Co-Creating Inclusion: Designing a Living Inclusive Teaching Toolkit

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Introduction

Over the past few years, there has been a growing surge in (re)designing engineering curricula and classroom policies to be more inclusive of students of all identities, especially those historically marginalized within engineering education. However, the labor of this work can often fall upon individual instructors in their own courses who lack the time, research, and resources necessary to determine a path toward stronger inclusive practices [1]. Toolkits are one way to present helpful resources to instructors to alleviate part of this labor, as a set of resources that are readily available to be used in their courses (e.g., [2]–[4]), while also equipping students with knowledge of how to individually and collectively foster inclusive classroom practices and stronger agency in advocating for changes they wish to see in their courses by pointing instructors to existing resources within such toolkits.

In this work-in-progress paper, we present an Inclusive Teaching Toolkit, a set of resources, tools, and guides for instructors and students to foster inclusive and accessible practices in their classrooms, created through a reflection-based co-design with instructors and students. While a variety of similar toolkits have been developed (e.g., [5]–[8]), our usage of the reflective method of co-design is a novel approach that adds to current scholarship, as it allows students and instructors to be involved in making the changes they wish to see in their classrooms. This set of resources is not intended to be all-encompassing and complete in its current form. As the department grows and changes, the resources will adapt to changing inclusive practices and circumstances. We see the value of our community being able to contribute helpful resources to an actionable set of tools. The SIGCHI Education Initiative proposed the concept of a "living curriculum" as a network for the co-creation of resources for HCI educators [9]. Our work not only celebrates the Inclusive Teaching Toolkit as a living curriculum but also centers it in the co-design process where we probe students and instructors to reflect and contribute to shared resources and knowledge to improve how we practice inclusivity in the classroom.

Building on the work of Svihla [10], the paper narrates our experiences of developing the toolkit as a design case, applying the user-centered design process where we treat both students and instructors as stakeholders. Through three academic quarters of prototyping, iteration, and user testing with students (both at Bachelor's and Master's levels) and instructors (student instructors, part-time industry instructors, teaching faculty, and research faculty) at a design engineering department, we provide a praxiological case study into co-designing an engaging collection of resources centered around inclusive pedagogy.

This paper will answer the question "What successes and barriers come up in the process of co-designing an Inclusive Teaching Toolkit as a living curriculum?" In addition to providing novel methods for developing an education-focused toolkit, our work will also be a template for

various engineering departments that have yet to adopt collaborative and reflective approaches to improving the inclusiveness of their classrooms.

Design Process

The authors, along with a recently graduated Bachelor's student, undertook the development of this Inclusive Teaching Toolkit under the auspices of our departmental Diversity, Equity, and Inclusion (DEI) Committee at a design engineering department at an R1 university. The second author, a graduate student-instructor, perceived the need for such a toolkit after having to make multiple course adaptations towards a more inclusive classroom, through trial-and-error with little to no guidance [1].

Having initially ideated on a list of potential components for the toolkit and brainstorming what each component would look like, we organized a series of co-design groups consisting of undergraduate and graduate students, enrolled for research credits. Across four academic quarters, we worked with eighteen student researchers, across all years (from first-year undergraduates to PhD students) and prior research/design experiences.

We adopted a co-design approach to this process [11], working with both students and instructors in our department, towards designing the Inclusive Teaching Toolkit. We began by posing our initial high-level structure to recruited student researchers, asking them to both build a digital prototype on Figma as well as prepare the initial contents of toolkit components. Both processes progressed in tandem, as toolkit components were collectively created by the group, their contents discussed and co-written, and then implemented into the prototype. By the end of the first quarter, the group had completed the design of a low-fidelity prototype.

In subsequent quarters, we extensively interviewed students and faculty within our department about individual components of and design choices within the Inclusive Teaching Toolkit. User interviews on the student side [12] consisted of questions such as whether they were satisfied with the content or wanted to see any changes within it, while instructors were asked whether listed resources would be useful in their courses. Both students and instructors were asked goal-directed questions such as whether components were discoverable or if interactions had their intended effects. We performed a few cycles of iterating on our prototype based on interview feedback and subsequent A/B testing to confirm whether our iterations aligned with interviewee expectations [13], thus arriving at a high-fidelity, ready-to-implement Figma prototype midway through the third quarter.

Toolkit Components

The toolkit branches into two pathways, based on the reader's role in the department: student or instructor. The instructor path consists of resources to aid with applying inclusive practices in

teaching a class. The student path overlaps in resources but from the perspective of students advocating for their own learning and contributing to an inclusive environment as a peer (Fig. 1).

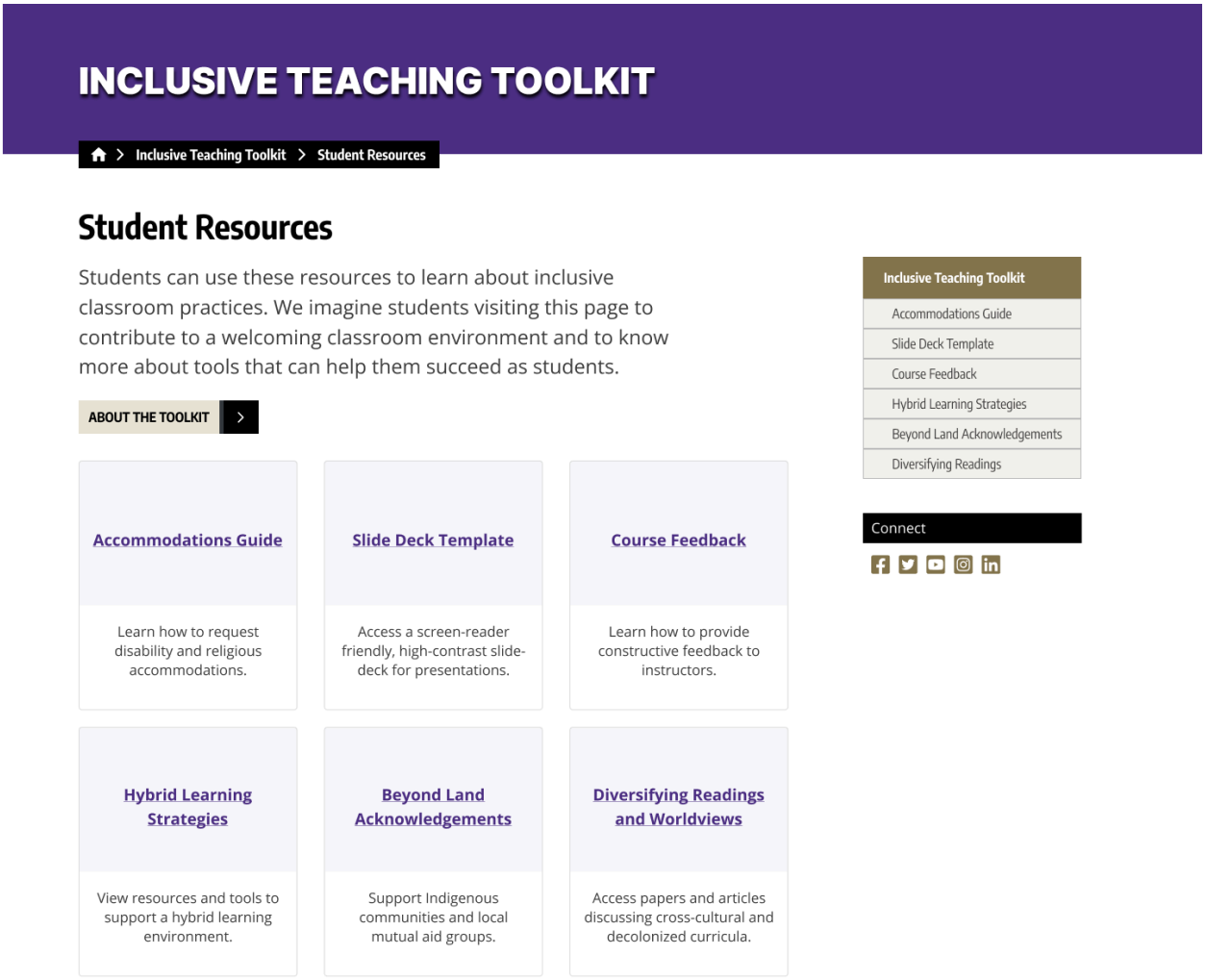

Fig 1. The prototyped screen of the Inclusive Teaching Toolkit's student resources page.

The toolkit consists of the following resources:

- **Disability accommodations guide:** disability-inclusive language, student-led organizations focused on disability advocacy and community, and screen-reader-friendly collaborative design software.
- **Religious accommodations guide**: tips on fulfilling/asking for religious accommodations, religious holidays calendar, and prayer/meditation spaces on campus.
- **Slide deck template:** an accessible, high-contrast slide deck with screen-reader-friendly fonts for lectures and presentations.
- **Course feedback:** ways to ask for and apply student feedback and reflection exercises/prompts for thinking through class experiences to give meaningful feedback.

- **Hybrid classroom strategies:** tips on making hybrid (in-person and virtual) classes work with recommendations of tools to use and best practices.
- **Beyond land acknowledgments:** information on crafting land acknowledgments, indigenous epistemologies, native organizations, local businesses, and mutual aid efforts.
- **Diversifying readings and worldviews:** articles, papers, and organizations focused on cross-cultural and decolonized curriculum.

And the following infrastructural components:

- **About the toolkit:** a home page where the toolkit and its purposes are introduced.
- **People:** profiles of all the student researchers who were involved in the co-design.
- **Contribute to the toolkit:** a form to request changes to existing content or to author the addition of a new resource.

Recognizing the diversity of courses and teaching styles in our department, we avoided a one-size-fits-all approach. The toolkit is imagined as a place for instructors and students to learn what they need according to their unique requirements. To support this, each resource has a variety of options for strategies and practices with examples of how they could be implemented and encouragement to customize them. Flexibility is essential in the utilization of the Inclusive Teaching Toolkit, especially in a department as interdisciplinary and diverse as ours.

Reflections

In the co-design process, students brought their perspectives to the table with reflections from their classroom experiences. This was a valuable addition as students recalled their positive and negative classroom experiences, reflected on how their identities impacted power dynamics in the classroom, and used the insights that arose in their discussions to inform the toolkit design [11]. Through this participatory process, the toolkit was informed by a diverse set of experiences within our community.

Additionally, we learned the importance of developing a shared understanding of inclusion criteria for a toolkit. The question of "Which resources are important to include or refer to?" ended up being strongly linked to the overarching purpose of the toolkit. For our work, the purpose was to curate and co-create inclusive teaching and learning practices and tools. Until we came to that conclusion as a group, we were incorporating many technical resources that belonged elsewhere. This created a lack of clarity regarding the toolkit's intended focus and launched the group into a reassessment to co-design a more intentional selection of resources.

One challenge was that recruiting instructors for interviews and testing proved to be difficult due to their busy schedules and piling responsibilities, whereas students were easier to recruit for interviews. Faced with such logistical difficulties, we decided to prioritize the student pathway of

the toolkit for completion first, continuing to center student voices in the development of the toolkit. Testing and iterating on the instructor portion of the toolkit remains an in-progress effort.

As the structure of the co-design groups supported students with varying levels of research and design expertise, another success was the extensive emergence of peer-to-peer learning opportunities. Students were able to learn about the design processes, software, and testing methods from each other— co-creating a connected and collaborative environment, central to the user-centered design process [14]. A variety of testing methods also fostered confidence in design decisions. Between usability interviews, card sorting, and A/B testing, we received necessary perspectives from the community and valuable learning opportunities for the group.

Another challenge that surfaced every quarter was the process of onboarding new students to co-design with. The ten-week quarter is a quick turnaround for design deliverables, and transitioning to a new group of researchers takes time. To address this challenge, the group attempted proactive strategies like creating annotated screens explaining design decisions. Despite the efforts to support a smooth transition, newly brought-in students were faced with a quick learning curve and had to be quickly familiarized with the prior methods, data, and design work. This resulted in a loss of continuity of the work but a gain of a variety of perspectives.

Conclusion

In this work-in-progress paper, we present our work in building an Inclusive Teaching Toolkit, through a co-design process with students and instructors within our department and supplemented with our reflections. Envisioned as a living curriculum, we look forward to continuing to design the toolkit as it grows with our community's contributions. We invite others to learn from our reflections and practice co-design to further efforts in cultivating inclusivity in the classroom, especially in engineering education.

Acknowledgments

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