

FROM CLASSROOM TO CONCEPT: BUILDING AN INCLUSIVE PRODUCT DESIGN STUDIO FOR GRADUATE STUDENTS

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ABSTRACT

The following paper explores the process of planning and leading an inclusive product design studio co-led by Carolina Gill, Professor of Industrial Design at NC State University, and Sara Weir, an Advisory UX Innovation Researcher, focused on accessible design at Lenovo. The studio was conducted as a nine-week project within a graduate level course in the Department of Design with 10 final year master students. Each student was paired with an “accessibility expert” participant who is an individual who self identifies as having a disability and experiences unique accessibility needs. Throughout the semester, the student-participant pairs worked collaboratively to identify a challenge and develop a corresponding design solution, resulting in 10 unique product concepts. The structure of this studio allowed students to gain hands-on knowledge of working with individuals with accessibility needs, experience adapting their research and design methods to meet the needs of diverse end-users, and lessons on accessibility best practices to apply to future projects. Building on the structure and outcomes of the studio, this paper provides a replicable framework for integrating participants lived experiences as a core element of design education. While developed within an industrial design context, the framework can be adapted across disciplines that seek to incorporate inclusive, participatory approaches within project-based learning environments.

This paper will highlight:

- The end-to-end process of planning an inclusive product design studio from idea to final outcomes
- Industry expert guidance on real world applications and benefits for designing inclusive products
- The importance of collaboration across academia, industry and community

Keywords: Designer-user collaboration, inclusive design, lived experience

1 INTRODUCTION

The primary objective of the studio project was to provide students with experience designing for accessibility by partnering directly with participants who identify as having a disability to address real-world challenges. The participants provided expert knowledge of their lived experiences as a central component of the design and research process, fundamentally reshaping how students define problems and develop solutions. The emphasis on lived experiences within this studio highlights a broader opportunity within design education and industry. Individuals with disabilities have a unique but often under recognised skillset. The challenges and obstacles they must overcome on a daily basis to navigate their physical and digital environments make them master problem-solvers [1]. Their mastery comes from their lived experiences of thinking outside the box to identify unconventional solutions, perseverance to be adaptable through setbacks in different situations, and being able to notice minute details [2]. For this reason, companies and organisations are increasing their emphasis on inclusive design and research practices by incorporating individuals with disabilities into their processes [3]. The success of these efforts can be seen today in projects like Google Research’s Project Euphonia which included individuals with hearing and speech impediments to improve voice recognition through open source datasets [4], Microsoft’s line of adaptive accessories that utilised the perspective of individuals with mobility disorders to expand the scope of the project to benefit more users [5], and Ikea’s project ThisAbles which created thirteen accessible furniture add-ons by partnering with a disability nonprofit [6]. These projects are just a few examples that highlight the impact individuals with disabilities can

have on products and services. However, if individuals with disabilities were brought into the design process from the beginning of a project, it would allow these individuals to maximise their impact by not only contributing to testing or data collection but problem identification and solutioning [3]. The studio was created to be a tangible, real-world example of including individuals with disabilities throughout the entire design and research process, from problem identification to concept evaluation.

2 CENTERING LIVED EXPERIENCES AS THE COURSE MOTIVATION

Through collaboration with participants throughout the design process, students develop empathetic design research skills, learn to identify and understand accessibility challenges from the participant's perspective, and create innovative solutions that meaningfully respond to authentic needs. This experience will prepare students to center user needs and design products that meaningfully improve accessibility for diverse populations. By the end of the studio, each student delivered a final concept that demonstrated thoughtful consideration of accessibility, design principles, and innovation. Figure 1 outlines the steps taken to prepare and plan the studio project prior to its initial start.

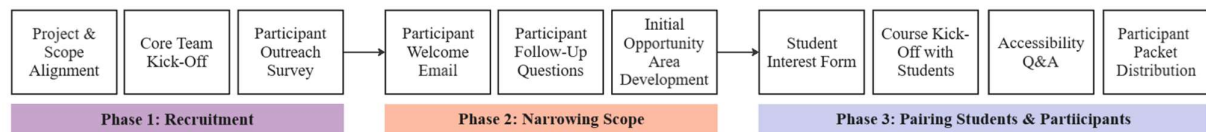


Figure 1. Pre Studio Workflow

2.1 Phase 1: Recruitment

In order for the studio to be successful, we had to find the participants who were willing to be open and share about their lived experiences with a disability. In order to help us find participants, we partnered with ablr. Ablr is a full-service disability inclusion organisation that specialises in accessibility training, education and testing [7]. By partnering with ablr we were able to identify 10 individuals who are blind or visually impaired to participate in the studio.

2.2 Phase 2: Narrowing Scope

In order to set the students and participants up for success, the lead professor and researcher sent out a questionnaire to participants asking them about their disability status, outlook on accessibility, daily routine, challenges, technology use, and products that work and don't work for them. This created a foundational level of knowledge that was shared with the students that they could use as a tool to prepare to work with their participant. The information allowed students to prepare questions, conversation starters and generate initial ideas prior to meeting their participant.

2.3 Phase 3: Pairing Students and Participants

The studio was designed so that each student would work directly with one participant throughout the course of the project. Students and participants were matched based on interests and background. It is found that pairing researchers/designers together with participants to co-create solutions gives equal value to both the perspectives ensuring the participants have the opportunity to contribute meaningfully in all phases of the process [8].

3 INCLUSIVE DESIGN PROCESS

Centring the studio on participant's lived experiences and fostering a 1:1 collaboration between the students and participants was designed to build more meaningful solutions. Research shows that focusing on lived experiences can help identify pain points, explore emotions, improve storytelling, and create deeper engagement with participants [9]. To help establish a meaningful structure for the studio to engage students and participants, we relied on the inclusive design toolkit by the University of Cambridge which categorises design and research activities into three areas: explore, create, and evaluate [10]. Figure 2 illustrates how the studio's structure was created based on these categories.

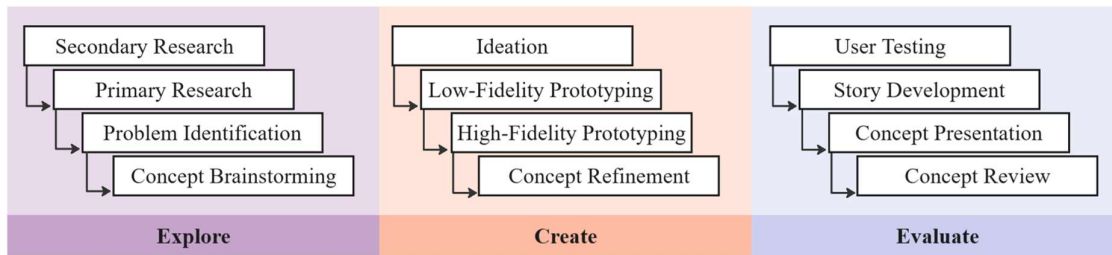


Figure 2. Overview of Process Flow, Based on the Inclusive Design Toolkit [10]

The studio was designed to have three main touchpoints between the students and participants.

1. Meet and Greet – The students and participants met for the first time to get to know one another, establish a working relationship, and identify a problem area.
2. Midway Progress Review – Halfway through the studio, the students and participants met to review their defined problem statement, proposed concept directions, and initial prototypes.
3. Final Concept Presentation – The students presented their final concepts to the participants, and the participants critiqued the concepts based on how well the students addressed their needs.

Table 1 provides a more detailed outline of activities included in the studio over the 9-week project.

Table 1. Implementation of Inclusive Design Process

Steps	Activity
1	Review project materials and prepare questions about accessibility, inclusive design, and working with individuals with disabilities.
2	Participate in an accessibility Q&A session with experts to build confidence and address assumptions or concerns.
3	Present early project thinking and receive participant assignments, including initial problem areas to explore.
4	Draft and refine interview questions, then conduct the first meeting with participants to understand needs, challenges, and opportunities.
5	Synthesise interview findings, identify key themes, and begin defining problem statements and early “how might we” directions.
6	Validate problem statements with participants and conduct secondary research, market reviews, and competitive analyses.
7	Develop and narrow initial concept directions, iterating based on internal feedback from peers and instructors.
8	Strategise and prepare a midway concept presentation for participants, focusing on how to communicate ideas clearly and accessibly.
9	Share midway concepts with participants, gather feedback, and refine ideas with input from design and accessibility professionals.
10	Prepare final presentations, culminating in a final showcase to participants, accessibility reps, faculty, and industry partners.

4 PROCESS REFLECTION

Designing and delivering an inclusive product design studio required navigating a range of practical and emotional challenges. These challenges shaped the structure and execution of the project. The following sections outline key challenges and the strategies used to address them, illustrating how the studio adapted to ensure meaningful collaboration and learning for all participants.

4.1 Limited Budget and Timeline

While we had full control of the content and structure of the studio, working within the constraints of the university restricted the project budget and timeline. The limited timeline resulted in moving the students and participants through the design and research phases quickly. Having more time could have allowed for further exploration and deeper problem identification at the beginning of the project. Additionally having access to a larger project budget could have allowed for more in-person touchpoints with the participants by having the resources to pay for their transportation to and from the university.

4.2 Overcoming Fears and Assumptions

For many students, this studio course was their first time working directly with a person with a disability. As a result, students had many questions about how to politely and effectively communicate and interact with the participants. As a way to overcome these fears and tackle assumptions we set up a Q&A session between the students and two accessibility experts from ablr. The discussion centred around the following questions generated by the students.

1. If someone is just getting started working in the accessibility space, what are the top 3 habits or mindsets that will help them work inclusively from day one?
2. What are the biggest misconceptions people new to accessibility tend to have? How can I avoid them in day-to-day work?
3. What are respectful ways to interact with people with different disabilities (e.g., offering help, language to use/avoid, pacing)?
4. What are simple things I can do to make meetings, emails, chats, and documents more accessible for everyone?
5. How should I offer help respectfully to someone with a disability?

The discussion provided the students with the confidence and information needed to begin the design and research process.

4.3 Communicating Ideas & Concepts

As exemplified above, the design and research process has many iterative rounds of developing and sharing ideas with participants. Traditionally in product design, students share ideas through visual means. This could include brainstorming ideas on post-it, sharing sketches of concepts on paper, and reviewing digital models of prototypes on PCs. Working with the blind and visually impaired community required alternate approaches to sharing and communicating ideas. Rather than relying on visual tools, the students learned to communicate ideas through defining and developing verbal narratives or concept walk throughs, physical prototyping, and focusing on textures and materials earlier in the process to communicate form and function. These methods overall resulted in successful communication between students and participants.

5 CONCLUSIONS

The success of this studio project was built on the equal and iterative collaboration between industry, academia, and the community. The structure, delivery, feedback and evaluation were developed iteratively between the three groups. Figure 3 highlights the successful key takeaways of the studio as a result of this collaboration.

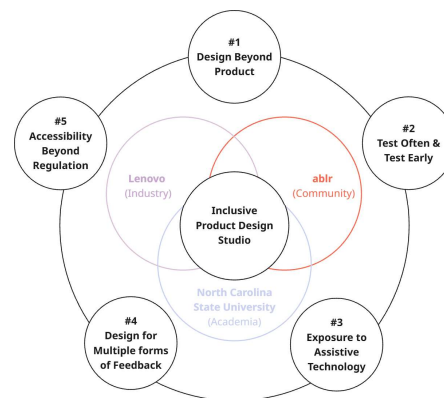


Figure 3. Studio Takeaways

1. Design Beyond Product – When designing inclusive and accessible solutions, students must not only think about the final product concept that the solution will embody but the entire experience, from how the product is purchased, setup, used, and stored. Creating an accessible solution requires thinking about the wholistic product experience.
2. Test Often and Test Early – Creating an iterative cycle of feedback between students and end-users as early in the process as possible allows for deeper exploration of needs which can lead to more

targeted solutions. Receiving feedback early allows students to not only receive the feedback as validation but respond to it and incorporate it into their designs.

3. Exposure to Assistive Technology – Students gained exposure and understanding to different forms of assistive technology including screen readers, text-to-speech, mobility aids, and voice recognition.
4. Design for Multiple Forms of Feedback – Students learned that including both primary and secondary forms of interaction with a product can increase accessibility by providing multiple different ways for users to receive the same information which can include auditory, tactile, haptic, visual, and other sensory cues. This highlights how a solution that works for one user might not work for the next.
5. Accessibility Beyond Regulation – While regulations and guidelines for accessibility are important and a vital consideration in the design process, accessible design must go beyond regulations to think about the specific needs of each individual user.

6 BEYOND THE CLASSROOM

Through the participation and completion of this studio, both students and participants worked collaboratively to identify a problem and design a solution. While these final concept solutions were designed based on a specific participant's needs, these solutions could be widely utilised by the general population as well. This phenomenon is referred to as the curb-cut effect. Today curb-cuts are widely used by cyclists, parents with strollers, travellers with luggage and older individuals but they were originally designed for those who used wheelchairs [11]. Since the installation of the first curb-cut in 1945, there have been many other products that were originally designed for those with disabilities but are used frequently by the wider population. These include fidget spinners originally designed for individuals with anxiety disorders, electric toothbrushes for those with restricted mobility, audiobooks for those who are blind or visually impaired, and speech-to-text for those with limited mobility [12]. These products exemplify how designing for one can have a positive effect for all. A more recent example are the Meta Ray-Bans. While not originally designed for the blind and visually impaired, the incorporation of speech, camera, and AI capabilities created a unique use case that had major impacts on the blind community, allowing users to read text, identify what's in front of them, and receive descriptions of images [13]. Together, these examples highlight how inclusive design not only addresses specific needs but also creates innovations that expand usability, access, and benefits for everyone. Ultimately, we hope this studio serves an example to equip emerging designers, researchers, engineers, and young professionals with the skills, awareness, and confidence needed to create more inclusive products that genuinely reflect the needs of diverse users. Table 2 outlines tips and recommendations for implementing a similar studio framework focused on implementing lived experiences in the design and research process.

Table 2. Tips and Recommendations for Embedding Lived Experiences in Design Education

Steps	Activity
Context	This framework could be utilised in other design fields such as graphic design and architecture that focus on both digital and physical prototyping as well as engineering labs.
Scalability	1:1 pairing may not be available in many instances. The same outcomes can be achieved by pairing groups of students (2-4) with an individual participant. This will allow students to be able to work together and share ideas as well as allowing the participant more involvement in the process.
Location	Having participants that are local allows for the potential of face-to-face interaction which resulted in stronger feedback and interaction between students and participants. For remote participants, pairs met virtually, and students mailed prototypes to the participant to have at their homes during feedback sessions.
Timing	Projects and classes that are operating within shorter timelines may face challenges incorporating as many touchpoints between students and

	participants. Opportunities for prolonged engagement allow for enough time to prep and plan student/participant engagements.
Ability Status	All participants in our studio identified as blind or visually impaired, if involving participants with multiple ability statuses more measures will need to be taken to ensure all participants can actively engage and collaborate with students.

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