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Practice what you preach: co-designing a lecture on co-design

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Practice What You Preach: Co-Designing a Lecture on Co-Design

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Abstract: The present paper reports on the experience of co-designing a lecture on co-design with a group of master students in the process of learning about co-design. Based on the educational system in place at the institution, the lecturer proposed a learning experience aimed to engage the students by addressing their learning interest within the scope of the course. The experience is described in terms of methods, tools and outcomes, and it is presented as a pilot on how involving the students in the design of educational format can result in their engagement and distribute the learning experience also outside the classroom. This is presented as a pilot to apply for further exploration on how the use of co-design more systematically in education can improve the learning experience and result in a safer and more challenging learning environment. Eventually, a reflection on the scalability of the experience and its iteration is proposed.

Keywords: *co-design; practice; teaching experience; master students; design; design methods*

Introduction

The learning experience presented in the paper was part of an introduction to the design methodologies presented withing the course Conceptual Design Methods. The course is offered in the first year of the Master Industrial Design Engineering (IDE) program at the University of Twente since 2021-2022 and aims to introduce the students to various design methodologies through short design assignments.

The course is open to all the students enrolled in a IDE master track, and students with other disciplinary backgrounds or exchange students are admitted after an interview to check that their prior knowledge is appropriate for joining the course. Overall, 31 students attended the course from February to April 2023 in the spaces of the Design Lab.

Within the course, three design methods were introduced and the students were asked to use them to address a specific design challenge. Before approaching the design assignments, the students received a theoretical introduction and a workshop to get acquainted with each methodology. Each theoretical session was organized and held by a professor specialized on the methodology, and the workshop was organized by a researcher using the methodology in their practice. The organization of each session was left to the communication style of each lecturer and aligned to the methodological approach proposed. The methodologies proposed were phenomenology (van Belle et al., 2019), co-design (Sanders et al, 2008; Steen, 2013) and futuring (Zaga et al., 2023).

The learning experience presented in the paper refers to the introduction on co-design. This is presented as a pilot to apply for further exploration on how the use of co-design more systematically in education can improve the learning experience and result in a safer and more challenging learning environment.

The intended learning objectives of the activities presented addressed the understanding of co-design as a key methodology in conceptual human centred design and the development, through first-hand experience, of a critical gaze that would allow the students to identify and select the tools based on the challenges and opportunities presented by different application contexts. In this specific case, the co-design activity was contextualized in a familiar environment (academic lecture as context), and students can use their own expectations and drivers (first-hand experience) to organize a follow-up session from which they could benefit in terms of content and participation (challenges and opportunities in terms of intrinsic motivation to attend the lecture, driven by the curiosity about the implementation).

Methods and materials

The educational experience has been set up in two moments: 1) an in-class workshop on the co-designing activity and 2) the implementation of the results in a lecture, resulting in a preparation assignment prior the lecture, a frontal lecture, a workshop and a content evaluation through a quiz. The research set-up presented in this paper is summarized in Figure 1.

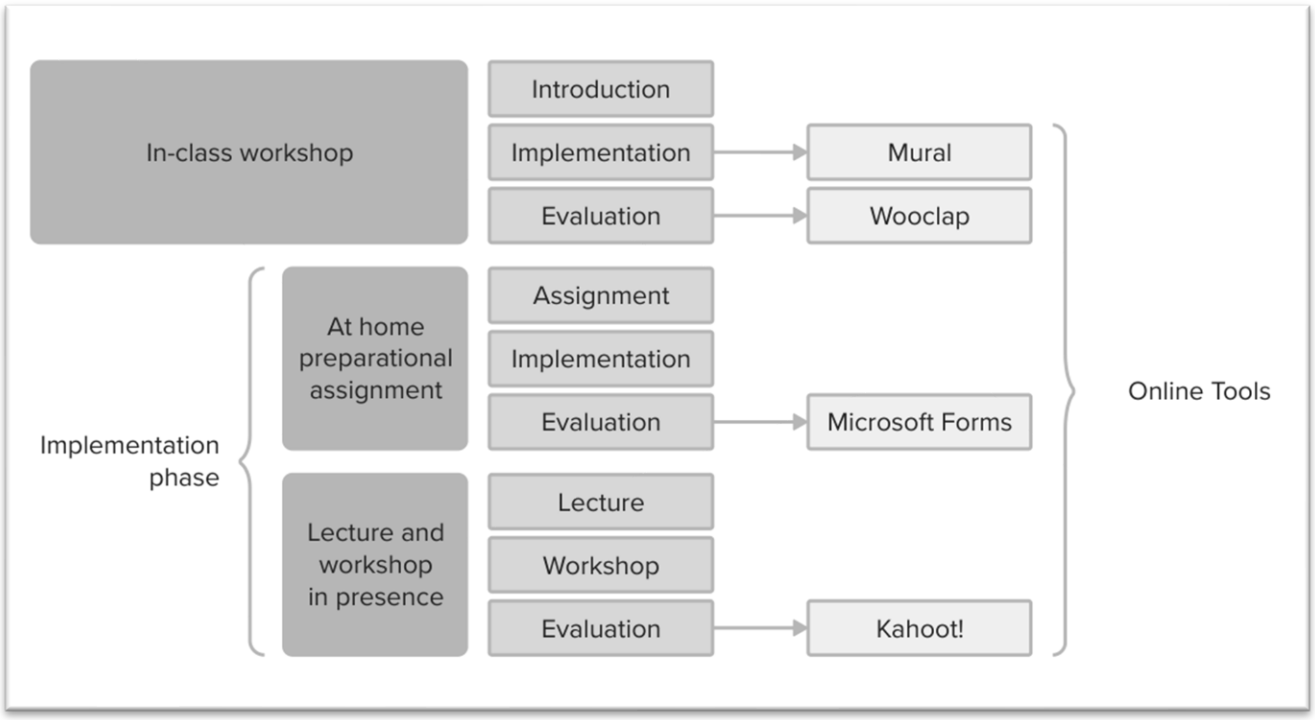


Figure 1. Visual overview of the research set-up presented in the paper

1. In class workshop/co-design session

The *in-class workshop* was aimed in engaging the students in a co-design activity that would have provided the materials for designing the following lecture. The workshop lasted 1h and 45 minutes and was structured as represented in Table 1.

Table 1. Structure of the workshop.

Class:	Conceptual Design Methods	Master, 1y	16/02/2023	Design Lab, Inform	
Learning Objective(s)	Experience a co-design session				
Assessment	Oral reflection on the procedure Feedback via Wooclap				
Time	**Topic**	**Content**	**Teacher activity**	**Student Activity**	**Materials**
10:45 – 11:00	Intro	Introduction on the activities of the day and launch of the first exercise	Present	Listen	Slides
11:00 – 11:30	Preparation	Each group reflects on one topic,	Provide starting material, then check	Read the materials, elaborate based on the constraints	instructions per group

		considering the constraints given by the teacher and their past experiences	and support the groups in the discussion		(x9), additional content
11:30 – 11:40	Discussion	Each group has 5 minutes to share with the other group the result and the insights from the previous session	Listen and take notes	Group A: Present the result of the previous discussion, take notes to present the results of Group C Group B: Take notes to present the work of Group A in the following session, presents the results Group C: Take notes to present the work of Group B in the following session, presents the results	
11:40 – 12:00	Presentation and incorporation on the slides	Groups present other group's results, the lecturer incorporates it in the design	Listen, keeps timing, take notes in the lesson plan table	Present, 3 mins per group	Lesson plan table Timer
12:00 – 12:25	Discussion on the content	The group addresses the content of the table, finding out what is there and what is missing	Facilitates the discussion and take notes	Contributes to the discussion with opinions, needs, perspectives	Lesson plan table
12:25 – 12:30	Wrap-up (and assessment)	Reflection on the activity, closure and feedbacks	Facilitate the discussion, summarizing results and ask questions	Participate to the discussion	Slides

The students did not receive specific information on co-design in preparation to the first session, some of them experienced co-design in their education but no evaluation of their prior knowledge has been conducted. The students received a short introduction on the activity of the day (about 15 min), after which they were asked to reflect upon the question “What do you know about co-design (and how)?”.

The students have been divided in 9 groups for the course, and the same division has been kept for the workshop. The groups have been engaged in a co-creation activity based on a snowballing technique. To start the workshop, each group received some guidance material to use to address the question proposed, and they had 30 minutes to discuss it within the group. The material consisted in a set of printed A4 papers with indication related to learning components in higher education. Specifically, each sheet addressed a different competence area required for a lecturer in higher education to obtain the University Teaching Qualification (UTQ) in the Dutch system (4TU UTQ Regulations, 2017). The sheets distributed between the students for this specific activity were: 1) Learning Outcomes, 2) Assessment, 3) Materials, 4) Content, 5) Tools, 6) Space, 7) Lecturer’s behaviour, 8) Students’ behaviour. During this phase of the workshop, the lecturer moved around between the groups, providing clarification of the guidance material when needed or joining the discussion with additional questions.

In the following 15 minutes, the groups were united in bigger groups including 2-3 groups each, and they were asked to share the outcome of their discussion and note what the results of the other groups were. Eventually, each group was asked to present in short (ca 3 min/group) the results of another group to the whole class, and the lecturer noted the outcomes on a table on a Mural (https://mural.co) board, projected on the bigger screen (Table 2).

Table 2. Input from the students.

Class:	Conceptual Design Methods	Master, 1y	16/02/2023	Design Lab, Inform	Materials
Learning objective(s)	define if co-design is the right method identify origin of co-design limitations of co-design (and relative challenges) how to set-up co-design sessions			private space, reduce distraction, appropriate size, re-arrangeable furniture (U shape), comfortable seat for active posture readable board	videos & papers before the lectures statement/summary and relevant videos before the lecture after the lecture: examples and case studies

				no known music in the background whiteboards per group	resources to deepen the knowledge (external people to talk to, videos, ...)
Assessment	(depends on the format) QUIZ with a small prize	multiple choice questions on how to tackle different scenarios			
Time	**Topic**	**Content**	**Teacher activity**	**Student Activity**	**Tools**
9:00 -		Intro	open discussion/simple questions to get everyone engaged no leading but sitting on the same level	Active mode	microphones
		Guidelines	active description & storytelling based on personal experience	Passive mode	
		When to apply the method			
		How to prepare for the method (location, participant, designer, behaviour)			
		Many examples			
		Short break			
	Group work/ mini workshop	Practice	Walk around to join discussion	Group activity, discussion active mode	Interactive on-line workshop ? better physical based on a case study sticky notes and whiteboards to get creative and make mind maps
- 10:30		Discussion and reflection	Snowball technique for final presentation	Groups are not the same	

When the content was reported on the table, the whole class was involved in a discussion over the content itself, commenting if they agreed on the outcomes of the discussion.

The students were asked their feelings towards the activity, specifically if they felt it was planned or more improvised. When some students addressed the feeling that the lecture was improvised, the lecturer showed the table used to structure the session (Table 1), projected on the same board in which the outcome of the workshop was collected, and explained how that structure is usually integrated in the teaching knowledge of every lecturer.

Eventually, the students were asked to give feedback on the workshop via Wooclap (https://www.wooclap.com/): the environment required them to join the platform with their smartphone, and they could contribute and provide feedback anonymously. In some cases, students were invited to elaborate verbally over the answers provided. Overall, 22 students participated to the evaluation. The questions were meant to explore: 1) the understanding of the students of the activity, 2) the understanding of the students of co-design, 3) the knowledge they feel they were still missing, 4) the engagement in the session. The results will be presented in the Evaluation section.

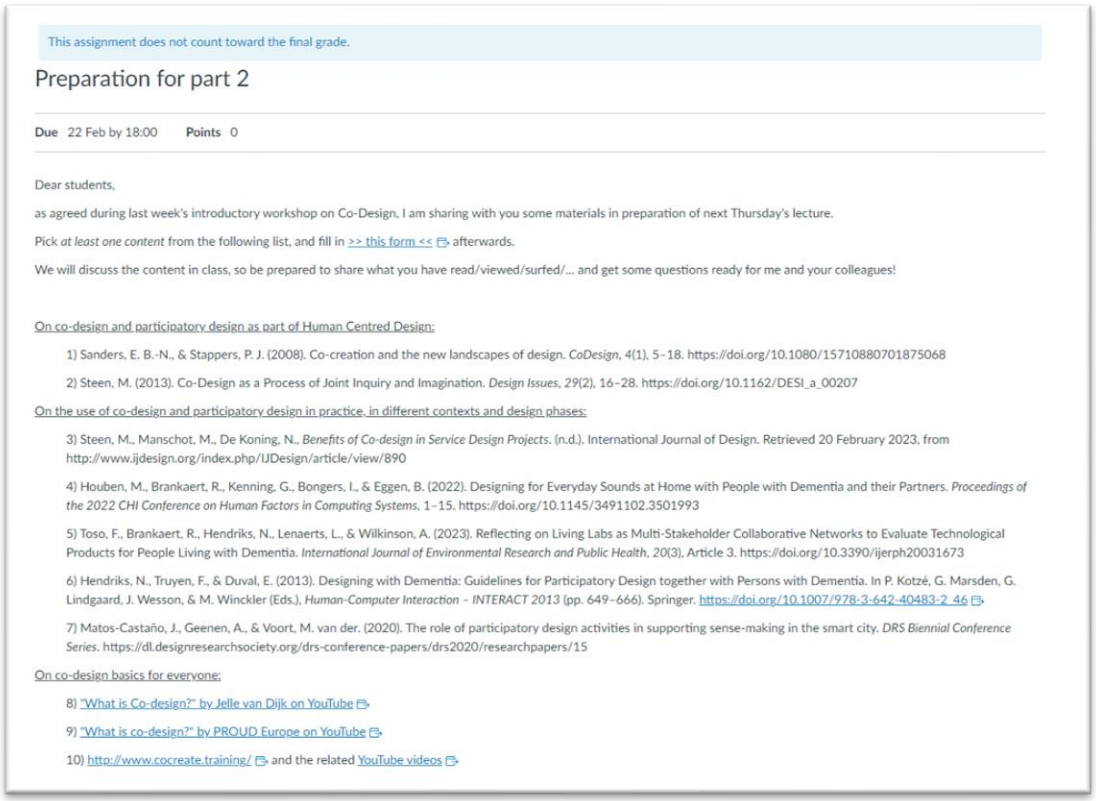
2. Implementation phase

The implementation phase of the lecture took place in two phases, following the students' requests:

1. Implementation phase 1: at home preparational assignment
2. Implementation phase 2: lecture and workshop in presence

2.1 At home preparational assignment

The first phase of the implementation consisted in an *assignment* to be completed before joining the next lecture (Fig. 2). The assignment required the students to make use of at least one of the materials proposed, choosing between videos, scientific papers and websites, and fill in an on-line module.



This assignment does not count toward the final grade.

Preparation for part 2

Due 22 Feb by 18:00 **Points** 0

Dear students,

as agreed during last week's introductory workshop on Co-Design, I am sharing with you some materials in preparation of next Thursday's lecture.

Pick *at least one content* from the following list, and fill in >> this form << afterwards.

We will discuss the content in class, so be prepared to share what you have read/viewed/surfed/... and get some questions ready for me and your colleagues!

On co-design and participatory design as part of Human Centred Design:

1) Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign*, *4*(1), 5–18. https://doi.org/10.1080/15710880701875068

2) Steen, M. (2013). Co-Design as a Process of Joint Inquiry and Imagination. *Design Issues*, *29*(2), 16–28. https://doi.org/10.1162/DESI_a_00207

On the use of co-design and participatory design in practice, in different contexts and design phases:

3) Steen, M., Manschot, M., De Koning, N., *Benefits of Co-design in Service Design Projects*. (n.d.). International Journal of Design. Retrieved 20 February 2023, from http://www.ijdesign.org/index.php/IJDesign/article/view/890

4) Houben, M., Brankaert, R., Kenning, G., Bongers, I., & Eggen, B. (2022). Designing for Everyday Sounds at Home with People with Dementia and their Partners. *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, 1–15. https://doi.org/10.1145/3491102.3501993

5) Toso, F., Brankaert, R., Hendriks, N., Lenaerts, L., & Wilkinson, A. (2023). Reflecting on Living Labs as Multi-Stakeholder Collaborative Networks to Evaluate Technological Products for People Living with Dementia. *International Journal of Environmental Research and Public Health*, *20*(3), Article 3. https://doi.org/10.3390/ijerph20031673

6) Hendriks, N., Truyen, F., & Duval, E. (2013). Designing with Dementia: Guidelines for Participatory Design together with Persons with Dementia. In P. Kotzé, G. Marsden, G. Lindgaard, J. Wesson, & M. Winckler (Eds.), *Human-Computer Interaction – INTERACT 2013* (pp. 649–666). Springer. https://doi.org/10.1007/978-3-642-40483-2_46

7) Matos-Castaño, J., Geenen, A., & Voort, M. van der. (2020). The role of participatory design activities in supporting sense-making in the smart city. *DRS Biennial Conference Series*. https://dl.designresearchsociety.org/drs-conference-papers/drs2020/researchpapers/15

On co-design basics for everyone:

8) "What is Co-design?" by Jelle van Dijk on YouTube

9) "What is co-design?" by PROUD Europe on YouTube

10) http://www.cocreate.training/ and the related YouTube videos

Figure 2. Overview on the assignment published on the course page

The on-line module proposed three questions aiming 1) to check the fruition and preference of the students for a specific content type [*multiple choice answer – Which content?],* 2) to verify their effective fruition and understanding of the content [*open question - Explain the content*] and 3) to foster their reflection on the content proposed [*open question – what insights?*]*.*

The assignment was uploaded on Monday and by Thursday (set deadline) the on-line form was filled in by 11 students out of the 34 participating in the course.

2.2 Lecture and workshop in presence

The lecture and the workshop in presence took place one week after the co-design session took place.

The lecture started with the setup of the room itself, for which students helped the lecturer in setting the desks in a U-shape. That disposition was indicated as a preference by the students to make the setting feel less formal and provide a good and equal visual to all of them.

Most of the students were on time, and the lecturer introduced the program of the day connecting it to the outcomes of the previous week's workshop and with feedback on the preparation exercise (Fig.3).

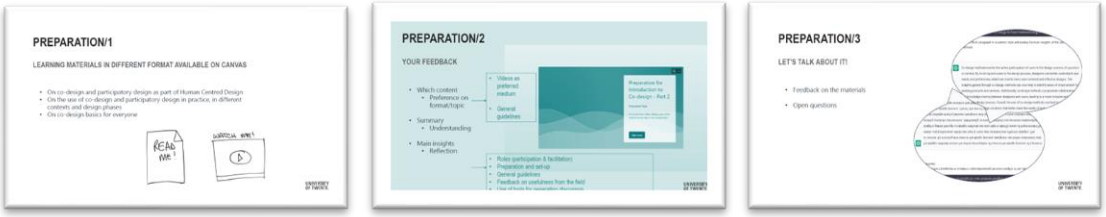


Figure 3. Slide set addressing the preparation

The first part of the lecture addressed the theoretical background required by the students to understand co-design. The content was based on the papers read by the students for the assignment, guiding them through specific passages

of the papers regarding the evolution of the methodology, the impact and the benefit of applying it, the roles of the stakeholders involved in the process and the critical aspects related to its adoption. Then, the presentation introduced some examples from co-design in practice, also based on the papers provided in the preparation.

The first part lasted for about 1h and 30 min, and questions were welcomed during the presentation. A coffee break of 15 minutes was introduced before the second part of the implementation.

The second part started with a reference to one of the resources presented in the preparatory exercise: the website reporting the outcomes of CO-CREATE (http://www.cocreate.training/), project on Co-creation funded by Erasmus+ framework between 2016 and 2018, providing guidelines and dissemination material to get engaged in co-creation practices. Students were asked to reflect on the steps of a co-design session (Fig. 4)

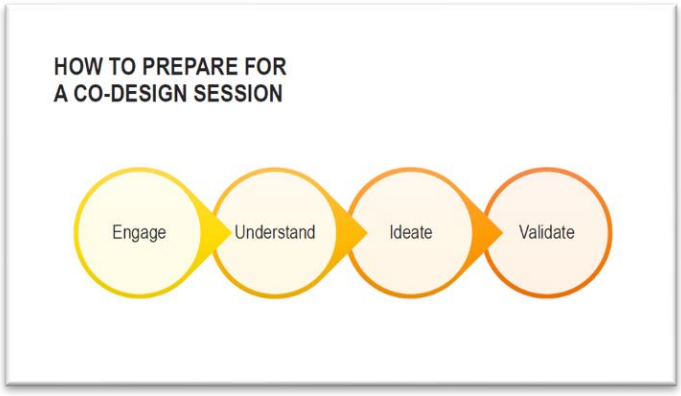


Figure 4. Steps of the co-design process presented to the students

A discussion moment was related to the slides, for which the students were asked to identify how the activities conducted were located in the process and how they related with the different phases. The correlation of phases and workshop will be addressed in the following paragraphs.

Students were then introduced to a hands-on workshop aimed to evaluate their understanding of three different actors in the co-design session, namely 1) the stakeholders, 2) the facilitator and 3) methods and materials.

Students were divided in three big groups by assigning to each a number from one to three, and they were provided with some materials to craft a physical representation of the related actor in 15 minutes (Fig.5).

Figure 5. Students engaged in the crafting activity

When the crafting time was over, the groups were asked to present their creation to the whole group (Fig. 6).

Figure 6. Students presenting the results (from the left: stakeholders, facilitator, methods and tools)

The lecture was concluded with a quiz aiming to assess their understanding of the concepts presented in the lecture. The software used for the quiz was Kahoot! (https://kahoot.com), and the students needed to use their smartphones to participate. A small prize was prepared as a reward, but students did not know what that would be. Eventually, the winner got a chocolate bunny, and all the participants got couple of small chocolate egg as consolation prize.

3. Evaluation

Different evaluation methods have been introduced to understand the students' comprehension and engagement relatively to the topic. Online tools that allowed anonymous participation by the students were chosen as supporting tools and main platforms to invite them to participate and be critical if needed, without being afraid of possible consequences on their final grade.

Students were already familiar with most of the applications used, also as consequence on their adoption by other lecturers during the Corona lockdown. Limitations on the participation were related to the lecturer's subscription: the use of some free plans did not allow the participation of the whole class to the activity.

The feedback moments took place 1) after the co-design session, 2) after the preparation assignment, and 3) after the in-person lecture and workshop.

3.1 Evaluation of the co-design session

The evaluation after the co-design session took place using Wooclap. The questions (Fig.7) addressed Q1) the understanding of the students of the activity, Q2) the understanding of the students of co-design, Q3) the knowledge they feel they were still missing, Q4) the engagement in the session.

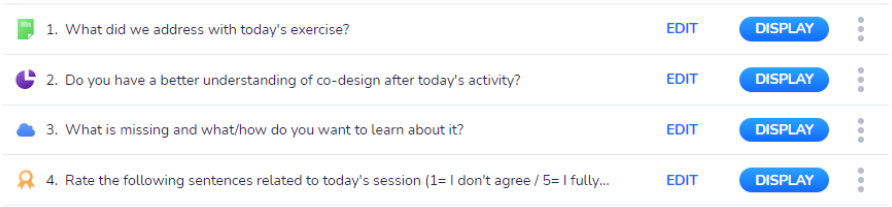


Figure 7. Questions proposed to the students

Q1 was a question with multiple answers allowed, and students' answers were distributed in a quite balanced way between the choices, showing that each student got a different perspective and a different understanding of the activity. 18 students out of 22 participating in the evaluation answered to this question.

Q2 showed how most of the students did not feel they had a better understanding of co-design after the activity. When asked to elaborate on the answer, some students mentioned that they had previous experience with co-design in their studies (bachelor in the same faculty/university), while students that did not attend the bachelor in the same faculty/university indicated that it was a useful exercise. 19 students out of 22 participating in the evaluation answered to this question.

Q3 required the students to provide some input in form of keywords on topics they want to address related to co-design. Examples of application in real life environment were requested the most (7), followed by the areas of use (3) and reasons for which co-design could work/not work (3). Other requests addressed how to involve vulnerable users, what theories and philosophies are beyond the method and how flexible it is.

Q4 addressed the engagement of the students, asking them to rate different statement based on their experience on a scale from 1 (do not agree) to 5 (fully agree). Not everyone felt confident in addressing autonomously co-design after the session (rated 2.2 over 5), a minority did not felt engaged and would have preferred a frontal lecture (1.9 over 5), but most of the students declared to be glad to have joined the session (4.7 over 5), to be looking forward to the next lecture knowing that they contributed to designing it (4.1 over 5), to wish more lectures were like that (3.4 over 5) and to feel in control of their learning (2.7 over 5).

3.2 Evaluation on the Preparation

The evaluation after the preparation is based on the Microsoft Forms document filled in as part of the assignment. The questions aimed 1) to check the fruition and preference of the students for a specific content type [*multiple choice answer – Which content?*], 2) to verify their effective fruition and understanding of the content [*open question - Explain the content*] and 3) to foster their reflection on the content proposed [*open question – what insights?*].

The results of the preparational assignment show an overall preference for the video content (Fig.8), but most of the students made use of multiple content (5 only paper, 2 paper and video, 1 only video, 1 video and website, 1 paper, video and website).

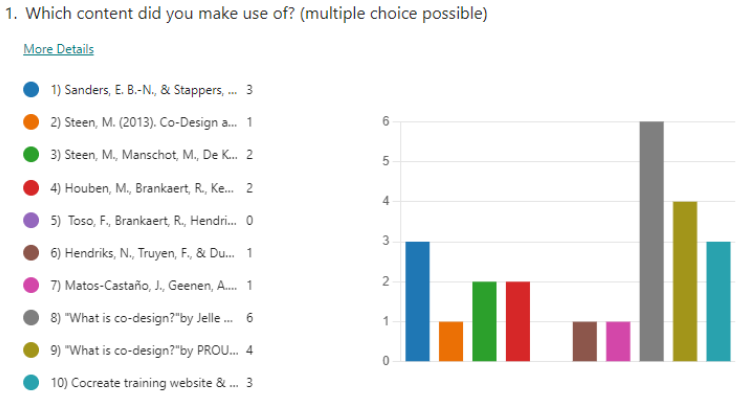


Figure 8. Result of the on-line form showing the fruition of the preparational content by the students

The second question required the students to provide a short summary (from one sentence to a short paragraph) of the content, aiming to make sure that they really went through it and paid enough attention to be able to explain the content in their own words.

The third question was set up to stimulate the students' reflectivity about the content, asking them to explain the insights they got from the fruition of the proposed content. The responses demonstrated appreciation of the learning materials in terms of introducing the method and explaining it in the context of HCD, both from students with previous experience on co-design and without. The examples of application were also appreciated, as well as the clarification of the roles and tasks assumed by the stakeholders involved in co-design sessions (e.g., facilitator vs user).

> I wasn't sure what co-design was, never having applied it. So this video was a nice general intro into the method of co-design. (Comment from a student)
>
> What I already kind of knew, but is still good to hear, is that co-design can create cohesion and support for the design direction in which you are going. (Comment from a student)
>
> Really nice example of how co-design can be really beneficial in certain studies. (Comment from a student)
>
> Besides that, it was really interesting to read about the feedback of the users. (Comment from a student)

> It's interesting knowing that there are four levels of creativity and that having users from all levels involved could enrich the process. Knowing that, some questions came to my mind. (Comment from a student)

3.3 Evaluation of the Lecture + workshop

The implemented lecture has not been evaluated per se, but a quiz has been proposed to assess the students' understanding of the topics discussed. The session took place on Kahoot with 21 participants.

The report provided by the platform (Fig. 9) shows an high percentage (80%) of correct answers by the students, and indicates that three students had trouble providing an answer to the questions on time, not being able to finish the quiz.

Conceptual Design Methods on Co-design	
Played on	23 Feb 2023
Hosted by	KAHOOT__ftoso144
Played with	21 players
Played	7 of 7

Overall Performance	
Total correct answers (%)	80,27%
Total incorrect answers (%)	19,73%
Average score (points)	4940,48 points

Figure 9. Result of the on-line form showing the fruition of the preparational content by the students

Looking at the students' performances per question, the difficulty of the questions seemed to be overall balanced (Fig. 10).

All (7) Search

Question	Type	Correct/incorrect
1 "Co-creation" is a term strictly related to the industrial design field	True or false	95%
2 "Co-design" is a specific instance of "co-creation"	True or false	71%
3 Co-design is NOT...	Quiz	86%
4 In co-design, all the participants are considered experts	True or false	71%
5 Which skills are NOT relevant for the designer as researcher in a co-creation context?	Quiz	86%
6 The "fuzzy" front-end is NOT...	Quiz	62%
7 Select the correct sequence for preparing a co-design session	Quiz	90%

Figure 10. Result of the on-line form showing the fruition of the preparational content by the students

Discussion

This paper addresses a case study from the practice, describing a specific learning experience. As this learning experience can set the basis for further iteration in the next edition of the course, it consists in a limited experience connected to the space and the participants. Nonetheless, the knowledge acquired through the experience can and should be used to repeat the experience in the following editions of the course, and can also be broadened and applied to processes of re-design of courses and curricula.

The space facilitated the experience in terms of accessibility and flexibility of the furniture in the room, allowing the implementation of the desk distribution compared to a classical teaching environment: the same experience would have been harder to implement in other buildings present on the UT campus.

The participants influenced the results of the experience with their attitude and interest towards the topic: participation can vary based on the personal interests of each student, and their responsiveness to the lecturer's input can be different in a bigger or smaller group. The observation of the students' active participation and behaviour in the previous lectures influenced the lecturer in being confident of implementing an experimental learning activity with that specific group of students. The composition of the classroom was not piloted, and therefore gender, age, cultural

background and previous education of the students participating in the classroom were not considered for the set up of the session, neither can be influenced by the researcher in case of further implementation in next editions of the course.

The result of the pilot is a structured activity that can be further implemented as presented in the paper, or completely re-designed again if the students' requirements emerging from the initial workshop will differ in the iteration of the course. In the case of the pilot presented, the lecture was not pre-defined and needed to be designed for the course in any case, therefore the co-design activity allowed to combine the first-hand experience of the methodology with the set-up of the theoretical content. In case of a further iteration, adapting completely the lecture to changing requirements can result in a time-consuming activity, and the balance between the benefit for the students and the availability of the lecturer(s) needs to be taken into account.

The content proposed within the lecture is not believed to affect the overall performance or the understanding of the topic by the participants of the learning experience: different theoretical material on co-design can be proposed in form of papers, guidelines and videos based on the lecturer's and students' preference. Recalling the preparational material proposed with the in-between homework in the following lecture is suggested in terms of educational practice: it provides the students with prior knowledge; they can prepare questions to clarify specific aspects of the theoretical content and allows the lecturer to dive more in depth within the topic.

Overall, using co-design as a basis for a learning experience engages the students by setting their expectations and participation to the lecture, plus resonates with the adaptation of the learning experience to the students' needs and desires in compliance with the learning requirements sets within the course structure. The students' responses after the workshop (addressed in 3.1) support the novelty of the experience and the involvement in the design of the next steps as an incentive, leveraging the intrinsic motivation of participating to the next lecture and the feeling of being in control over their learning.

The co-creation session allows to create a common ground and an open environment in which the students feel comfortable to openly interact, asking questions and setting the peace of their own learning together with the lecturer. By placing themselves at the same level of the students, the lecturer becomes an ally in the learning process more than what happens within frontal lectures as in more classical approaches.

Limitations

The paper presents a teaching and learning experience from the practice. The paragraphs above focus on the set-up, implementation and observation of the insights provided by this experience, while the next lines address two main limitations of the case study.

First, the comparison and the construction of the experience based on literature or other case studies have not been considered for this implementation. The time for the preparation of the workshop and the time in between the workshop and the lecture were limited, therefore a different planning is suggested. The concepts introduced to the students in the initial workshop can be simplified and aligned with a stronger reference to co-design practices more than focus on the structure of the teaching activity, and students can be involved in the identification and presentation of relevant materials in the second lecture.

Second, the attitude and the behaviour of the lecturer and the students can be considered a limitation for the replication of the study: their participation to the in class discussion and the engagement in the workshop can vary, and the previous knowledge and the preferences for the structure of a learning experience can be different than the ones encountered in the experience reported in the present document. The complexity of the structure emerging from the first workshop can increase, depending on the availability of spaces and materials. The participation and the expectations of the students can differ based on cultural and educational background, but introducing boundaries and set structures can result in a limitation of the space for co-design. The experience of the lecturer in combining the expectations of the students and engaging them without driving them to a solution based on pre-defined structures is a core point for the replication of this learning activity.

Conclusion

The workshop and the lecture described in this document are to be intended as a pilot to explore the use of co-design as a tool to experience and learn about co-design as a method. The set-up is based on the assumption that the

involvement of the students in the design of the educational format can result in a deeper engagement and contribute to a distribution of the learning out of the boundaries of the classroom. While the pilot presents a series of limitations, the feedback collected through the evaluation enlighten a positive response from the student to these dynamics. This provides the funding for further exploration on the use of co-design in education, a comparison with best practices and case studies from other disciplines and a series of design iterations that could overcome the limitations presented by this pilot to facilitate the replicability of the experience in different settings and with different participants.

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