International Journal of Management and Applied Research, 2023, Vol. 10, No. 2

Fostering Student Participation with Design Thinking in Higher Education

Cynthia E. Heiner, Christine Schnaithmann, Nora Kaiser, Romina Hagen

Freie Universitaet Berlin, Germany

Abstract
In this reflective article, we describe our experiences using Design Thinking (DT) to increase student participation and challenge the standard roles and ways of working in Higher Education. We put together a design team of students, academic teaching staff, and educational developers. The intentional mix of perspectives facilitates critical discussions about teaching and learning, and the shared responsibilities associated with developing, implementing, and engaging in it. We describe a framework for using DT in Higher Education, which particularly takes advantage of DT's "user-centered approach" and "bias towards action". Additionally, we present a practical example from within our project, Students' University, and discuss its potential in contributing to a more student-centered teaching and learning environment. We conclude by offering a brief summary of the opportunities, challenges, and potential transformations achievable through the application of DT in Higher Education.

Keywords: Design Thinking, Student Consultants, student-centered teaching, Design Framework

Received: 24 July 2023
Revised: 11 Sept 2023
Accepted: 18 Sept 2023

ISSN 2056-757X

https://doi.org/10.18646/2056.102.23-014

1. Introduction

In recent years, there have been many discussions about why Higher Education (HE) should shift from a largely instructor-focused model towards a student-centered one (e.g., Kember 1997; 2009). Especially since the Bologna Process, European HE institutions have been reexamining their goals behind university instruction and considering how to become more student-centered, increase student participation, and support a more diverse cohort in lifelong learning (Sursock and Smidt, 2010). Yet, despite all the conversations, there is no clear consensus as to how to increase student participation and make the shift towards student-centered learning and teaching actionable.

One promising approach is through Design Thinking (DT), a method that places the "user at the center of the process" (Design Council, 2023; Brown and Katz, 2011) and drives collaborative problem-solving. DT involves using experiential insights to build empathy, stimulate idea generation, and implement “iterative prototyping” that develops innovative and human-centered solutions. DT brings together diverse stakeholders to better understand the ‘user’ context and thereby co-create solutions that are a better fit for purpose. We acknowledge that DT has already been applied in HE curriculum and learning design (e.g., Grabill et al., 2022); however, the practical implementation of actively involving students as partners remains largely an aspirational goal (MacNeill and Beetham, 2022).

In our view, the experience of a ‘user’ in HE context is shared between students and academic teaching staff (thus forward referred to as instructors). We emphasize the need for student participation in learning design, which gives students a voice in their own HE experience. This approach aligns with a constructivism theory of education, which puts the learner experience at the center of teaching (Guaman-Quintanilla et al. 2023). Instructors – acting as "enablers" of education –are equally important as they significantly shape students' experiences through their teaching implementation. As a result, the two user experiences are interconnected through the process of teaching and learning.

In our project, Students’ University, we also include educational developers in the design teams, capitalizing on their skills in facilitation and knowledge in student-centered learning environments. It was important to be explicit that within our project, instructors, students, and educational developers were treated as equal partners, emphasizing a collaborative and egalitarian approach that is not the norm in our HE context. Each role contributes significantly to the teaching and learning process in distinctive ways and understanding these different perspectives and valuing their contributions equally requires the communication, trust, and empathy, that DT emphasizes (Köppen and Meinel, 2015; Grau and Rockett, 2022).Thus, we believe DT’s “user-centered approach” to be a good fit for our goal of both increasing student participation and for contributing to a more collaborative HE experience overall.

Additionally, we embraced DT’s concept of “bias toward action” through iterative “prototyping”. In our HE context, making changes to teaching and learning is often resource-intensive, both in terms of finances and time. The traditional approaches

involve either costly "pilots" or going through complex administrative procedures to modify study structures. These can be unnecessary, especially when introducing small, evidence-based changes. The idea of iterative prototyping allows for a dynamic approach of quick implementation and feedback cycles on small, practical, and light-touch changes in teaching and learning. We prioritize solutions that both bring in the student perspective and are easy to implement within existing institutional structures and rules.

In this reflective article, we will first describe our project, Students' University, and our local HE context (Section 2), followed by an outline of the DT framework we employed for design work with cross-status teams (Section 3). In Section 4 we will present a practical example of our DT approach for a project focused on improving the experience of first year computer science students. Finally, Section 5 will briefly summarize the opportunities and challenges for applying DT in HE.

2. Project description: Students' University

In 2022, the Dahlem Center for Academic Teaching at the Freie Universität Berlin was successfully awarded funding for a two-year project, Students' University (StudentU), aiming to increase student participation in HE. The project uses DT to find new ways to increase student participation in teaching and learning. The goal was to use the collective insights from students, instructors, and educational developers to empower cross-status teams to create local examples of how to intentionally design a HE experience.

The core StudentU team consisted of four academic staff members with broad expertise in the social sciences, humanities, DT methodologies, and STEM education, and two "Student Consultants", bringing with them their distinct and valuable perspectives (Cook-Sather, Bovill and Felten, 2014).In many traditional HE contexts, including ours, hierarchical relationships persist. To challenge this, we deliberately included students as equal partners in our project, and thus providing a model for collaborative and equitable student participation.

Instructor partners were identified through an internal process, which included submission of a statement of interest and follow-up discussions with the StudentU team. Proposals for a so-called "Learning Evolution Project" (LEP) could come from any discipline, but the main theme had to be related to student participation (Bartley, Dimenäs and Hallnäs 2009). The scope of the LEPs varied, from large redesigns of degree programs to small, single module interventions.

To lay the groundwork for each LEP, initial meetings were set up between StudentU and the interested faculty and students. The meetings allowed the faculty team to describe their teaching context, challenges, and goals and the StudentU team to introduce the design process, which was new to all faculty participants. We note here that it was critical for these instructors not only to agree to collaborate with students as partners but also to appreciate the iterative nature of DT and, in turn, embrace mistakes as an inherent part of the process. In other words, we searched for teaching faculty who already had a "student design mindset", as defined by Grau and Rockett (2022, p.

143S): "having a focus on the student with empathy, bias towards action to experiment, prototype and iterate, being open to feedback, collaboration and co-design with students, and being curious about students and their needs." This mindset and way of working was – and still is – relatively novel within our HE context.

Protocols from these meetings were shared online as editable working documents. These working documents played a vital role to facilitate the collective understanding among all team participants. After initial meetings, four LEP partnerships were formed from a range of disciplines: Computer Science, Chemistry, Art History, and North American Studies. In Section 4 we will detail the journey of the LEP in Computer Science as an example of our DT process.

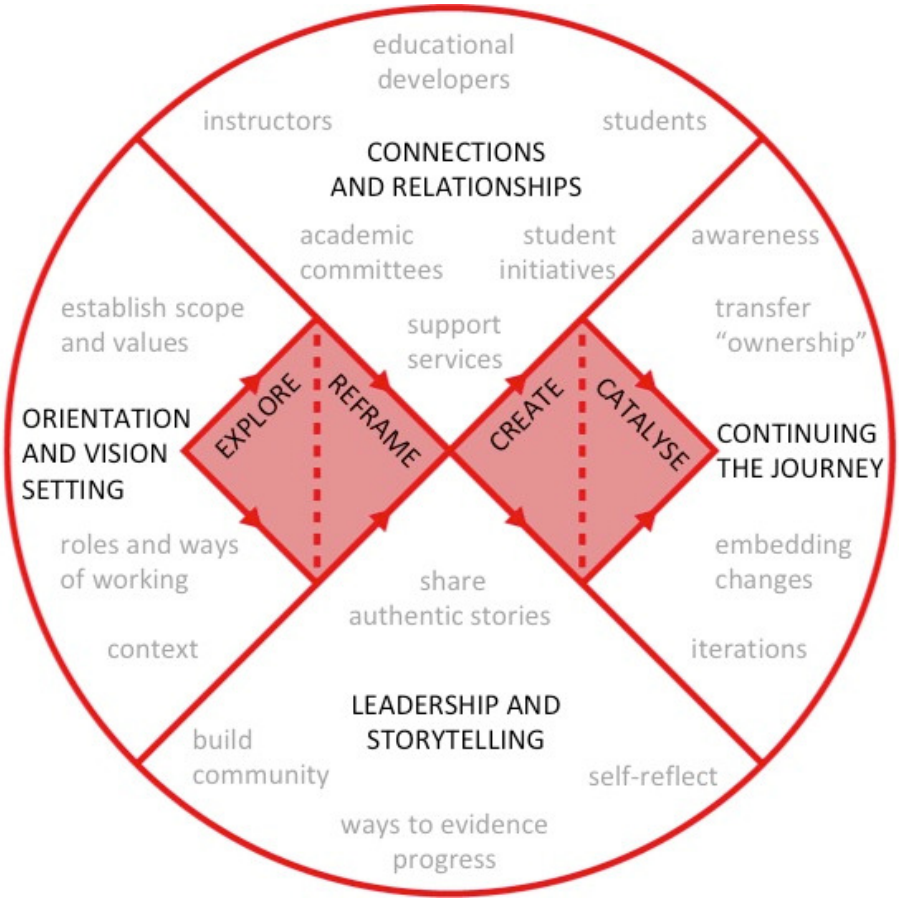
3. Design Thinking Process Adapted to HE Context

In this section, we will describe our framework and approach for using DT within the StudentU project. Although we chose LEP partners who already had a well-defined "student design mindset" (Grau and Rockett, 2022), it was still crucial to establish a more comprehensive framework that could guide the project's direction and provide a comparable experience for every LEP, regardless of their specific scope or discipline.

We took inspiration for our own design process from the Systemic Design Framework (Design Council, 2021) and the Design Framework for Student Engagement (Friis, 2019; Grau and Rockett, 2022; Roth et al., 2020). Figure 1 is adapted from the Systemic Design Framework and illustrates our guiding principles for using DT in StudentU. For clarity, we will discuss in Section 3a the outer circle, which depicts the broader conditions and environment needed to support DT in HE, and in Section 3b the inner double diamonds, which describes the iterative, actionable steps of DT.

The outer circle is broken in to four sections, each highlighting a condition needed to achieve sustainable change through DT (see Section 3a). The gray text adds description for how these conditions might be interpreted, particularly within a HE context. The double diamonds in the center show the divergent-convergent pattern of DT activities (see Section 3b). This derivative work is an abridged version from the image "Systemic Design Framework" (Design Council, CC BY 4.0), available at https://www.designcouncil.org.uk/our-resources/systemic-design-framework.

Figure 1: Visualization of the Design Thinking framework used within our HE context at StudentU



3a. Environment for Design Thinking

Looking at Figure 1 (outer circle), the first condition for a supportive DT environment is agreeing on a shared *Orientation and Vision* (left side of Figure 1). Although we initially discussed context and design mindsets in our meetings, we needed additional sessions with each LEP for in-depth conversations about overarching goals, potential outcomes and benefits for diverse stakeholders, and longer-term plans to sustain any positive changes resulting from the LEP. Being mindful of workload and time constraints, we had candid discussions about expectations, roles, and responsibilities within the LEP. Our goal was to establish a way of working that challenged the common trend where innovative initiatives rely on the (unpaid) dedication of individuals and often lose momentum when those individuals depart. We aimed to showcase DT's impact within a regular workload capacity for the StudentU team and LEP partners, while also offering financial support to recognize student LEP contributions.

Another condition for DT, especially for achieving long-term impact, is to reach out and build *Connections and Relationships* (top part of the circle in Fig. 1). Within most large HE institutions, however, crossing institutional and disciplinary boundaries can be challenging. For instance, there may be several teams working on related projects but working in silos across a large HE institution like ours. Joining up these

individuals and initiatives requires active effort. Nevertheless, it is worth it for the benefit of the shared resources and gains from incorporating broader perspectives. Within our institution, the StudentU team occupied a unique position, often referred to in HE as the 'third space', playing a key role in connecting different parts of the university. Although it took some time to understand the specific local context and disciplinary culture, StudentU was able to successfully facilitate important connections for each LEP across various departments and university services.

Effective collaboration and team alignment around the shared vision demand clear *Leadership and Storytelling*, as depicted in the bottom part of Figure 1. Strong leadership encompasses community building and proficient project management, involving discussions on timelines, deadlines, deliverables, and diverse methods to document impact. Equally vital is an open and honest storytelling narrative that addresses both the opportunities and challenges the team encounters throughout the process. Our intention was to create an environment where the team felt empowered to 'fail safely'. By openly sharing our trial-and-error experiences, we transformed mistakes into valuable learning opportunities, challenging the prevailing HE practice of solely celebrating successes. Dedicated time for both individual and group reflection was instrumental in helping the team identify effective strategies and areas for improvement – a practice also considered essential for effective teaching and learning. While our project engaged the entire team in the design process, StudentU staff assumed a central leadership and storytelling role. They drove the LEP's progress, documented the process, and disseminated the work, often in collaboration with LEP partners, at various teaching and learning forums.

Lastly, to achieve sustainable change through DT one must consider ways of *Continuing the Journey* (right side of Fig. 1). It is crucial to hold explicit discussions regarding next steps, progress pace, and responsible parties. Likewise, questions about operational responsibility, accountability, and ownership must also be addressed. Within HE, the concept of 'ownership' often carries weight, as formal recognition is necessary for career advancement. Consequently, there is often a reluctance to integrate projects into existing HE offers and structures. Moreover, this dilution of ownership may lead to stagnation of the project, with no one person or team assuming responsibility for the continual quality control and improvements of the project. In our project, where guaranteed funding lasted only two years, we were acutely aware of this issue. Hence, the involvement of LEP partners and the extensive network of connections and relationships we cultivated across the institution proved to be invaluable, providing essential support for each LEP project.

3b. Practical steps of Design Thinking

So far, we have discussed the conditions that shaped our DT working environment within HE. Now we will shift to the actionable part of the DT process– explore, reframe, create, and catalyse – depicted within the double diamonds in the center of Figure 1. The design steps present a pattern of divergent thinking, e.g., to explore the problem space, and convergent thinking, e.g., to reframe the initial problem from a user centered perspective. We will explore each diamond separately, as they each

represent one divergent-convergent pair. The iterative nature of DT encourages the ongoing consideration of new insights, refinement, and improvement of the prototypes.

In the divergent *Explore* phase (see Fig. 1), our primary objective is to gather diverse 'user' insights (Micheli et al., 2019) about the educational experience within each LEP's defined scope. As mentioned in the Introduction, we consider both students and instructors as 'users,' so combing these insights reveals a multi-faceted, rich understanding of the full educational 'user' experience. We explored a range of qualitative methods, as outlined in Figure 2; a detailed account of the Flash Interview method can be found in Section 4. Figure 2 also visually illustrates the relationship between the depth of information ('benefit') and the associated effort and logistical 'cost' required to obtain this information.

Balancing the goal of reaching a broad student population with the need to obtain more detailed information involves a clear trade-off. For example, conducting one-on-one interviews offers the opportunity for rich and nuanced insights by allowing follow-up questions and deeper exploration. However, these interviews pose logistical challenges and are costly to conduct with a large number of students. Although the StudentU team tested all these methods, they were not universally applied to all LEPs. The choice of methods was influenced by several factors, including the scale and scope of the LEP, its objectives, the extent of previously identified (student) insights, and the capacity of the StudentU team.

Figure 2: Cost-Benefit Visualization for Gaining Student Insights through Various Qualitative Methods

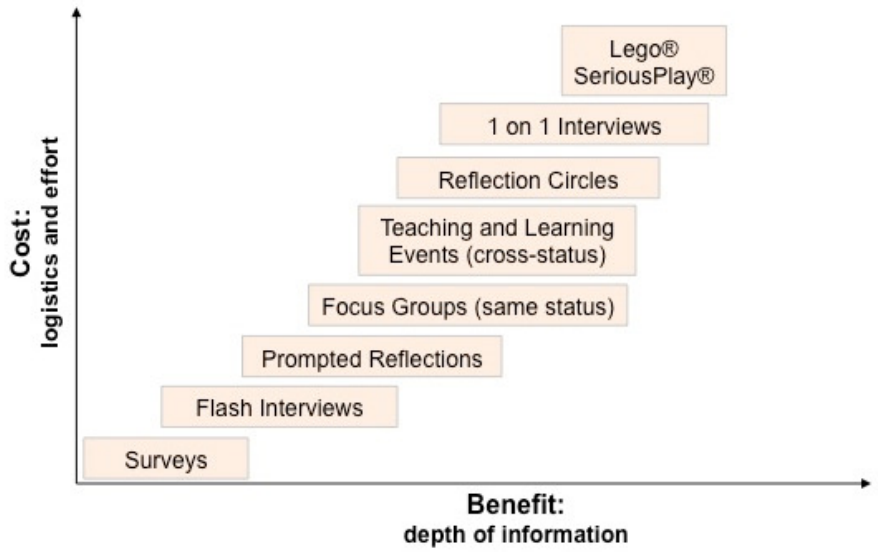


Figure 2 shows a visualization of the cost-benefit relationship of a sample of qualitative methods which the StudentU project experimented with for gaining student insights.

The various perspectives discovered in the divergent *Explore* phase are then analyzed in the following convergent *Reframe* phase. This phase allows for a refinement of the

initial questions and reevaluation of the goals and scope of the project based on the gathered insights. We can recognize common patterns by looking at the aggregate, yet also see the individual needs, which allow us to better understand who our users are, what problems we're solving, and the kind of experiences we want to create.

In our case, we were focused on increasing student-centered learning and student participation, so we were interested in both identifying specific obstacles preventing the shift to student-centered teaching and understanding what strategies might enable more student participation. Considering the insights, we then developed new, customized questions tailored to suit the specific needs of each LEP. These questions provided us with a direction for proceeding into the ideation part of the DT process. We recognize a risk that we may rely too heavily on the sample of student insights we gathered, which only represent a portion of the student body. Nevertheless, we argue it is still beneficial to use these real experiences as starting points, as the inclusion of some student information is better than the standard approach where instructors make most (or all) teaching decisions without much (or any) student involvement. As we collect more information and feedback throughout the iterative DT process, we can further mitigate any bias effects.

Having gone through the first divergent-convergent diamond, we proceed to the second actionable DT diamond, '*Create*' and '*Catalyse*' (see Fig. 1). The divergent thinking involved in the *Create* phase promotes an inventiveness needed for dealing with complex challenges (Guaman-Quintanilla et al., 2023). This phase is about encouraging ambitious, outside-of-the-box thinking and generating numerous different ideas within a designated time. No ideas are excluded; all ideas are initially treated as equal and plausible. Ideas come from everyone in the team and may also be based on evidence from the literature. In our case, many of our initial ideas were rooted in the team's extensive experience in HE. Additionally, the educational developers in StudentU played a crucial role by applying their knowledge of educational research to suggest practical ways of implementing research findings within the LEP context. For instance, we introduced the work of Yeager et al. (2016) which uses a psychological intervention to ease the transition into university; we will discuss this further in Section 4. Referring to the literature enabled us to efficiently build upon existing evidence rather than reinventing the wheel (see the discussion in Section 4).

In the final convergent *Catalyse* phase, the team must determine which ideas to prioritize their time and resources, establishing timelines for their transformation into prototypes. Prototypes may take the form of tangible 'artifacts', such as a physical resources, or intangible experiences, like interventions, or a bit of both (e.g., how will a student experience my resource). When choosing ideas for prototyping, the LEP team performed a cost-benefit analysis, evaluating the resources needed for preparation and implementation against the potential benefits. Key considerations for the LEP team were factors like the number of impacted students and staff, workload calculations, involvement of other stakeholders, possibility of iteration, and potential for long-term integration of prototypes into the local structures. Additionally, the LEP team prioritized prototypes that could be tested within the university's current regulations. We recognized that exploring existing 'grey spaces' offered optimal testing

conditions, as completing unnecessary paperwork for a small prototype would be inefficient and contradict the iterative nature of prototyping.

The StudentU team assumed responsibility for implementing prototypes designed for extracurricular workshops and for gathering feedback for further iterations, while instructors took charge of integrating the prototypes that needed to be delivered in a classroom setting. The DT process of co-designing the prototype solutions ensured a sense of shared ownership across the LEP team. Since all status groups were actively invested in the prototype's design, the outcome is expected to better align with the priorities and goals of both students and instructors, as well as reflect the best practices from literature.

4. Practical application of Design Thinking in a Learning Evolution Project aimed at improving the experience of first year computer science students

This section presents a brief overview of how we applied the DT framework, described in Section 3, to a LEP in computer science focused on enhancing the first-semester student experience and easing the overall transition to university. We note that our focus here is on examining the steps of the DT process and not on the details of the LEP itself.

To set the DT environment, we began with *Orientation and Vision Setting* (see Fig. 1) with our LEP partners. The StudentU team held three meetings with the two instructors responsible for introductory computer science courses, who originally submitted a proposal of interest (see Section 2). It was critical that all status groups were represented, so a computer science student was asked to join each meeting as well. During these meetings, everyone was asked to share their experiences and thoughts as to what challenges students faced in their first semester. Some ideas put forward in the discussions were difficulties in math, keeping pace with the more complex material, and limited social integration. There were also concerns that many students and staff seemed to maintain an attitude that only top students could excel in computer science. It was also noted that entering university comes with many navigational challenges, e.g., finding the way around the university – both physically and digitally – and meeting new people. There may also be additional extracurricular challenges, such as living alone for the first time and trying to establish a study-work life balance. These discussions provided valuable insights for the team to consider.

The next practical step in the process was to seek out more student ‘user’ input as part of the *Explore* phase of DT (see Fig. 1). We considered the approaches shown in Figure 2, aiming to select one that struck the right balance between depth of information and logistical and workload costs. One student suggested reducing logistical costs by making efficient use of the time between lectures – when students are already on campus – to ask them a few targeted questions. These so-called ‘Flash Interviews’ consisted of three questions, in which we asked the students about their challenges in their first year of university, how they dealt with them, and what support they received or wished to have received. Four members from the StudentU team stationed themselves six times outside the main lecture hall during breaks, asking

permission to engage with 1st and 3rd semester students. In total, the StudentU team spoke with 35 students, each for between 5 to 20 minutes. In this way, we were able to gather an initial set of targeted insights in a relatively short time (90 minutes in total) with minimal additional planning.

These insights served as our starting point for the practical *Reframe* phase. The StudentU team met to share the student responses from the interviews. We visually represented the data, with yellow post-its for each student response, and then clustered these by topic. We noticed two types of emergent themes: content-specific challenges and social and general skills challenges. Since our primary focus is on the DT process, we've chosen to provide only a couple of examples of the challenges we've discovered, listed in Table 1.It was noted that students encounter different challenges at different times throughout the entire first semester. While recognizing our initial analysis is based on a limited sample, expanding our insights to include a wider range of student perspectives, beyond the LEP team, should help mitigate sample bias effects. We plan to gather more insights in future iterations.

Appreciating the need for varying support at different times, we reached out to the computer science "Mentoring" program team, responsible for incoming student orientation and onboarding. This is an example of building the *Connections and Relationships* needed for a DT environment (see Fig. 1). Representatives from Mentoring joined us in an ideation workshop, as part of the practical *Create* phase (see Fig. 1). All participants made suggestions, the details of which go beyond the scope of this paper. Noteworthy, though, was how the exposure to diverse perspectives through DT shaped the ensuing discussions. There was a marked increase of empathy with the students and a deeper appreciation of the teaching and learning experience.

Table 1 lists some examples of the challenges identified by the LEP team that computer science students may face during their transition to university. Those challenges listed in bold font indicate the ones for which the team designed prototypes with the numbers corresponding to the prototype list at the end of this section.

Table 1: Challenges identified by the LEP team

	Content-specific challenges	**Social and general skills challenges**
Induction and orientation (beginning of term)	- lack of basic programming preparation, - improve existing pre-semester math review	- pressure to meet the increased pace, depth, and expectations (1) - lack of personal feedback and self-assessment may lead to insecurities
Weekly Tutorial sessions (throughout term)	-request for clearer alignment between assignments and exams - consider tailored questions/reviews according to levels and content	- request for structured Peer learning/social opportunities (2) - consider digital networking and support
Learning and Feedback (end of term)	- request to keep and expand online resources (introduced during Covid) - workload and learning outcome coordination across courses (4)	- need for general learning strategies and study skills (3) - lack of opportunities for self-reflection

The LEP team, including Mentoring, selected which prototypes to develop in the subsequent *Catalyse* phase:

1. Intervention experience aimed at increasing a students' sense of belonging, based of the work of Yeager et al. (2016);
2. Dedicating time in the first week of tutorial sessions to structure student interactions and encourage students to find study partners;
3. Offering a study skills Workshop together with Mentoring during the student orientation week;
4. Designing a "pause" of the pace in all introductory courses to allow for discussion space about learning strategies and workload.

Each prototype aims to alleviate a challenge listed in Table 1 (marked with the same number). Note that we did not create a prototype for every challenge listed in Table 1. This is partly due to workload constraints and partly due to prioritizing prototypes that could be delivered within the current structures and institutional rules. Prototypes 1-3 were planned for execution in the spring semester 2023. Prototype 4 requires first gaining the support of all the first-year instructors to use their class time, and hence was tentatively scheduled for winter semester 23-24.

For discussion purposes, let us look at Prototype 1, where we created curated student stories to normalize common challenges, following the methodology described in Yaeger et al. (2016). To create the intervention material, we asked final year Mentoring students to fill out an online, free-text survey about their experience as first year students. We focused on three key challenges already identified earlier through the DT process: making social contacts, dealing with expectations and feelings of self-doubt, and study skills and strategies. Their responses provided us with authentic, local student voices, which is also an aspect of *Leadership and Storytelling* (Fig. 1). Although the intervention is relatively small, it has been shown to have substantial impact on the educational experience (Yaeger et al. 2016). Hence, establishing this resource for future use can be considered an application of *Continuing the Journey* (Fig. 1).

5. Conclusions & Outlook

In this reflective article, we present our experience using a Design Thinking (DT) framework to foster a collaborative design mindset and actionable design process within Higher Education (HE). The project had two overarching goals. First, to increase instances of student participation, making the student perspective more visible and, thus, emphasizing the shared responsibility between students and staff for teaching and learning in HE. Second, to demonstrate how DT– as a co-creative, pro-active and iterative approach with a focus on rapid realization of prototype solutions – could transform the standard roles and ways of working in HE.

Specifically, we discuss our experiences within the StudentU project, using a DT framework for working in cross-status teams of students, instructors, and educational developers. The collaborative process is, itself, an example of increased student participation. Moreover, by embracing DT's "user-centered approach", we encourage the teams to explore and create solutions that considered the lived experiences of both

students and instructors. In this way, the participants develop a sense of shared responsibility and mutual empathy for those involved in teaching and learning. This transformative power has the potential to equally benefit all participants going through the DT process, fostering change in one's role and their relationship to the broader educational context and community.

Additionally, by adopting DT's "bias toward action," we efficiently implemented multiple prototypes in a single semester, diverging from the conventional resource- and time-intensive multi-year pilots. We share a practical example of the DT approach in computer science, showing the full DT process. One key enabler was to find and use the space within the university's existing structures and regulations to test prototypes. The project's prototypes and interventions are being currently delivered with support from LEP partners, indicating a promising momentum for lasting change.

It is also important to draw attention to some possible limitations of DT. For one, as a creative practice, it is challenging to conduct rigorous scientific evaluations at the pace of prototyping and iteration. Unlike classical disciplinary research, which aims to generate new knowledge or set up controlled experiments to test hypotheses (Brown and Katz, 2011), DT is a method that uses various insights to guide co-creative experiences and prototype development. Nevertheless, indicators of evidence can be sought during the exploratory process to develop more rigorous experimental designs for testing further iterations. Additionally, the process requires a design mindset, accepting all participants and their experiences as equal and valuable. Furthermore, it is important to gain diverse insights from a broad sample of stakeholders to mitigate sample bias; such effects should diminish as feedback is incorporated into further iterations.

Going forward, we believe that cross-status design teams, including a “student consultant” role, should become common practice across the university for establishing change in HE (Reinholz et al., 2017; Cook-Sather et al., 2014). It also proved valuable to have team members situated in the HE 'third space', who could work across faculties and the broader university services to identify shared challenges and creative solutions. As part of our commitment, we're developing a professional development workshop to share our experiences, cultivate a "student design mindset" among instructors, and promote student participation.

Overall, DT is a valuable approach to drive transformative change in HE. Our assertion is that the key to enhancing the teaching and learning experience does not rely on any single prototype but, instead, on the shared design experience and the cumulative impact of numerous small prototypes. It is through such meaningful exchanges between instructors, students, and educational developers, that we might create tangible examples of inclusive student participation, challenge the hierarchical “us and them” mentality, and make a sustainable difference to teaching and learning.

Acknowledgements:
The authors acknowledge the valuable contributions of our Student Consultants, Carolin Thiele and Birthe Hoffmann, and Dr. Katja Reinecke, director of the Dahlem

Center for Academic Teaching. The work presented here was funded by Stiftung Innovation in der Hochschullehre (2022), grant FRFMM-262/2022.

6. References

1. Bartley, K., Dimenäs, J. and Hallnäs, H. (2009), "Student participation in higher education: A question of governance and power", *Nordic Studies in Education*, Vol. 30, No.3, pp. 150–165. http://doi.org/10.18261/ISSN1891-5949-2010-03-02
2. Brown, T., and Katz, B. (2011), "Change by design", *Journal of Product Innovation Management*, Vol. 28, No. 3, pp. 381–383. https://doi.org/10.1111/j.1540-5885.2011.00806.x
3. Cook-Sather, A., Bovill, C. and Felten, P. (2014), *Engaging students as partners in learning and teaching: A Guide for faculty*, San Francisco, CA: Jossey-Bass.
4. Design Council (2021), *Systemic Design Framework*, available at: https://www.designcouncil.org.uk/our-resources/systemic-design-framework/ [accessed on 19 May 2023].
5. Friis, S. A. K. (2019), "Speaking to Design Students' Motivation – When Creating Design Thinking Courses Based on the United Nations Sustainable Development Goals". *DMI Journal*, Vol. 14, No. pp. 60-72. https://doi.org/10.1111/dmj.12054
6. Grabill, J. T., Gretter, S., Skogsberg, E. (2022), *Design for Change in Higher Education*. Baltimore, Maryland: Johns Hopkins University Press.
7. Grau, S. L. and Rockett, T. (2022), "Creating Student-centred Experiences: Using Design Thinking to Create Student Engagement", *The Journal of Entrepreneurship*, Vol. 31, No. 2 Supplement, Special Issue: Entrepreneurship and the Craft of Teaching, pp. S135–S159. https://doi.org/10.1177/09713557221107443
8. Guaman-Quintanilla, S., Everaert, P., Chiluiza, K., and Valcke, M. (2023), "Impact of design thinking in higher education: a multi-actor perspective on problem solving and creativity", *International Journal of Technology and Design Education*, Vol. 33, pp. 217–240. https://doi.org/10.1007/s10798-021-09724-z
9. Kember, D. (1997), "Are conceptualisation of the research into university academics' conceptions of teaching", *Learning and Instruction*, Vol.7, No.3, pp. 255–275.
10. Kember, D. (2009), "Promoting student-centred forms of learning across an entire university", *Higher Education*, Vol. 58, No. 1, pp. 1–13. https://doi.org/10.1007/s10734-008-9177-6
11. Köppen, E. and Meinel, C. (2015), "Empathy via Design Thinking: Creation of Sense and Knowledge", In: Plattner, H., Meinel, C., Leifer, L. (Eds), *Design Thinking Research: Building Innovators*, Cham: Springer, pp. 15–28. https://doi.org/10.1007/978-3-319-06823-7_2
12. MacNeill, S. and Beetham, H. (2022), *Approaches to curriculum and learning design across UK higher education*, Bristol: Jisc.

13. Micheli, P., Wilner, S.J.S., Bhatti, S.H., Mura, M. and Beverland, M.B. (2019), "Doing Design Thinking: Conceptual Review, Synthesis, and Research Agenda", *Journal of Product Innovation Management*, Vol. 36, No.2, pp. 124-148. https://doi.org/10.1111/jpim.12466
14. Reinholz, D. L. Corbo, J. C., Dancy, M., and Finkelstein, N. (2017), "Departmental action teams: Supporting faculty learning through departmental change", Learning Communities Journal, Vol. 9, pp. 5-32.
15. Roth, K., Globocnik, D., Rau, C. and Neyer, A.-K. (2020), "Living up to expectations: The effect of design thinking on project success", *Creativity and Innovation Management*, Vol. 29, No.4, pp. 667–684. https://doi.org/10.1177/09713557221107443
16. Sursock, A. and Smidt, H. (2010), *Trends 2010: A decade of Change in European Higher Education*, Brussels: European Universities Association.
17. Yeager, D. S., Walton, G. M., Brady, S. T., Akcinar, E. N., Paunesku, D., Keane, L. and Gomez, E. M. (2016), "Teaching a lay theory before college narrows achievement gaps at scale", *PNAS: Proceedings of the National Academy of Sciences*, Vol. 113, No. 24, pp. E3341–E3348. https://doi.org/10.1073/pnas.1524360113