrelevant values that take their project in to many different directions (so as to have a clear design focus and aim).

4.3 Q3: What advice can the teachers offer for others wanting to use this particular teaching activity in their own courses?

4.3.1 Teacher 1. According to the teacher, one of the key insights gained from using this teaching activity was the need for the worksheets and/or digital tools in order to carefully guide and support students so that they can get explore value words in a nuanced manner. As mentioned above, the whole-class discussion turned out to be ineffective in providing an in-depth understanding. From a practical perspective, the whiteboard was too small to capture even a single value cluster, and the tedious process of manually writing up all the value words on the board put the other groups in an unfortunate waiting position. This experience calls for a clever use of digital tools, with which students can document complex value clusters that might arise and review them from multiple perspectives. As argued by Teacher 1, such tools should encourage students to develop abilities to:

- **Empathize:** see the value words in each cluster from the different perspectives of the stakeholders – in other words: in-situ understanding of value words.
- **Contextualize:** understand the value words in relation to the context of the case and the relationship between stakeholders in the case: for example, how does trust look like when applied in the relationship between parents, children and social workers in vulnerable families?
- **Translate:** develop a sensitivity towards a vocabulary of value words that is suitable to the situation that they design for. This might imply translation from more general and abstract terminology to more specific and concrete terminology in order to align value words with the kinds of language present in the intentions of the stakeholders in the case.
- **Critically Reflect:** consider how value words and their corresponding clusters might be interdependent. For example, which words across value clusters form a “value family” (a collection of value words that have a flavor that is accurately/appropriately chosen from the perspective of the situation that designers address)?

Furthermore, the class presentations led to rather superficial discussions about the value clusters, where students seemed to expect the teacher to evaluate the overall quality of each value cluster. Thus, the goal of the whole-class discussion was unclear because it did not have any purpose serving further development in each student group's design processes. Instead Teacher 1 suggests a peer-review process where groups sit together in pairs and try to identify the value words in each cluster that serve the particular case and context that each group is working on. The results of these discussions can then be presented in front of the whole class or handed in to the teacher or yet other peer-review groups where student groups provide the teacher and/or each other with the value clusters and the corresponding reflections on each cluster.

4.3.2 Teacher 2. According to Teacher 2's experiences from using the *Values Clustering* teaching activity, the students are expected to have carried out a preceding teaching activity where they would identify the core project values around which they will build value clusters. To gain both depth and breadth in their understanding



Figure 1: Examples of core project values lists developed by the bachelor students in the class of Teacher 1.

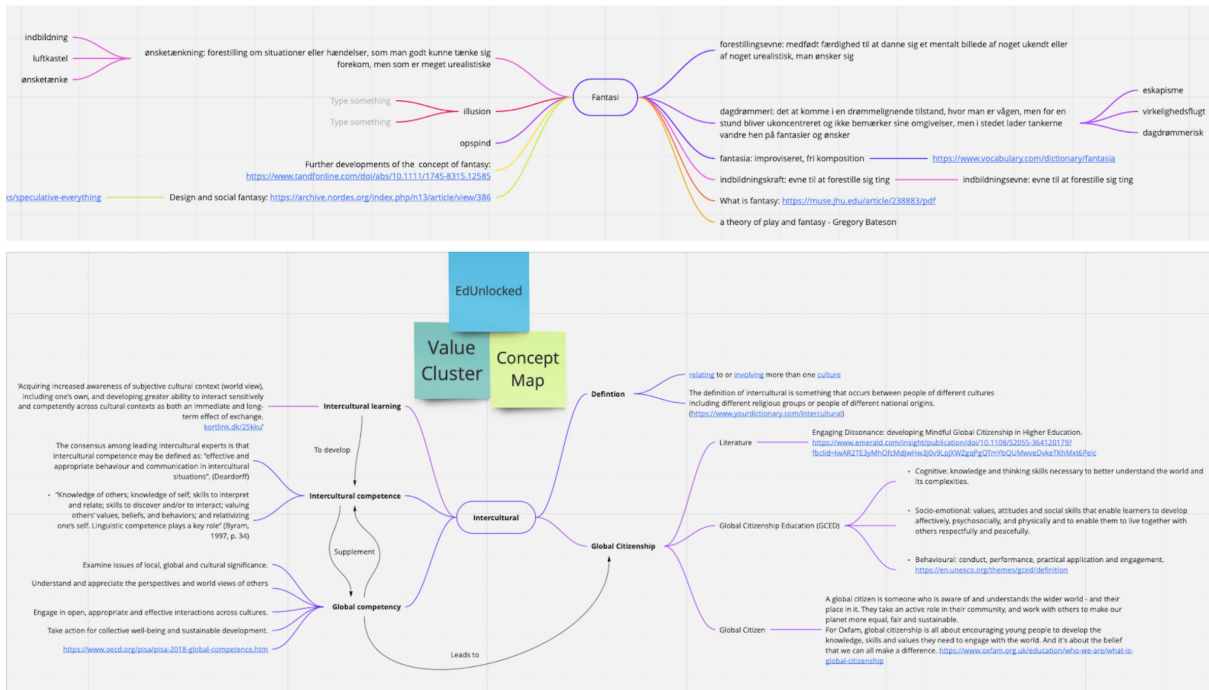


Figure 2: Examples of mind maps developed by the master students in the class of Teacher 2.

of the core project values, students should preferably also pick just one or very few value words to work with. Then the students were instructed to focus on developing a multilayered cluster with synonyms, connotations, descriptions and resources, rather than developing a superficial understanding around multiple value words.

In case teachers choose to work with *Values Clustering* through the “onion model” with three (or more) layers, students should start by putting the core value words in the inner ring, then synonyms and connotations (align with their definitions) in the second ring, and then links to literature and resources in the outer ring. In this way, a “double-depth” is created. Firstly, the students’ value vocabulary is deepened by generating a vocabulary around their core value through adding synonyms and connotations. Secondly, the students’ value understanding is deepened through adding definitions and descriptions of the value word and its synonyms

and connotations along with literature and resources to further their knowledge and comprehension of that value.

Another insight was the importance of clarifying to the students that this work should be integrated and furthered in their design process. The teacher should follow up on the students’ design work with integrating the value cluster and their insights into their design projects, rather than just leaving it behind as a completed exercise.

5 DISCUSSION

5.1 The role of digital technologies in teaching

The results presented above show that there was a main difference between how the two teachers adapted the teaching activity based on the availability of digital tools and supportive materials. In Teacher 1’s class the students worked in analogue settings using

a joint physical whiteboard for generating clusters. In the case of Teacher 2, the students worked remotely in a digital setting and were provided with an online tool for creating digital mind maps that represented their clusters. The results generated by the students in the two classes varied. Teacher 2's students reached to produce a comprehensive material in direct connection to the activity (see Figure 2), while Teacher 1's students included much more elaborated reasoning in the succeeding milestone presentations and in the written project report submitted at the end of the course (see Figure 1). These two cases illustrate how the teaching activity *Values Clustering* can be adapted to fit for both in class and distance learning settings where access to different sets of supportive digital technologies are offered. In comparison, the results generated by the students in the digitally supported online setting (Teacher 2) were well documented, and represented the students' reasoning in a more dynamic way. The online tool used for generating mind maps both served as a tool for structuring their value reflections, and for capturing the landscape of connotations and synonyms developed in shareable and editable formats. It may thus be beneficial to introduce similar digital tools in physical classroom settings as well.

5.2 In-depth understanding of the meaning of the value words

In both cases, the teachers were able to see that the students had deepened their understanding of the meaning of the value words. This was however achieved in different phases of their learning processes, and based upon how the teachers chose to adapt the teaching activity and frame the clustering. Teacher 2 asked the students to search for related literature (the third layer in the onion) during the actual clustering activity. They therefore anchored their value words in existing research around values. Teacher 1's students were not requested to relate their value words to research until after the teaching activity was completed. Their reasoning was presented during milestone presentations and in written project reports where they also referred to related literature, and which was submitted at the end of the course. This indicates that if teachers can motivate students to search for and build on related research during their clustering activity, it might help students to gain a deeper, theoretically grounded understanding of values in an earlier phase of their learning processes. However, adding such an extra layer of complexity must correspond to students' abilities and the time planned for the activity.

5.3 Bachelor versus master level courses

The two cases explored here represent two different majors and degree programs. The teachers thus had to adapt the teaching activity to make it suitable for the specific educational levels, the students with different educational interests, and the learning goals of the particular courses. In the master level course, Teacher 2 put a stronger emphasis on the scholarly aspect of designing, and not only the design practices. As described in previous section, this was done by integrating the literature search as part of the *Values Clustering* activity. In the case of the bachelor course, Teacher 1 put more effort into the actual design work and how to prepare the students for the next phase in their design process, that was, to manifest these values

in their designs. The students were asked to relate to research, but this was mainly done in retrospect when filing the final report upon their projects. The course was an introductory course implying that some of the students were still in the phase of getting introduced to the academic context. These examples illustrate how the teaching activity can be adopted to fit various educational levels by adding extra layers of complexities, for examples, such as asking students to engage with and refer to research literature as an integrated part of the clustering.

5.4 Designing for appropriation

In designing open educational resources, a high level of generalization is often necessary to accommodate a wide range of learning contexts. What became evident in our study is how teachers can take the same teaching activity description and then be creative to modify it to meet their own needs. When designing for open educational resources, it is of important to support a high degree of appropriation. As is the case with the use of digital technologies in online settings (Teacher 2), due to the situated nature of learning and teaching processes, teaching activities might not be used in the exact same way that the educational designers had originally envisioned. This appropriation is not a sign of failure, but rather shows that the users (i.e., teachers) understand and are comfortable enough with the design to try using it in their own ways [8].

Through this study, we have gained an understanding of the importance of including several inspirational examples for the teachers to *see* how one can perform a teaching activity in a flexible manner, instead of prescribing a strict guideline for implementing the activity. In the *Values Clustering* activity, this could for instance be a list of multiple ways to support the visualisation of the value clusters, such as a shared whiteboard, a digital mind mapping tool, posters, or a combination of visual materials. With different people, their use of design will change, and the contexts in which the activities are performed will change as well. That is why a design for use must be about a design for change [8], which is a design principle that ought to be considered when designing open educational resources. The possibility to appropriation can further create a feeling of ownership since the users will feel that they are in control and can experiment to find new ways to achieve their goals. These feelings of ownership can be as important for the user experience as the practical functionality of the design [8]. Since this study only covers the teachers' first time use of the teaching activity, studying the long-term appropriation would be an interesting topic for future studies, tracing the iterative modification of a design activity initiated by the same teacher over time.

5.5 Limitations

The focus of this case study has been on the teacher perspective and not on the student perspective. An important further step would be to investigate students' experiences and determine improvements based on their perspective. Furthermore, the teaching activity was deployed in two Scandinavian countries that are quite similar in terms of educational contexts and culture. Thus, another next step would be to run the teaching activity with teachers in other parts of Europe, and beyond.

6 CONCLUSION

Teaching about values in the design of future socio-technical systems, products and services is currently gaining momentum, and we believe that this can significantly contribute to moving the field of Human-Computer Interaction forward. However, this demands advancement of theory, methodology, and practices in teaching students how to be responsible towards the societal values in designing and digitally transforming society. As highlighted in the introduction, there are still few academic examples describing how to teach students to become responsible designers who are attentive to values in design. The teaching activity presented and explored in this case study article serves as an example for how discussions and actions around values in design can be framed and implemented in the classroom. It also serves as an example of how to design for change by designing a teaching activity that is open for appropriations, but without losing its essence in terms of the learning goals the activity strives to fulfill. We invite all teachers to use and appropriate this *Values Clustering* teaching activity, as well as the other teaching activities that are currently under development. These activities will be made freely available through an forthcoming open educational resource. By doing so, we hope to support teachers across a range of educational and cultural contexts to educate responsible designers of the future.

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