VAlue Sensitive design in higher Education (VASE)

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VASE Report 2:
Evaluation of pilot testing of the teaching and assessment activities

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Authors:
Wolmet Barendregt, Eindhoven University of Technology
Rikke Toft Nørgård and Eva Eriksson, Aarhus University
Elisabet M. Nilsson, Malmö University

For more information about the project, and the development process:
http://vase.mau.se.

Join the LinkedIN community “Teaching for values in design”:
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Abstract

This report maps out the development and evaluation procedure for the VASE teaching and assessment activities. This is further complemented with information about the procedure for and results from all pilots of teaching activities which have been conducted throughout the project period. In total, the project has developed a pedagogical framework consisting of 28 teaching activities, 12 assessment activities, a curriculum compass to structure the activities, and one open educational resource (OER) from which all materials are openly made available to teachers. All output is based on two desk research reports, 38 pilots in four countries, conducted by 50 teachers involving 1 563 students in various design and engineering programs. Finally, the indicators and measures for successfully piloting the teaching and assessment activities are presented and reported upon.

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1. Introduction

This report is written as part of the Erasmus+ project Value sensitive design in higher education (VASE[1]). In the following, the methodology applied in the VASE project will be outlined in detail. We will describe the development of Report 1: Desk research on teaching and assessing for values in design in higher education and Report 2: Evaluation of pilot testing of the teaching and assessment activities, the iterative development of the teaching activities through several rounds of reviewing by partners, as well as the development of the curriculum compass and the assessment activities. Also the piloting, and the evaluation procedure of the teaching and assessment activities, the OER, the Multiplier event are described.

The teaching activities developed on teaching for values in design partly derive from the researchers' own experiences from conducting the pilots, and partly from related work, theory, and existing examples, collected and reported on in the desk report (Report 1 part I: Desk research on teaching for values in design in higher education) as well as in a series of peer-reviewed publications (conference papers, book chapter). The developed teaching activities have been reviewed, piloted and iterated, and published online. In order to develop specific assessment activities to follow up on the learning goals for the teaching activities, we have used a similar approach and also developed a desk report (Report 1 part II: Desk research on assessment activities for teaching for values in design in higher education), The process is outlined in more detail below.

2. Development methods and procedures

The development of the VASE pedagogical framework is grounded in research and methods that combine desk research, teaching practice, educational design processes, pedagogical design pattern development and peer-review shepherding to secure research-grounded, method-driven and quality-assured activities for teaching for values in design.

A three-phased generic model for conducting educational design research (McKenney & Reeves, 2012) was used as an underlying and guiding development process methodology. Educational design research is a genre of educational research aimed at providing solutions to educational practitioners in relation to practical and complex educational problems such as how one can teach for values in design. Solutions can take the form of educational products, processes or programs that both support teachers in their educational practice and seek to discover new knowledge that can inform future research, development and practice within that domain. Below is a short description of how the three-phased model guided the educational design work in the VASE project:

- *Phase 1) Exploration and analysis*
  Exploring the domain of teaching for values in design by conducting a literature review on (teaching and assessing) values in design and through this developing the research grounding of the VASE project presented in several desk research reports. Furthermore, the method of pedagogical design patterns as a systematic educational

[1] https://vase.mau.se/, accessed on 2021-10-19.

development method was introduced.

- *Phase 2) Design and construction*
  On the basis of the VASE research grounding the three core competency pillars and seven overarching learning objectives were identified and described. Then the SOLO taxonomy (Biggs, 1982) was applied to pillars and learning objectives to support teachers in moving students' competencies from a beginner to an advanced level. This led to the construction of the VASE curriculum compass as a model for developing students' understanding of values in design from a simple to more complex levels. In parallel, several rounds of so-called pattern mining workshops were conducted on the desk research reports and amongst the project participants to capture existing educational knowledge and practice. Through this a large catalogue of potential pattern candidates was generated, and from this a selection of patterns were selected and developed using an adaptation of the pedagogical pattern method resulting in the design of 28 teaching activities cutting across the three pillars and SOLO levels. Furthermore, 12 assessment activities were designed to support teachers in evaluating whether the intended learning outcomes in the teaching activities were achieved by the students.

- *Phase 3) Evaluation and reflection*
  Alongside the design of the 28 teaching activities and 12 assessment activities, iterative peer-review of all activities were carried out using the pedagogical pattern evaluation method called shepherding (a method similar to peer-review processes within research, see Harrison, 1999). This method ensured multiple cycles of evaluation, reflection and revision of the activities throughout the project. Furthermore, the teaching activities were piloted in 38 pilots involving around 50 teachers and 1 563 students across four countries and in different courses and subjects. Subsequently, the activities were to some extent evaluated by questionnaires for students and teachers respectively. The VASE project's educational design process concluded with the publication of all teaching and assessment activities, the curriculum compass, cases, reports and research publications on the VASE OER online platform that together presents a pedagogical framework entitled the VASE framework.

The main outcome of the project – the collection of teaching and assessment activities – was developed using a modification of the pedagogical design pattern method (Goodyear, 2005; Nørgård et al., 2019; Köppe et al., 2018; Laurillard, 2012). The pedagogical design pattern method is a systematic educational development method aimed at capturing "best practice" from research and practice, which are then developed into concrete activities for teaching and learning within a specific domain; here teaching for values in design. The pedagogical design pattern method has been modified in that we have iteratively developed our own pattern template inspired by, but not equal to, e.g. the pattern template suggested by Laurillard (2012) or Goodyear (2005). Some of the main differences are that assessment activities are separate from the teaching activities, the learning objectives are formulated based on the SOLO taxonomy, and that we have a strong focus on describing the different steps of the teaching activity in detail.

The pedagogical patterns should describe best practice in such a way as to capture practice on a “meso level” between the general (macro) and the concrete (micro), so that activities can be adapted and reused across different contexts and disciplines while preserving the best practice of the activity. Pedagogical design patterns are particularly suited to develop educational practice within emerging digital and technological fields as they bridge pedagogical theories, practitioner expert knowledge and design practice within educational technology (Goodyear, 2005). As a method, pedagogical design patterns offer a systematic way for practitioners to develop new teaching and learning activities through creating couplings between educational theories, methods and practice, and they capture, describe and substantiate teaching and learning design in ways that are accessible for teachers within the domain (Goodyear, 2005).

Through participatory pattern development processes the VASE project participants worked together across institutions and with teachers as partners to develop a collection of teaching and assessment activities for teaching values in design (Goodyear, 2005; Köppe et al., 2017; Mor & Winters, 2008).

The core premises of developing such a pedagogical collection are “systematization”, “sharing” and “adaptability” (Goodyear, 2005; Laurillard, 2012; Pedagogical Patterns Project, 2012; EuroPLoP, 2021). *Systematization* of educational development and practice (given that the development process is organised as intentional), reflective and iterative educational design processes and all activities are designed using shared methods, templates and review procedures. *Sharing* through developing an external, open and shared activity repository and teaching resource that are built using acknowledged research-based educational methods and targeted at identified educational needs to be shared with all teachers and educational developers within that domain. *Adaptability* through describing the activities on a “meso-level” that contains enough information and instruction for non-experts to carry out the activities but are open and flexible enough to be adapted across different disciplines or contexts and for different pedagogical purposes or approaches.

Below the process will be described in more detail for each part.

2.1 Desk research development and peer-review procedure

Two literature reviews, one on teaching and one on assessing values in design was conducted. These literature reviews were reported as two separate desk research reports: Report 1 part I: Desk research on teaching for values in design in higher education (Bekker et al., 2019) and Report 1 part II: Desk research on assessment activities for teaching for values in design in higher education (Gyldendahl et al., 2021). Both reports have been developed by partners in the consortium, and the reports have been through a peer-review process. The peer-review procedure used for these reports was that all team members were allowed to make revisions and comments directly into the report documents developed by one or two of the team members responsible for the report. The reports were shared by all in an online workspace (Google Suite). After comments and edits were added, the responsible team members worked with the edits and asked for clarification before making the final version of the report.

2.2 Peer-review procedure of teaching and assessment activities

A peer review process was used for internal quality assurance for the teaching and assessment activities to assure consistency and high standard for documented project results. All the teaching and assessment activities have been formatively peer-reviewed and revised in at least two full iterations, or more, and conducted by at least two reviewers in extension to the author of the activity. Reviewers were assigned to several rounds of the review process to ensure all activities were addressed by team members with different backgrounds. Although a peer-review template was developed, focusing on relevance, methodological soundness, quality of achievements, quality of presentation, and finally layout/spelling/format, we decided instead to review directly into the shared documents.The peer-review took place in our shared online workspace, directly into the teaching or assessment activity description. A record of the number of reviews and the status of the pattern has been recorded in a worksheet for teaching activities and one for assessment activities.

Based on the results from the peer-review process, the teaching and assessment activities have been further developed before pilots.

2.3 Development procedure of teaching activities

Inspiration and knowledge for developing the teaching activities was gained from Report 1 part I: Desk research on teaching for values in design in higher education (Bekker et al., 2019). At the two initial Transnational project meetings two workshops were held for drafting ideas of teaching activities, using an educational pattern approach (Goodyear, 2005). The results from these educational teaching pattern mining workshops were gathered and documented, and resulted in a total of 32 patterns. Interviews were also conducted with educators regarding teaching values in design, and where to find information to teach this subject. An interview template was developed and used for this purpose.

Based on the desk reports and our own teaching experiences when piloting, we have iteratively developed a model for progression in teaching for values in design, entitled the Curriculum compass. This compass is based on three pillars, and with learning goals structured according to the SOLO taxonomy. Besides structuring learning goals, the curriculum compass is also used as a navigation tool on the OER supporting the teachers to find appropriate teaching activities for the educational setting.

The development, based on the desk report, and own practice, resulted in 28 teaching activities that were iteratively developed and described by using a teaching activity template. The design of the template followed an educational pattern approach (Goodyear, 2005), and was also adjusted several times based on insights gained when using the template.

2.4 Development procedure of assessment activities

Inspiration and knowledge was gained from the report Report 1 part II: Desk research on assessment activities for teaching Values in Design in Higher Education (Gyldendahl et al,

2019). We gathered various assessment activities, as found in related work. These were later classified according to different assessment approaches (summative and formative; ipsative and authentic). The sorted assessment activities were then ranked in relation to their fit with teaching values in design, and those with highest priority were worked through to be more subject specific to values in design and to fit the teaching activities.

Based on this, we have iteratively developed 12 assessment activities, using an assessment activity template. Each teaching activity has a set of assessment criteria, and is matched with a proposed assessment activity. As for the teaching activities, the design of the assessment activity template followed an educational pattern approach (Goodyear, 2005), and was adjusted several times based on insights gained during the development process.

3. Evaluation

3.1 Formative evaluation of teaching activities

For each pilot, two templates for evaluation of the activities have been developed. The first template was completed by the educators and focused on the quality of the material. The second template was completed by students and focus on the quality of learning experience. The results from the two templates, quality of material and quality of learning experience, are included in this report.

The pilots have been recorded in a Google sheet, and the teaching materials have been shared on our shared Google drive. Initially, a consent form was developed and tested with students, however, as we soon realised that we did not collect any personal data, we decided not to make use of it anymore. A pilot evaluation questionnaire was developed for both students and teachers. The questionnaire was primarily used in the initial pilots, however later we decided to directly inform the development of the teaching activities instead of recording the experiences.

After each pilot, the teacher used the experience from teaching to review and further develop the piloted material. Through this formative evaluation, the teaching materials have been developed iteratively.

3.2 Evaluation of assessment activities

The assessment activities were first assessed by several team members who were assigned to each activity. They both reviewed the content and the form of the assessment activities. After this first round of reviewing, the developers of the teaching activities were asked to pick suitable assessment activities for their teaching activities. In doing so, they were asked to think about the constructive alignment of the teaching activities with the assessment activities and suggest changes for the assessment activities to better support this. All comments were then discussed during a plenary meeting after which the responsible team members for the assessment activities created a new version that was approved by the team.

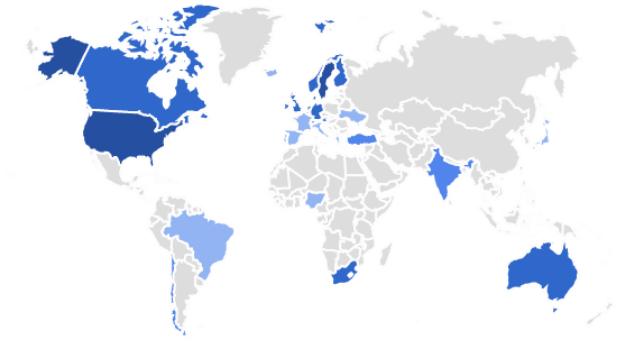
3.3. Formative evaluation procedure of the OER

In the first stage, both external and internal practitioners with a background in usability evaluation and website design were asked to participate in a usability testing. Based on the problem reports and recommendations created by those experts, several improvements to the consistency, layout and navigation of the OER were implemented. In the second stage, a user test with two experts in values in design and teaching in relevant programs in higher education was performed. These experts were asked to perform several representative tasks on the OER while thinking aloud. These user tests revealed an additional number of redesign recommendations, which were implemented in the OER before launch.

3.4 Evaluation procedure of the Multiplier event, OER and teaching and assessment materials

By the end of the project, a summative evaluation took place during the multiplier event. Here, the discussion focused on the OER and teaching and assessment materials, both for presentation but also for critical discussions during a panel with invited experts. No specific tools were designed for this, but the discussion, feedback and chat clearly showed that the participants found the materials useful and accessible, and also confirmed that there is a huge need for these types of resources.

The Google analytics on the OER report that 322 new users accessed the site during the period August 26 and October 19, representing various countries and continents.



LAND	ANVÄNDARE
Denmark	105
Sweden	68
United States	30
Netherlands	27
South Africa	13
Norway	10
Canada	9

Fig. 1. User accessing the OER from various countries and continents (screenshot from Google Analytics, October 19, 2021).

4. Piloting

4.1 Procedure for pilots

Each partner has been responsible for conducting pilots in their respective university. In addition to that, pilots conducted in for instance guest lectures in universities outside of the partnership have also been documented (Chalmers university of technology in Sweden, and Ozyegin University, Turkey).

- The pilots have been documented in a Google sheet, and the teaching material shared on our shared Google drive.
- A pilot evaluation questionnaire was developed for both students and teachers . These were primarily used in the initial pilots, however later we decided to directly inform the development of the teaching activities instead of recording the experiences.
- We have not completed any additional attendance forms for the pilots, but rather made use of the standard records from the respective university.
- We have not collected signatures from the teachers conducting the pilots, however, each teacher was responsible for filling out details in the shared Google sheet with an overview of pilots.

4.2 Overview of Pilots

Below is a list of all the pilots conducted in the project.

- Teachers: nr of teachers who have been teaching and/or examining students who have been taking part in a pilot.
- .Students: participants of a course, module, lecture where one or several of the teaching and assessment materials have been piloted
- Pilot: The pilots differ in size from whole courses to guest lectures.
- The pilots are also listed on the VASE project website: https://vase.mau.se/pilots/

Year	**Partner**	**Program**	**Course**	**Level**	**Nr of teachers**	**Nr of students**
2021	MAU	Independent course	Values in Design	MA	2	7
2021	AU	Experience economy	Designproject	MA	2	35
2020	MAU	Graphic design & media studies	Interaction design & media	BA	1	38
2020	MAU	Product Design	Product Development and the Human Being	BA	1	23

2020	MAU	Independent course	Product Design	BA	1	14
2020	MAU	Interaction design	Relational Design	MA	1	23
2020	AU	Information studies	Interface analysis	BA	1	100
2020	AU	Digital design	Interaction and interface design	BA	1	53
2020	AU	Digital design	Co-design	BA	1	53
2020	AU	ICT-Based Educational Design	Design: theory, methods & practice	MA	1	18
2020	AU	Information studies	Computer Game Theory	MA	1	16
2020	AU	Summer Course	Game.Play.Design	BA	1	40
2020	AU	Experience economy	Designproject	MA	1	32
2020	AU	Experience economy	Design processes	MA	1	32
2020	TU/e	Human-Technology Interaction	User Experience	MA	1	75
2020	TU/e	Data Science	Creative Thinking and Innovative Design	BA	1	80
2019	MAU	Graphic Design and Media and Communication studies	Interaction design and media	BA	1	44
2019	MAU	Interaction Design	Collaborative Media	MA	1	12
2019	MAU	Interaction Design	Collaborative Media	MA	1	14
2019	MAU	Interaction Design	IxD Methods	MA	2	30

2019	GU	Information Systems: IT, Users and Organizations	Interaction Design	BA	1	80
2019	AU	Information studies	Interface analysis	BA	2	100
2019	AU	Information studies	Computer Game Theory	MA	2	25
2019	AU	ICT-Based Educational Design	Design: theory, method & practice	MA	1	16
2019	AU	Summer Course	Game.Play.Design	MA	2	40
2019	AU	Experience economy	Designproject	MA	1	32
2019	AU	Experience economy	Design processes	MA	1	32
2019	AU	Digital design	Interaction and interface design	BA	2	40
2019	AU	Information studies	Bachelor project	BA	1	13
2019	TU/e		Matter of transformation	MA	1	22
2019	TU/e		Design for social innovation	MA	1	35
2019	TU/e	Psychology and technology	Human Factors	BA	1	80
2019	TU/e	Human-Technology Interaction	User Experience	MA	1	88
2018	TU/e	Broad bachelor	Empathy with the user	BA	2	70
2018	TU/e	Industrial Design	Squad Play and Learn	BA	2	30
TOTAL:					**43**	**1442**

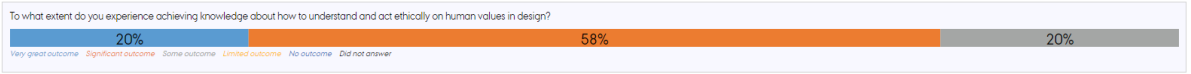
Table 1. Overview of pilots conducted within the project.

Year	Country	University	Program	Level	Nr of educators	Nr of students
2020	Turkey	Ozyegin University	Communication design	BA	2	28
2020	Sweden	Chalmers University of Technology	Interaction Design and Technologies	MA	2	80
2019	Sweden	Chalmers University of Technology	Interaction Design and Technologies	MA	2	70
TOTAL:					**6**	**178**

Table 2. Overview of outreach – pilots conducted outside of the project.

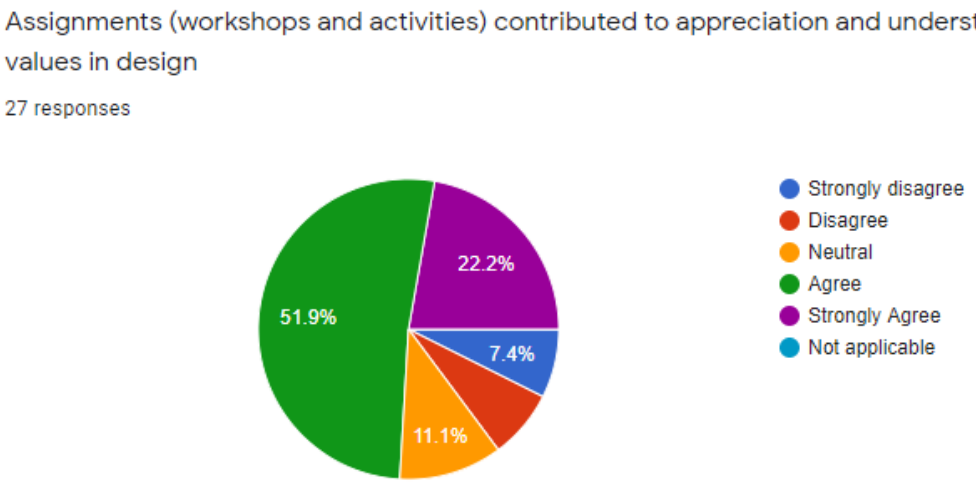
4.3 Results from pilots

- The teaching activities have to various extent been piloted by 50 teachers with 1 563 students in four countries. The pilots have been recorded in a Google sheet, and the teaching material shared on our shared Google drive.
- From the initial trial period of evaluating pilots through questionnaires, we have 7 responses from teachers. In those responses, over 70 % indicate the highest relevance possible regarding the question “To what extent was this material relevant to you?”, and 86 % indicate high on the question “To what extent do you experience increased capacity to teach value sensitive design in relevant and innovative ways?”.
- From the initial trial period of using the student evaluation questionnaire, we learned that 90 % out 30 students indicate high to the question “I have learned something about working with values in design that I consider valuable for my professional development”. However, we soon decided not to provide a separate evaluation questionnaire, but instead make use of the mandatory course evaluation. An example from 2020, where 78 % answer Very great or significant outcome to the question: “To what extent do you experience achieving knowledge about how to understand and act ethically on human values in design?”



- ” For shorter interventions, such as a guest lecture, an exit ticket was provided, see example from exit ticket from Ozyegin University in Turkey conducted in Mentimeter in 2020.

Another example from The Netherlands in 2019, conducted with Google forms, here:



4.4 Indicators and measures of pilots

As described in the original application, the quantitative indicators for successfully piloting the teaching resources and assessment resources are:

- At least 50 teachers have been involved in piloting the resources (documented through signatures),
    - This was achieved, although it has not been documented through signatures, but through filling out the shared Google sheet.
- At least 1 500 students have been influenced by the teaching and assessment resources (documents on student attendance),
    - This was achieved. 1 563 students participated in the pilots where one or several of the teaching and assessment materials were piloted. Their participation was not documented by any additional student attendance forms, but rather through the respective university records of student

attendance, and reported on by the responsible teacher in our shared Google sheet.

- At least 1 multiplier event is organised and executed for at least 50 participants (photos, report and press coverage),
    - One multiplier event was organised at the end of the project. Due to Covid-19 travelling restrictions the event was transferred to an online format. In total, 63 people registered for the event, of which 35 people attended in the end. The event was video recorded for others to watch afterward.

- At least 7 peer-reviewed research articles published as well as 7 presentations communicating about the teacher's and learner's use and experience of teaching and assessment resources on national and international level (present on research and media databases or through weblink),
    - This was achieved. A series of papers and articles have been either published or are undergoing review for publication. The published papers are eleven in total: Eriksson et al., 2021; Nilsson & Hansen, 2021; Kok et al., 2021; Eriksson et al., 2021; Nilsson et al., 2021; Barendregt et al., 2020; Eriksson et al., 2020; Nørgård et al., 2020; Hendry et al., 2020; Van Mechelen et al., 2020; Eriksson et al., 2019. Publications submitted for publication are two in total: Eriksson et al, 2021; Nørgård et al., 2021. Additionally, there have been numerous presentations, see VASE website for the complete list of presentations and publications: https://vase.mau.se.
- At least 75% of the teachers submit positive evaluations when assessing the experienced value of the teaching activities,
    - This is partly verifiable through seven evaluation forms, however more importantly is the continued use of the teaching and assessment activities that we experience in the pilot overview.
- At least 75% of the students submit positive evaluations when assessing the improved quality of teaching and learning in relation to values in design.
    - This is verifiable through evaluation forms, exit tickets, Mentimeters, and final course evaluations.
- At least 75% of the participants submit positive evaluations when assessing the quality of the multiplier event.
    - This has not been verified through an evaluation form developed for the multiplier event, but rather from the discussions with external experts, the participants in breakout rooms, and in the chat.
- At least 4 cases of press coverage of the project in at least 3 different countries.
    - The VASE project has been linked by several research institutions in Denmark (e.g. CCTD, 2021; CDC, 2021), by the hosting institution at Malmö University in Sweden (MAU, 2021; VASE, 2021), the project is listed as a "Kindred lab" by the Value Sensitive Design lab at Washington University in USA (VSD, 2021).

Indicators for assessing the experienced value of the teaching ressources and improved quality of teaching and learning in relation to values in design:

- Teachers' experience of professional development within values in design, a qualitative update of the design curriculum and increased capacity to teach for values in design in relevant and innovative ways.
    - This is verified through the evaluation questionnaires, see results from piloting above.
- Students' experience of achieving relevant labour market skills, future-ready education and updated knowledge about how to understand and act ethically on trade-offs between human values, design, and social forces that emerge through human use of that design.
    - This is verified in the evaluation questionnaires, see results from piloting above.
- Participants in the project declare interest in the aim of the project, find it relevant in relation to their teaching and learning practice, and value the project aims and outputs.
    - This is verified through the quantitative self-evaluation questionnaire that is sent out after each transnational project meeting, as well as through the continued piloting and intense publication work.

5. Conclusion

Due to Covid-19, several strategies have changed in the project, such as, e.g., teaching online instead of on-site, run online project meetings and the multiplier event, and make less use of the developed evaluation questionnaires to students and teachers. In spite of that, we have reached the following results:

- Desk research reports (Bekker et al., 2019; Barendregt et al., 2021, 2021a; Gyldendahl et al., 2021)
- 38 pilots with 1 563 students and 50 teachers in 7 different institutions in the following four countries: Sweden (CTH, GU, MAU), Denmark (AU, DPU), The Netherlands (TU/e), Turkey (OZU),
- A pedagogical framework on teaching for values in design including:
    - 28 teaching activities
    - 12 assessment activities
    - Eights case descriptions
    - A curriculum compass
- An online open educational resource (OER) making all the teaching resources included in the pedagogical framework freely accessible. On October 19, 622 unique users had accessed the site.
- A multiplier event that 63 people representing 47 institutions signed up for (whereof 35 attended the event in the end). The institutions are located in Europe, but also in the USA, Chile, Brazil and Singapore,
- Establishment of an emerging international network of teachers, currently 71 members,
- Eleven scientific publications (plus two under review).

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