

Design for Many Voices

Co-Design Research with College Students

by

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Abstract

Educators and researchers in the learning sciences have begun to experiment with co-design as a strategy for engaging and respecting the lived experiences of learners and supporting the construction of collaborative knowledge in classrooms. In this Participatory Action Research study seven student co-designers and a researcher-designer-educator used a co-design approach to create inclusive materials and processes for a college course in a social justice-focused human and community services program. This paper describes their work to generate an inclusive co-design process model and illustrates the ways in which a co-design approach supported the construction of inclusive materials and processes for use in their learning environments.

Key words: inclusive design; inclusive education; co-design

Acknowledgments

This paper describes a collaborative Participatory Action Research project, and so, as one might imagine, I have far more people to appreciate than can fit into a standard acknowledgments page! For this reason, I have created **Appendix A: Acknowledgments**, found at the end of the paper.

Dedication

Pauline Duffett

February, 1942 - January 11, 2017

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1 Introduction

1.1 An Illustrative Story

I wanted to begin with a story. I am an educator, researcher, designer and social justice activist who likes to tell stories. My stories come from a life lived as a queer and gender fluid activist, counsellor, researcher and educator. My people from birth are of European origin, mostly Scottish ancestry, gloriously neuro-diverse and creative, and they raised me with some awareness of the class and race privilege that everyone in my birth family experiences. My chosen family is queer, multiracial, and multigenerational, and I bring to this research study the knowledge they have shared and continue to share with me. Ever since early childhood I have most loved learning that came in the form of a narrative, and now, in my adult life, I am fortunate beyond words to live and work and learn in the presence of wise and gifted storytellers.

I wanted to begin with a story. It is what I was raised to call a true story, one that comes from my own experience of teaching students who are learning to become counsellors and social justice advocates in the area of violence against women, trans people, and children. Some years ago, while I was teaching a course regarding supports for children and youth who have experienced violence, the reality of what happens when learners do not see their lived experience as a valid source of knowledge came

into sharp and uncomfortable focus for me. In this course the participants: explore policies and practices used in supportive services; develop critical analysis of how systems operate; and build skills to ground their own practice as counsellors and advocates. Many learners referenced their knowledge of child protective services in written assignments that only I would see. They described their knowledge in small fragments, sometimes apologetically. This knowledge was gained as children and youth in many cases, as parents and family members in others, as workers and placement students, and as community members. It was clear to me that their knowledge often, perhaps *most* of the time, ran counter to dominant narratives about how Western societies protect and seek justice for children targeted for abuse. These narratives of heroic police, legal and social service professionals have been popularized in American television dramas such as Law and Order Special Victims Unit. However, when real life child protection workers visited the class, students often remained silent about what they knew. I was not surprised to read about their experiences and thoughts; much of what they had to say confirmed the knowledge I had gained while working in community organizations and building a life among anti-violence activists and educators. I was frustrated, though, that I had not been able to create a learning environment in which learners understood that their knowledge would be welcome in the classroom, relevant and valued; instead I was seeing glimmers and shards of brilliance emerge through the cracks in their assignments and in comments they scrawled on notes accompanying written work.

The absence of these student's lived experience, knowledge and analysis in classroom discussion made it difficult for us to construct knowledge collaboratively, and it left me as the sole presenter of counter-narratives that, while they may have validated the "closet" or suppressed knowledge of many students, were positioned as just that: counter-narratives that could be rejected or forgotten because they run counter to the commonly-held beliefs about social institutions that lie at the core of Western society, institutions that include the family, religion, the helping professions, and law enforcement. Students' hard-earned knowledge concerning violence, abuse, and systemic injustice is critical to work done in the area of child protection, and to society overall, *precisely* because it challenges dominant narratives; their knowledge provides missing pieces that have the power to transform how we view key institutions and how they function. The situation in the classroom became particularly and painfully apparent to me one day when an expert in child protection visited the class. **Fig. 1** below is a rough sketch I made in an effort to present the situation as I observed it. It demonstrates the alienation of students from the existing knowledge base on the subject. Creating this sketch helped me to understand my frustration and it is, for me, the starting point of everything that follows.



Figure 1. The Problem Space.

1.2 Arriving at the starting point

Learners arrive at post-secondary educational institutions bringing with them the treasure troves of knowledge and experience that they have been accumulating since birth. As educators we have been told repeatedly that students thrive when they are able to see aspects of themselves, their communities, and the knowledge generated therein reflected in at least some elements of curriculum and course delivery. They are able to use prior knowledge as a starting point from which they can engage in activities of testing, measuring, critiquing, questioning and enhancing and otherwise engaging meaningfully with course content. The cost to learners of being excluded from cognitive engagement with content and instead being expected to simply internalize

knowledge presented to them in the form of dominant narratives is profound, as has been demonstrated by researchers exploring the experiences of learners who are located at the margins of mainstream education. Writing of the experiences of Indigenous children in schools in Australia, Bland and Atweh (2007) have found that “where students are not provided with ways to ground new learnings in their own experiences and cultures, they may become further alienated from education and ‘made to feel mistrustful of their own voices, their own ways of making sense’ “(p. 338). Describing the exclusion of Aboriginal post-secondary students in Canada from the learning environments in which they find themselves, Cote-Meek (2014) has observed that “...it is not often, for instance, that Aboriginal students find themselves reflected in the institution, in everyday classroom curriculum, in the university buildings... and/or in the faculty and staff employed at the institution.” (p. 91). In a study exploring retention and engagement issues for black community services students in an Ontario college, Price (March, 2016) recommended that the institution “Ensure diversity within course curriculum.... All students should feel that their courses are relevant and inclusive of their lived experience” (p. 34). Moola (2015) has made explicit the reality of exclusion for students with disabilities in Canadian universities by acknowledging that exclusion from content extends to exclusion from knowledge production: in Canada students having disabilities are “most often alienated from the research process” (p. 47), and great strides are needed “before ... disabled students are fully regarded as bodies that bear intellectual value in the academy” (p. 68).

The state of being outside of the educational mainstream and possessing marginalized knowledge affects more individuals than has previously been recognized by learning institutions. When we take into account the intersecting nature of learners' identities, as Sapon-Shevin (2012) does in a thorough definition of "Inclusive Education" (par. 1), it becomes clear that while a student may be at the centre of dominant narratives about—for example—socioeconomic class and learning, that same student might also be an outlier in relation to ethnicity or expression of gender identity. Many, perhaps the majority of learners, experience outlier status in one way or another. Not only are learners' abilities constrained when they do not see aspects of their lived experience and knowledge reflected; our educational institutions and society overall also suffer when vast swaths of our population are not included in the generation of knowledge.

Educators at all levels of institutionalized learning have worked to develop pedagogies that value learners' unique insights and skills, viewing them as collaborators and actors in the generation of knowledge rather than as vessels destined to arrive empty and leave filled. Educators employing constructivist pedagogies work from the premise that that learners construct knowledge based on their interaction with materials, experiences and concepts, and that they make meaning from these interactions, often in collaboration with others (Gagnon & Collay, 2001). Constructivist pedagogy can be found in academic environments with a social justice focus, where it is not uncommon for educators and instructional designers to ground pedagogical approaches in critical

theory analyses of social structures and issues of equity, marginalization and systemic injustice. (See, for example, Bellefeuille & Buck, 2005).

North American models for formal education are not, however, designed to be welcoming of such approaches. To begin with, even when constructivist models are tolerated, their application and implementation is still generally left to the oversight of the individual instructor. Even if the pool of post-secondary instructors in Canada were reflective of the diversity of our students, which it most decidedly is *not* (Gordon, 2018) it is neither reasonable nor realistic to expect a single individual working in a system that places instructors and disciplines in institutional silos to transcend their own inevitable limitations in order to develop and implement accessible curriculum that is reflective of pools of diverse learners with complex and intersecting identities. Furthermore, an even larger obstacle is posed by institutionalized understandings of the purpose of education in North America. T. Rose (The End of Average, 2014) has traced the roots of North American education to early 20th century Taylorist economic and industrial models (pp. 49-55) and averaginarian thinking (p. 81). Advocating for “disruptive innovation” in a learning system that is failing to meet the needs of many learners as we move into the 21st century, Treviranus (Treviranus, Life-Long Learning on the Inclusive Web, 2016) has observed:

...the foundations of our schools were laid in a time when knowledge was scarce, knowledge storage and access was constrained, only select members could arbitrate and bequeath knowledge, authority structures were centralized to guard the castle, and only the elite few could climb the ladder to higher knowledge. These deep foundations are antithetical to inclusive learning and ill

prepared for the changed reality we find ourselves in. (“Life-Long Learning on the Inclusive Web”, par. 8)

As recently as October 2017, the head of the Ontario Council of Colleges commented that “Ontario colleges [and by implication Ontario college students] do not necessarily generate knowledge” (Sher, 2017). It seems, however, that time is up for models of education that restrict knowledge making and investigation to a privileged minority whose pre-existing location inside of the castle Treviranus refers to above precludes any access requirements and demands an ability to at least pretend to conform with dominant narratives about knowledge and learning.

Seismic shifts in the conceptual ground on which Western models of education have been built— in particular the work done by Indigenous knowledge-keepers, researchers and theorists, work generated in the field of inclusive education, the rapidly growing number of projects using co-design models in educational settings, and the entry of Maker Movement thinking and dialogue into educational spaces— require new ways of thinking about knowledge, how it is constructed, how it is handled in academic institutions, and what qualifies as “knowledge” in these settings. In “Decolonizing Aboriginal Education,” E. A. Munroe, L. Lunney Borden, A. Murray Orr, and Mi’kmaw Kina’matnewey D. Toney and Mi’kmaw educator J. Meader, (Munroe, Lunney Borden, L., Murray Orr, A., Toney, D., & Meader, J., 2013) have observed “a close alignment between Indigenous knowledges and notions of 21st century education” (p. 332), and noted that when it comes to curriculum, “Increasingly, pockets of innovation around the world apply curricular and instructional approaches

that reflect the tenets of Indigenous knowledges and 21st century education” (p. 332). Treviranus, (“Realizing the Potential of Inclusive Education”, 2018), has focused on the potential of inclusive education to address the ever-widening privilege and influence gaps occurring globally, and has suggested that even as increasing numbers of learners are disengaging from education, “there is a nascent responsive move toward personalizing education,” a move that “offers an opportunity to support previously marginalized learners” (par. 33). Stappers and Sanders (“From Designing to Co-designing to Collective Dreaming: Three Slices in Time”, 2014a), have asserted that co-design, currently “emerging as the dominant practice in other design domains,” has been slow to affect instructional design, however they envision that by the year 2044 education will be rooted in a sort of co-design pedagogical pathway, with students learning and practicing co-design in elementary school, moving on to hacking in middle school; practicing what we now think of as service learning in the form of participatory design with community members; and finally encountering design as a core component of all university-level curricula (pp. 46-48). Rosenfeld Halverson and Sheridan (Winter, 2014) have gone so far as to argue that the trend towards remaking learning spaces in higher education opens the possibility of “change[ing] the conversation from being about the design of schooling as informing learning to instead the design for learning as informing schooling” (p.499). Incorporating Maker Movement notions about the connections between making, learning, and the construction of knowledge into our designs for education has, they have asserted, “the potential to transform how we understand ‘what counts’ as learning, as a learner, and

as a learning environment,” with the result that understandings of “what counts may legitimate a broader range of identities, practices and environments” (p. 503). As these transformations take place it is critical that educators and learners find ways of tracking, exploring and learning from their experience, creating beacons for those looking for support in a sea of change, and signposts for those who will come after us.

1.3 The pathway for this MRP Journey

In this report I describe a participatory research study carried out with students in an urban Ontario college in the winter of 2018. The study provided an opportunity for me, as a design researcher and educator to work with seven students to conceptualize and prototype inclusive materials for an innovative course on Child and Youth Development, and to co-create a preliminary process model for inclusive co-design with student designers. I begin with a discussion in Section Three on the reasons for grounding this study in participatory research methodology, connecting it to: the rich history of Participatory Action Research (PAR) in movements for inclusion in education; and literature on leading PAR practices generated by disability justice researchers who have strategized to keep the *with* not *on* principle of PAR front and centre in their work. I also acknowledge, from my position as an educator and researcher of European descent, the influences of Indigenous research and knowledge construction writings, particularly as they relate to PAR frameworks. In Section Four I report on relevant literature in the fields of inclusive education, instructional design and constructivist pedagogy. I then discuss current approaches to inclusive design for

education and locate this study within the recent and rapidly evolving body of material on co-design and Maker Movement influences on education. In Sections Five and Six I present key aspects of the study, including: design requirements; constraints; context; and examples of how some of our inclusive design activities met specific requirements. In Sections Seven and Eight I present the four concepts and prototypes generated by the co-design team, the process model for co-design arrived at by the end of the research, and discussion of the concepts of validation and traceability in relation to design decisions. Sections Nine to Eleven finish with discussion of insights and a review of questions generated by the study leading to possible next steps.

2 Inclusive Design Goal

The design researcher/facilitator and seven student co-designers, all of whom are affiliated with a social justice counselling and activism-focused college program, worked together over four sessions to address two connected challenges:

- How might we expand the inclusivity of our program's Child and Youth Development course by designing key elements to reflect the unique insights and knowledge of students who have taken this course?
- How can we use our experience working on the above challenge to co-create an inclusive co-design process model for future use in the program?

Recognizing that the very notion of a universally applicable model is problematic within the one-size-fits-one framework of Inclusive Design (“What is Inclusive Design?” IDRC, n.d.), the team worked with an understanding that the model they were creating was very much situated within the contexts of both their work together, and the larger educational setting within which they are located. While the research is in no way meant to generate tick boxes or check-lists to be applied to disparate situations and learning environments, we do hope that others will recognize of some of their own hopes and frustrations in our endeavours. We would like to think that the research will spark further learning, complex conversations, future experiments and explorations into the use of co-design in academic settings, and even bigger design challenges.

3 Inclusive Methods

It is essential that a study focused on inclusion and knowledge collaboration in a post-secondary environment employ methodologies that demand compatibility between process and outcomes, and that focus on the experiences of participants as they engage with the research questions. The design for this study uses a Participatory Action Research (PAR) methodology, supported by critical theoretical and standpoint feminist approaches to support reflexive processes throughout. I will review the thinking behind these methodological choices, and then acknowledge and describe ways in which this research has been influenced by my ongoing efforts as a settler researcher

located on Treaty 13 territory to respect and to learn from Indigenous knowledge-making and Indigenous research practices.

3.1 Participatory Action Research (PAR)

Participatory action research methodology often seems antithetical to the hierarchical structures and practices embedded in post-secondary learning institutions; no doubt this is one reason why it is so rarely used in educational research. At the same time, well-designed and executed PAR is highly compatible with Inclusive Design approaches and therefore offers promise to those inspired by constructivist and critical pedagogies of liberation and transformation. Baldwin (2012) has suggested that “Participatory Action Research challenges the status quo by giving voice to local people’s perspectives and shifting views on what constitutes useful knowledge” (p. 8). Much of the ground-breaking PAR that leads in the actualization of the “research *with* rather than *on*” principle (Charlton, 2000) has been carried out in studies connected with disability justice issues (see, for example: Kitchin, 2000; Kramer, Kramer, Garcia-Iriarte, & Hammel, 2010; Bergold & Thomas, 2012; Tuffrey-Wijne & Butler, 2010; and Nind & Vinha, 2012). This work informed the research design, particularly as it relates to questions of power dynamics among participants, the challenges of using PAR, and details on inclusive research methods. While there is little documentation of PAR carried out in post-secondary environments, I was able to draw on a rich body of material generated by educator-researchers who have used PAR at the secondary school level, and whose goals have included: supporting students in the construction

of collaborative knowledge and pursuit of critical inquiry (Bland and Atweh, 2007); validating and expanding knowledges generated in learners' families and communities (Cammarota & Romero, 2011); and supporting learners to challenge the dominant narratives connected to their marginalization (Groves Price & Mencke).

3. 1.1 Inclusive Co-design methods.

In this study PAR was enacted through an inclusive co-design approach. Stappers and Sanders (Co-creation and the New Landscapes of Design, 2008) have regarded co-design as a specific form of co-creation, using the term "co-design" to "refer to the creativity of designers and people not trained in design working together in the design development process" (p. 6). Roschelle, Penuel and Shechtman (2006), have defined co-design in educational settings as:

"a highly-facilitated, team-based process in which teachers, researchers, and developers work together in defined roles to design an educational innovation, realize the design in one or more prototypes, and evaluate each prototype's significance for addressing a concrete educational need" (p. 606).

I employed both definitions when proposing a study that would involve myself, as a trained facilitator and design researcher, and first-year college students working together to co-design elements of a course that the students had recently completed. It was clear to me that co-design would invite students to participate in the act of making, that it would engage them in creating and evaluating prototypes in an iterative process, and that this would involve "construction and transformation of

meaning” (Sanders & Stappers, 2014 b, p. 6) in a way that would provide insights into not only the course that we were designing, but also into the actual process of co-design as it applies to the post-secondary environment in which both course and students are located.

3.2 Social Constructivist and Standpoint Feminist Theory

The research design is rooted in a social constructivist, feminist epistemology for three reasons. First, social constructivism informs the pedagogical foundation of the college program that hosted the research, and its methods and frameworks are more likely to engage students from this program than would a methodology reliant on the pursuit of absolute verifiable knowledge. Second, the research questions are intended to bring together multiple perspectives and knowledges. Constructivist approaches, when done right, demand inclusive methods that recognize that “human experience, including perception, is mediated historically, culturally and linguistically.... that there are ‘knowledges’ rather than ‘knowledge’ (Willig, 2000, p. 7). The program in which the research is located also embraces feminist standpoint epistemology using an intersectional framework, particularly as articulated by Patricia Hill Collins (*Black Feminist Thought: Knowledge, Consciousness and the Politics of Empowerment*, 1999). Grounding the research in standpoint epistemology requires that members of the team work reflexively throughout the research process to explore and share thoughts about their own standpoints (Willig, p. 7), usually referred to in the program as ‘social locations,’ and the ways in which those locations intersect and connect to systemic

power and marginalization. The methodological emphasis on constructions of meaning and standpoint dovetails with the emphasis on reflexivity in PAR captured by theorists and practitioners including: Nind and Vinha (2013) who suggested that inclusive research requires paying attention to all participants' relationship to the research (p. 8). Bland and Atweh (2007), who insisted on open discussion regarding roles and a recognition of the expert knowledge that each participant brings to the collaboration (p. 34); and Bergold and Thomas (2012), who asserted the need for ongoing reflection in the areas of personal and biographical attributes as well as the political, economic and social context in which the project is embedded (p. 11).

3.2.1 Auto-ethnography and the Role of the Researcher/Designer

As the instigator of this research, I was keenly aware of the importance of choosing methods for self-reflection that would be compatible with the methodological framework, and that would enable me to articulate my relationship to the research and to the other members of the research team with clarity and openness. I am positioned in the research as an insider/outsider, a position that embodies both strengths and challenges (see, for example Corbin Dwyer & Buckle, 2009). Feminist and queer auto-ethnographic methods, with their emphasis on narrative inquiry (Ettorre, 2017), standpoints (Adams & Holman Jones, 2011), and “deconstructive skepticism about the workings of reality, power, identity and experience” (Adams & Holman Jones, p. 108), provided the bones for a reflexive practice that I used to document my experiences and thinking throughout the project.

3.3 Influences of Indigenous Research and Knowledge-Making Approaches

This research was planned and carried out on Treaty 13 lands against the backdrop of the work of the Truth and Reconciliation Commission of Canada. Each of the two academic institutions involved in the research have been engaged in responses to the call for Truth and Reconciliation, particularly as it relates to education, and knowledge-keepers in the Office of Indigenous Education and Services at the college where the research was carried out provided foundational resources for the Child and Youth Development course that eventually became the catalyst for this research. My intention in this work is to honour knowledge shared by my Indigenous colleagues and by the Indigenous scholars whose work they have pointed me towards. The writings of Cree scholar Shawn Wilson (2009), and Aboriginal researcher Norman W. Sheehan (2011) have informed my discussions of participant self-location in relation to research, explication of bias, and structures that support dialogue. Some of the larger epistemological and ontological questions discussed by Wilson, and also by Munroe et al. (2013) are also posed—though from non-Indigenous standpoints—by the other PAR and design researchers whose work is central to this research project.

4 Scan of Current and Emerging Approaches

This study is grounded theoretically in the conceptual space where Inclusive Design, Inclusive Education and Constructivist Pedagogy overlap.

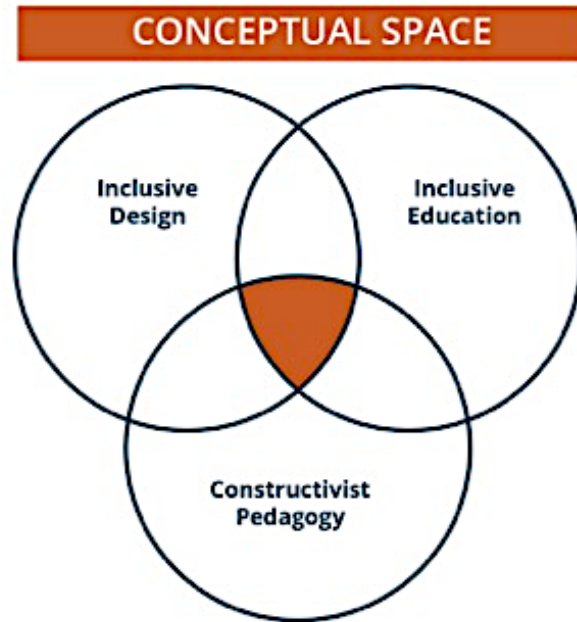


Figure 2. The conceptual space.

Literature from all three fields has contributed to the theoretical framing of the research, with recent case studies of experiments bringing co-design into constructivist-centred classrooms, usually comprised of marginalized learners, providing inspiration and insight. A look at recent experiments in two areas—one being the introduction of Maker Movement thinking and practices into secondary education, particularly in STEM classes; the other being the introduction of student-faculty-administration co-creation and partnerships into the field of post-secondary student engagement studies— rounds out the scan of landscapes that welcome investigation into co-design and constructive knowledge collaboration in colleges.

4.1 Inclusive Education, please meet Inclusive Design

Writing in the *Encyclopedia of Diversity in Education* (2017), Sapon-Shevin states that while the term “inclusive education” initially described the inclusion of students with disabilities in mainstream classrooms (par. 1), “a more comprehensive definition has emerged, one that extend[s] to discuss the ways in which education is provided that recognize, honor and respond to other demographic differences...in addition to differences in students’ skills and assumed abilities” (par. 1). An inclusive education approach is diametrically opposed to the averaginarian Taylorist model that dominated Western education of the Post-War period: “a rigid, lockstep curriculum is incompatible with thinking inclusively and flexibly about a wide variety of learners” (par. 8). The expanding field of inclusive education has, however, been slow to embrace design thinking: as recently as 2017, inclusive design was not mentioned in Loreman’s “Inclusive Education” entry in the *Oxford Research Encyclopedia for Education* (Loreman, 2017). Loreman *does* identify UDL (Universal Design for Learning) as a promising philosophy for education that can ensure access and promote student success (par. 8). Certainly, UDL approaches are making a significant impact in many post-secondary institutions, sparking myriad conversations about pedagogy, access and teaching methods and driving changes in practice that are intended to incorporate the three core UDL principles of multiple means of engagement, multiple means of representation, and multiple forms of action and expression (Meyer, Rose, & Gordon, 2014). However, the focus on universality and large-scale, broadly applicable solutions places a UDL approach outside of the one-size-fits-one focus of this

particular co-design research study. Inclusive design for education, whose three dimensions include: recognition of individual difference and uniqueness; an inclusive process of design or learning design; and the recognition of the greater impact of design coupled with movement toward positive systemic change (Treviranus, 2018), provides rich soil in which to root an inclusive co-design PAR project centred on intersecting and divergent student voices.

4.2 . Instructional Design and Constructivist Pedagogy

Design thinking *has* influenced the relatively new field of instructional design, with Gagnon and Collay's *Designing for Learning* (2006) describing elements of constructivist classrooms, and instructional design researchers, including Romero, Orzechowski, & Rahatka (2014) Bellefeuille, Martin & Buck. (2005) reporting on projects involving the application of constructivist instructional design theory to curriculum in Canadian college-level programs. While their work is not explicitly inclusion-focused, Romero et al.'s embrace of Jonassen's Problem-Based Learning model (pp.3-5), and Bellefeuille et al.'s use of constructivist pedagogy to shift the roles of learners and instructors in order to build collaborative knowledge, address some inclusive design concerns regarding the inclusion of individual students' unique knowledge and ways in which inclusive design for education may create larger systemic benefits.

Instructional design literature focuses largely on the role of trained designers in developing responsive curriculum; it is notable, however, that as far back as 1995, Wilson argued for instructional designers to incorporate “participatory design techniques, *including* end users (both teachers and students) as part of the design team” (Wilson, B., 1995). This early call for participatory instructional design that includes student voices has *not* been fully embraced in the instructional design literature, however it is not clear why. I imagine that there are interesting narratives that may have been suppressed, or that information gained from attempts to involve students in participatory design exists only in untold stories; there may be critical lessons regarding the absence of student voices as full participants in instructional design projects for those of us drawn to practice co-design now, over twenty years later, if only we could get at them.

4.3 Mash-ups of Co-design and Making for Inclusive Design in Education

Meanwhile, a growing number of educators, researchers and designers have collaborated on projects applying constructivist pedagogy to inclusive education concerns and challenges while using design approaches that embrace at least some of the dimensions of inclusive design. In their early and foundational article, Roschelle, Penuel and Shechtman (2006), recognizing the expanding use in the learning sciences of co-design with teachers for the purpose of technological innovation for classrooms, proposed a definition of co-design in education as:

“a highly-facilitated, team-based process in which teachers, researchers and developers work together in defined roles to design an educational innovation, realize the design in one or more prototypes, and evaluate each prototype’s significance for addressing a concrete educational need” (p. 606).

Stating their desire to “contribute to refining and spreading this promising method of design” (p. 611). Roschelle et al. have outlined seven key co-design process components and explored tensions that often emerge throughout their use. Designers Kwon, Wardrip and Gomez (2014) used their findings to work with urban high school teachers serving an economically and racially marginalized community, with the intention of training the teachers in the practice of co-design research. The teachers, who were already using a constructivist-oriented Problem Based Learning (PBL) model popular with instructional designers, worked in collaborative teams to co-design curriculum with the intention of sharing and improving practice as well as building their school’s capacity (pp. 55-57). The study found that interdisciplinary project co-design among middle school teachers enhanced their classroom practices and acted as a catalyst for collaboration. Thoring, Mueller, Badke-Schaub and Desmet (Thoring, Mueller, Badke-Schaub, & Desmet, 2017) also used Roschelle et al.’s process components, in this case to develop a toolkit for co-designing creative learning spaces in a design school. Their research, unlike previously discussed co-design work, included students working along with teachers, staff and spatial planners and administrators on teams led by design professionals.

Thoring et al. picked up the theme of the importance of facilitation in co-design as it appears in Roschelle’s definition. They concluded that a well-trained group facilitator

constitutes a critical element in their co-creation toolkit (p.253). The theme of facilitation as critical to success also appears in the work of Van Mechelen et al. (Van Mechelen, Laenen, Gielen, Vanden Abeele, & Zaman, June, 2017), who have also explored co-design with students—students in this case being 103 children. Van Mechelen et al. considered the matter of facilitation from a perspective that centres on researchers’ use of critical reflection to evaluate ‘co-design dynamics’ in a participatory design process. Noting that only recently have authors acknowledged the importance of identifying and facilitating group dynamics in co-design with students, they suggest that a focus on these dynamics has a positive impact on students’ motivation and their development of creative solutions (p. 269). The researchers have described their work as “translating solutions [to challenges posed by group dynamics] from an educational into a co-design context” (p. 272) and they have declared their intention to continue on this path.

Their stress on group dynamics and the impact they have on co-design processes runs parallel to concerns expressed by Martin (2015), writing in “The Promise of the Maker Movement for Education,” about the need for educators to pay careful attention to the design of activities surrounding learning technologies. Martin cautions against a seductive conceptualization of the Maker movement that assumes that its value lies primarily the imagined capacity of its revolutionary tools to spark transformations in education (p. 37). Reflecting back on the earlier, mistaken, belief that computers could, in and of themselves act as agents of change in education, and the idea that their

placement in classrooms would catalyze transformative change, Martin sounds a clear warning to educators to remember that: “the social architecture of activities surrounding technology is at least as important as the devices themselves” (p.37). The early work on co-design in educational settings discussed above certainly suggests that—to borrow Martin’s terminology—the ‘social architecture’ of co-design activities, the careful attention to group dynamics and facilitation of processes, cannot be separated out from the toolkits that such activities produce.

Whether our conceptualizations of the power of Maker Movement thinking are flawed or not, educators are increasingly turning to Maker Movement-inspired research and co-design activities in the classroom, particularly when it comes to challenges related to inclusion. The collaboration between Project H Design and the Bertie, Pennsylvania School District, which was well-documented in a 2010 TED Talk (Pilloton, 2010), and covered by *Slate* (Hohenadel, 2014) is an early example of designers being recruited by a school board to teach co-design skills to economically and racially marginalized high school students in the hopes of sparking individual learning and benefitting the broader community. This particular example resulted in the school board cancelling the project before its three-year mandate had ended, and it is not clear if problems with social architecture or the relationships between designers and community members played a role in the board’s decision; these potential blocks to the project success are not covered in any of the mostly celebratory media coverage.

In contrast, Calabrese Barton and Tan (2017) focused very specifically on social architecture surrounding Maker thinking and on the teaching and learning of science as an “*historicized and relational practice*”[italics mine], even as they critique gender, race and class assumptions about who gets to *be* a maker (p. 2) in their report on a co-design project intended to address the long history of struggle in the classroom for youth of colour (*Abstract*), and the alienation they experience as a result of STEM (Science, Technology, Engineering and Math) teaching and learning practices. In their design research with economically and racially marginalized middle-school students, Calabrese and Barton worked with youth and teachers, using participatory methods, to support the youth in gaining design research and community ethnography skills that they then used to: identify problems shared by students in their classes; engineer solutions; test results; and iterate further. In the process, students were encouraged to build on connections to their own cultural knowledge and practices (p. 5): for example a student who had been accompanying his electrician uncle on jobs from the age of three was able to use and share his early learning, along with supplies he was able to bring from home, to advance his group’s project to build an “occupied” light for the bathroom in the corner of their classroom, a highly successful project that resulted in ending a situation in which many students had faced embarrassment as a result of being intruded upon. Barton and Tan found that:

“The dominant equity narrative in STEM/Making education is problematic because it does not align with the goals of justice. It positions youth, especially those from non-dominant communities, as inferior and in need of remediation ...The youth in these classrooms...pushed back against normative structures in

the science classroom. They engaged in design work that leveraged what they learned in their class...[and]opened up dialogue around the problems they collectively faced and their capabilities in responding to them” (p. 8).

Barton and Tan’s results make a powerful argument for the use of their methods in forging new narratives in classroom education, and are echoed in some of the excitement faced by learners in this research study as they worked through the “making” period of their co-design work.

Finally, there is not a great deal in the literature that focuses specifically on co-design with students, other than with students training to be designers, at the post-secondary level. There is, however, an emerging body of literature in the field of student engagement that examines possibilities for co-creation and partnership between faculty, administration, and college and university students. Bovill, Cook-Sather, Felten, Millard and Moore-Cherry (2016) have explored roles played by students in such collaborations and have suggested that co-creation has the potential to become “a mainstream approach to curricular and pedagogical development” (p. 197). Felton et al. (2013) have presented the basis for such partnerships, which range from employing students as consultants to share perspectives on teaching and learning, asking students to collaborate on research projects, and asking students to represent student voices in decision-making settings in the institution, as follows: “Emerging evidence demonstrates that including students as partners.... in such work enhances student (as well as faculty) motivation, confidence and sense of intellectual agency” (p. 63). Work in the field of student engagement also addresses and proposes strategies for dealing

with institutional resistance to collaboration with students. At the same time, Bovill et al. challenge the motivations behind institutional investment in collaborative processes, arguing that the “managerialist and marketized higher education environment” (p. 197) which views students as consumers who can also be made the main culprits for their lack of engagement, plays large in conversations about partnership.

Valée (2017) has argued that student engagement literature frequently places responsibility for change on marginalized learners (Background), and Bovill et al. acknowledge that “taking an inclusive approach to partnership often requires staff and institutions to *reframe* [italics mine] their perceptions of students (and colleagues) who have traditionally been marginalised” (p.204). The illustrative example of reframing that they provide, requires: a) a reframing of “hearing loss” on the part of deaf learners as, instead, “deaf *gain*”; and b) the enacting of a “thoughtful pedagogical redesign” (p. 204) that welcomes elements of the knowledge, assets and valuable perspectives that result from this gain into the classroom.

This act of reframing loss as gain, and then moving forward with pedagogical redesign that invites learners’ unique knowledge into the classroom is critical for those of us working to redesign deficit models of education. At the same time, there is a danger that *imbalanced* partnerships with marginalized learners, specifically with deaf students in this example, will result in situations where the institution’s learning comes at the expense of learners from marginalized groups who suddenly find

themselves regarded as valuable sources of knowledge; the dynamics of such partnerships require constant critical reflection as well as engagement with the larger communities in which marginalized learners are situated.

This study will join growing number of studies exploring co-design at the post-secondary level, not specifically within the context of student engagement, but rather as a pedagogical tool supporting the creation of inclusive learning experiences and the construction of collaborative knowledge. Specifically, it explores in more detail than other studies the specific elements involved in co-design with students and it highlights reflections on power dynamics between design researchers, faculty and learners. It asks questions about the use of models for inclusive co-design with learners within the context of a “one-fits-one” design perspective and evaluates results within the context of the dimensions of Inclusive Design. This project will find a place in the space where inclusive education, inclusive design and constructivist pedagogy overlap, a space that is ripe for exploration at this moment of rapidly shifting understandings of teaching, learning, and education.

5 Design Requirements and Constraints

Requirements for inclusive co-design research fall into two connected categories: the creation of a safer communicative space; and the creation of an inclusive space. Why a safer space? Striving to establish safer space is essential because when we ignore the structures and practices underpinning collaboration the participatory element of PAR

is either compromised or completely unattainable. Why inclusive space? When we do not set out with the declared intention of building and maintaining inclusive teams, processes and tools, we continue to replicate what we already know with the result that the inherent flaws and biases in our designs go unchallenged. Below I elaborate on requirements for safer and inclusive space, and then describe some of the constraints on the process.

5.1 Creation of “Safer” space:

Bergold and Thomas (2012) describe the need to establish a “safe space,” also described as a “communicative space,” in Participatory Action Research as a way of fostering conditions conducive to the following: open communication, disclosure, self-reflexivity, and reflection on the research situation and process (Section 3.2). While I would argue that a goal of creating and maintaining a constant state of absolute “safety” for participants in qualitative research—or in education for that matter—is probably unattainable, it is certainly the case that PAR is reliant upon the creation of a supportive environment to foster participation. Martin (2015) has placed importance on the “social architecture” that supports collaboration in makerspaces (p. 37); I am suggesting that the work we do to conceptualize and establish practices and activities that support safer space for participation might be conceived of as the construction and maintenance of solid social architecture. Five requirements for establishing safer, communicative spaces for co-design with students are:

1. Collaborating with participants who are known to one another.

Kitchin (2002) has argued that PAR projects are suitable in instances “where all members are already well known to each other and ... know they can work together” (p. 9). Further to this, I would suggest that “already knowing” a co-participant may not require a personal relationship in situations where participants are part of a self-identified community that already has established practices and values. B. Wilson (1995) has argued that researchers “must participate” in the communities that provide the setting for their work (p. 650). I would add that coming to “know” others involved in the research is a benefit derived from activities whose goals include meeting the requirements for building social architecture, and that when activities are well designed participants’ knowledge of one another is likely to evolve throughout the co-design process.

2. Scaffolding activities over time.

A practice of initiating co-design with smaller activities that are highly facilitated by the educator-researcher, when there is one, and then progressing towards activities in which the facilitator’s assistance is available when asked for provides participants with the possibility of building confidence and gradually increasing participation. Bland and Atweh (2007) describe the process in their PAR with high school students as “scaffolding a process in which communicative action takes place and students’ imaginations are released” (p. 341). The extended time aspect of this requirement is

critical but often neglected because of scheduling and other constraints. It bears repeating that scaffolding requires more than one session.

3. Locating oneself in relation to the research.

Bergold and Thomas hold that in PAR it is necessary for participants to disclose and reflect on “personal and biographical attributes and dispositions” (Section 4.3). For Nind and Vinha (2012), doing research inclusively and increasing participation begins with transparency concerning everyone’s relationship to the research (p. 8), including developing an understanding of who on the team might be considered “researchers” in relation to traditional Western methods, and who might be considered “the researched” (p. 8). Publicly situating oneself within research is fundamental to many Indigenous Knowledge frameworks (Wilson, S., 2009; Drawson, Toombs, & Mushquash, 2017) and serves many purposes. For Bland and Atweh, the practice of self-location is, among other things, part of the establishment of a “parity of esteem” (p. 341) among all co-researchers, a state that promotes recognition of the unique and expert knowledge each individual brings to the work. In addition to locating one’s knowledge, identities and experience base, the practice of situating oneself makes possible the explication of bias. In “Indigenous Knowledge and Respectful Design,” Sheehan (2011) argues that “Respectful Design workers must be the first to know, understand, and communicate their biases and make the influence of their perspectives on evidence and products explicit” (p. 79). In addition to supporting parities of self-esteem and making conversations about bias desirable and respectful,

practices of self-location create space for participants to introduce aspects of themselves and their experience that may not be visible or obvious to team members, thus contributing to the first requirement described above: that participants are “known” to one another.

4. Discussing and ensuring clarity regarding roles and benefits to participants.

A critical aspect of any PAR undertaken within academic institutions is the strict and institutionally-delineated distinction between student-designer roles and researcher-designer roles. It is critical to the PAR process that the power—or lack of power—attached to various roles when it comes to designing research itself, and also to enacting design decisions that emerge from the research, is acknowledged in the design process. The definition of co-design employed by Roschelle et al. (2006), and referenced in Section 3 of this paper, views the role of the researcher-designer operating in an educational context as distinct, and addresses that role and its accountability to the research and to the co-researchers. Discussion regarding roles and the power and responsibilities attached to them requires the explication of benefits to individuals and to communities. Discussions of this nature have the greatest potential for approaching “reciprocal appropriation,” the two-way transformation described by Bagele Chilisa, (2012), that is possible when all participants play a part in defining and evaluating the benefits of participation rather than merely being informed about them in the standard letter of consent.

5. Ensuring opportunities for reflexive engagement.

PAR demands a high degree of reflexivity, with the time and space necessary for reflection being a “decisive prerequisite” for collaboration (Bergold and Thomas, 4.3). In a study comparing co-design activities among middle-school teachers, Kwon, Wardrip and Gomez (2014) identify the practice of reflective discussion—and in one case the *lack* of reflective discussion—as central to the outcomes achieved. As with scaffolding, reflection requires time and also participation in activities that are inclusive and accessible to members of the design team.

5.2 Creation of Inclusive Space

While it is critical to communicative space that co-design teams maintain strong social architecture, this does not guarantee that the space is also an inclusive one. In other words, while a space might feel relatively safe to individual team members, it may at the same time exclude potential participants whose voices are critical to the design process. Additionally, existing team members may find that aspects of their own knowledge, experience and viewpoints that seem relevant nonetheless have no place within the existing process; they might also decide to suppress knowledge and experience because to do so feels safer. Working to establish *inclusive* space for PAR codesign requires the following:

A diverse team. Inclusive design processes require teams that are “as diverse as possible and have experience of the ‘extreme users’ (as coined by Rich Donovan) the designs are intended for” (Inclusive Design Research Centre, 2). Assembling a diverse team requires a shared understanding of the meaning of diversity within the context of the research and is easier when the research site has a pre-existing culture and practices that value, celebrate, and support diverse perspectives, narratives and collaborative knowledge construction. Maintaining an active team of participants whose perspectives, lived experience and backgrounds are widely varied *does* require strong social architecture; meeting the requirements from Section 5.1 helps to clear a pathway for requirements for inclusion.

Inclusive and usable tools. While tools may be designed with the goal of inviting participation or furthering goals of inclusion, they cannot be deemed “accessible” or useful outside of the context, the users’ requirements, and the specific goal(s) for they are designed to achieve (Inclusive Design Research Centre, Relative Nature of Disability). It is therefore necessary to build tool selection, evaluation, adaptation and possibly even tool creation into the co-design process. Again, as with maintaining diverse design teams, social architecture is necessary. In this instance, it supports the communicative space that invites full disclosure from team members regarding the “fit” of proposed tools and collaborative efforts to adapt and create new and more functional tools when and as needed.

Inclusive processes. B. Wilson argues that each instructional design team “Needs to configure a model...that is tailored to their community and the constraints of the project” (p. 655). As with tools, the inclusiveness of the process is connected to context and user requirements. Inclusive processes are comprised of activities and strategies that enact, with varying degrees of success, requirements of users as they move through the design cycle. As a way of demonstrating the relationship between the requirements I have discussed above, and the specific activities in this co-design process, I have created a table cross-listing the two (see **Table 1**, below). I have provided more detailed context regarding activities in Section 6.3.

Table 1. Co-design activities.

This table lists various co-design activities used in the research and indicates which aspect(s) of creating safer and inclusive space each activity contributed to.

	Participants known to one another	Scaffolding activities over time	Locating selves in relation to research	Clarity re. roles and benefits	Opportunities for reflexive engagement	Building and supporting a diverse team ¹	Creating inclusive and usable tools	Creating an inclusive process
ACTIVITY: Informed consent discussion and process (Sessions 1 and 2)	X			X		X		X
ACTIVITY: Co-creation of collaborative agreements (Sessions 1 and 2)	X	X			X	X		X
ACTIVITY: Birds and Feathers (Session 1, Session 2)	X	X	X	X	X	X		X
ACTIVITY: Journey and Experience Mapping (Sessions 1 and 2)	X	X	X		X	X		
ACTIVITY: Post-it Polling (Sessions 1 and 2)			X		X			X

¹ In this context a “diverse” team is one whose participants have a wide variety of lived experiences and identities well outside of the norms and dominant discourses of post-secondary education in North America.

ACTIVITY: Circle Reflection. (All sessions)	X		X		X	X		
	Participants known to one another	Scaffolding activities over time	Locating selves in relation to research	Clarity re. roles and benefits	Opportunities for reflexive engagement	Building and supporting a diverse team ²	Creating inclusive and usable tools	Creating an inclusive process
ACTIVITY: Concept generation in small groups. (Sessions 1 and 2)		X				X	X	X
ACTIVITY: Small groups build concepts out into prototypes. (Sessions 2, 3, 4)		X				X	X	X
ACTIVITY: Circle sharing concepts and prototypes. (Sessions 2,3, 4)	X		X		X	X	X	X
ACTIVITY: Circle feedback and evaluation of process. (Sessions 1, 2, 3, 4)	X		X	X	X	X		
ACTIVITY: Filling out concept templates. (Sessions 3 and 4).		X			X		X	X
ACTIVITY: Filling out feedback templates. (Sessions 3 and 4)		X			X		X	X
	Participants known to one another	Scaffolding activities over time	Locating selves in relation to research	Clarity re. roles and benefits	Opportunities for reflexive engagement	Building and supporting	Creating inclusive and usable tools	Creating an inclusive process

						a diverse team ³		
ACTIVITY: Tracing concepts back through development process. (Session 4)				X	X			X
ACTIVITY: Journey and experience mapping the co-design process. (Session 4)	X		X		X	X	X	X
ACTIVITY: Circle evaluation of co-design process. (Session 4)	X		X		X		X	X
ACTIVITY: Filling out questionnaire evaluating co-design process. (Session 4 and after if required.)			X		X	X	X	X

*In this context a “diverse” team is one whose participants have a wide variety of lived experiences and identities well outside of the norms and dominant discourses of post-secondary education in North America.

5.3 Constraints

The major constraints on this research project arise from realities inherent to carrying out research in academic institutions. The scheduling of co-design sessions, for example, was completely dependent on class schedules and intersession breaks. An even larger constraint on the design process is that the academic cycle does not bend to fit to the design cycle; while student designers participated fully in selecting and generating concepts for development and then prototyping them, their design ideas will not be implemented until the next cohort of students arrives and the designers have moved on to their second year. Thus, this project did not afford student co-designers participation in the latter stages of the design cycle. Similarly, the requirement in academic institutions that an ethical review board approve research involving students, while obviously necessary within the context of the institution, prevented student engagement at the front end of the design cycle, as decisions about the research were required for research proposals and ethics approval before student involvement could begin.

I chose *not* to impose constraints on the range of course elements available for co-design. I made this decision because I was unwilling to curtail the enthusiasm and creativity of the co-design team. The lack of constraint did, however, mean that one—but only one—of the prototypes had to be amended somewhat, since decisions about its adoption would have required administrative approval and action. The designers involved reported that the process of building out their concept provided them with

insights nonetheless, and their prototype communicates a clear message about access and classrooms that will not be ignored by faculty and staff. However, one of the team working on this concept *did* comment in the final evaluation that in future they would choose to focus on a more contained challenge, rather than one that involves the school at large. For my part, I would make sure to talk with the team in more detail about implementation and constraints at the front end of the process before design challenges are clearly established.

6 Context

6.1 Opportunities.

The site for this study is a unique college program in which women and trans students develop skills and analysis for becoming counsellors, advocates and activists in anti-violence and social justice work. The program is an outlier in the college system, small and flexible enough to have the capacity to attend to students' individual requirements, and dedicated to inviting and welcoming students, faculty and staff to express and explore knowledge from the margins through the use of constructivist pedagogy, and through enacting the very requirements for inclusion outlined in Section 5 of this paper. Beginning in their first semester, students study and practice interpersonal communication and group facilitation skills, developing their abilities in

the areas of building social architecture and working across difference. This makes students in the program well-suited to participation in inclusive co-design research.

My position as an educator in the program afforded me inside knowledge and relationships that supported the conceptualization and actualization of the research project. The fact that I was on a year-long professional development leave opened up the possibility of collaborating on research with students whom I was neither grading nor teaching, a critical matter when considering ethical issues involved in educational research. While the students knew me as a member of their program community who had visited a few of their classes to talk about access issues and design, and who was accountable to the college administration, their only official connection to me during that year was through the co-design project.

The first-semester course selected as the focus of our design interventions, Child and Youth Development, provided a unique opportunity for design input on the part of students. The course had been the subject of revitalization in the previous year, when a team of educators and instructional designers had overhauled it with the goals of: incorporating new technologies to enhance learning experiences; creating opportunities for collaborative knowledge construction and problem-based learning; and expanding the core curriculum, which consisted—as it does in most Child Development courses—almost exclusively of Western theory (see Ridgley, A., McLean, Dasmohapatra, & Bonisteel, 2015). As is typical in such situations, the course development team had not been able to include students formally in the design

process. They had, however, recruited students to provide culturally aligned voice-overs for the five child-avatar animated videos created as part of the course redesign. Students' work on the voice-overs had opened an unexpected window for engagement; during their voice-over sessions all five students expressed opinions about the avatar videos and how they could be improved, and for the most part the design team incorporated their suggestions. Several months later, just as *this* research project was being conceived, the instructional designers and educators who had been engaged in the first redesign project were excited about the opportunity to extend and formalize student involvement in the ongoing revision of the course.

6.2 Challenges

The five-week Ontario Colleges strike of 2017 delayed the start of the research by two months and resulted in a number of challenges, the most immediate of which was a smaller group of participants than originally anticipated. The initial plan had been for students in the Child and Youth Development course to be offered the option of participating in co-design activities, for which credit might be earned, during scheduled class time at the end of the semester. However, the loss of teaching hours combined with the difficulty of planning the final weeks of the fall semester meant that the research was postponed until the spring reading break, a time when many students were working, taking care of children, or out of town. The group of seven students who participated, and who chose to continue the co-design sessions into their second semester of studies even though it meant navigating difficult scheduling challenges,

brought widely divergent life experiences, backgrounds and perspectives to the co-design table; it is likely, however, based on clear expressions of interest and follow-up communications from students who attended recruitment sessions but did not participate in the research, that the body of participants would have been considerably larger and even more representative of the outliers in what is a very diverse student population, if sessions had been scheduled during times when students are expected to be at school, ideally as part of the course that provided the research focus.

The loss of five weeks from the teaching schedule, and the subsequent requirement of faculty that they redesign outlines and assessments accordingly, had multiple effects on course delivery and the use of new elements intended to encourage digital collaboration. One of the carefully-planned innovations in the course, a collaborative knowledge activity meant to take place over several weeks, had to be scrapped and could not be considered for co-design since students had not experienced it.

Fortunately, the course instructors were still able to use the five child avatar videos, one of which learners chose as a focus for design intervention.

When I was consulting with colleagues before the research began, we speculated that students might not want to reflect on their turbulent semester, let alone engage in inclusive co-design; luckily, we were wrong. In the very first co-design session the design team co-created a map of the course on a huge whiteboard spread across two walls and then each student-designer charted their own journey through the course on the larger map. In the debriefing circle that followed, participants spoke about the

value of looking back on their experience: “I thought everyone experienced the strike in the same way I did. Through this process I am realizing how different our experiences were; it’s good to know what it was like for other people.” Other students spoke that day about how much they appreciated the opportunity to engage in work that was relevant to their studies and their career plans, but that was not tied up in the arduous tasks of recovery from the strike fallout. Another benefit to participation, in addition to the skills they gained, was that student designers earned a digital co-design badge from the college’s Office of Research and Innovation. This turned out to be more valuable in many ways than the marks we had initially planned to offer, given that co-design for service is quickly becoming a factor in the fields where students in the course are applying for placements and jobs.

6.3 Meeting requirements with tools and strategies.

Below I describe some of the ways in which three of the co-design activities contributed to meeting the requirements for safer and inclusive space as described in Section 5 and listed in Table 1.

Requirement: *Determining an inclusive process*

Activity: *Establishing agreements for collaboration.*

When participants establish group agreements for collaboration, they contribute to building the conditions that they require in order to participate and share their thinking. The co-design team in this research project established and amended a set of agreements based on individual requirements and shared ideas about useful practices. I brought a potential set of agreements to the first session, and I had also shared the list in the preparatory materials posted on the Google site I had created in order that participants could receive materials in a screen-reader-friendly format in advance of our meeting. I invited the co-design team to add to, amend, or challenge anything on the list. One participant asked for an additional agreement that would address an access requirement that had not been discussed to that point; there were no further changes or additions. Bland and Atweh (2007) observe that in PAR settings students may be uncertain of their place in the power relationship, and that it takes time to get used to having their voices respected (pp.344-45); it is entirely possible that students may not have felt comfortable enough, especially early in the first session, to fully engage in establishing agreements for collaboration. This is a reason to ensure that agreements are living documents in co-design, that they are accessible during design sessions and are easily adapted or changed, rather than merely existing as laminated poster-sized artifacts presented by designer-facilitators.

Requirements: *Participants locate themselves in relation to the research; Participants are known to one another.*

Activity: *“Birds and Feathers”.*

In this activity, participants, including the researcher, identified voices and identities that they were bringing from their lived experience to our design work (for example: “mother,” “queer,” “Bengali,” “Muslim,” “mobility impaired”), wrote them down on paper “feathers”, and added the feathers to a large stylized representation of a mythical bird, thus creating a visual profile of the group. Using a conversation circle structure, each participant talked about the feathers they had added. This activity allowed participants to: become aware of some of the commonalities and differences in our experience and identities; to begin to know one another in ways that we wanted to be known; to gain a preliminary sense of who we were as were as a team; and to begin developing awareness of voices that were absent.

Requirement: *Opportunities for reflective engagement.*

Activity: *Journey and Experience Mapping.*

Journey mapping was unquestionably the favourite tool of the design team. It allowed participants to create detailed narratives of their experiences, while at the same time creating a larger visual of the entire team’s journey and experience. We used it in the first session to lay the foundation for identifying design challenges and used it again in the final session to evaluate the co-design process. While designers spoke of their appreciation for the tool because of the opportunities it provided to reflect—indeed

more than one of them commented that they either planned to use the tool in their personal lives or had already been motivated to do so—several spoke during the first debriefing of the value of the tool’s ability to demonstrate to them commonalities and particularly differences in their experiences of both the course and the impact of the strike and its aftermath. One student commented that it really served the purpose of helping her to think outside of her own experience as she prepared to engage in collaborative design work.

7 Proposed Design and Design Decisions

Co-design research took place in four sessions held over a three-week period. During these sessions we—the team of seven student co-designers and myself—worked through a design process that I had modelled and that we adapted along the way. In this section I summarize and present highlights of the work done by the co-design team to build out four specific concepts based on aspects of the course that the student designers identified as needing attention. I then discuss the larger process model that the team worked with and also worked *upon*—refining, adapting, and ultimately evaluating in our final co-design session.

7.1 Four concepts/prototypes:

During the discovery stage students identified four elements of the course for co-design. They subsequently produced a design concept for each and collaborated in small groups to build out their concepts into prototypes of varying levels of fidelity. The four concepts and their work

on them are outlined below. The first two resulted in the production of digital artifacts, both in medium-to-high fidelity formats; the third involves a design for a physical classroom layout for this course; and the fourth begins the creation of a process model in response to needs identified not only in this research, but also in a recent study on the experiences of black students in community services.

7.1.1 Global Knowledge Mapping: collaborative activity for newcomer learners

Early in the Discovery stage of the process, a student who is a newcomer to Canada commented that she wished there were more opportunities for newcomers to share cultural knowledge and perspectives. She had appreciated the first unit of the course in which an Anishinaabe knowledge-keeper taught life cycle and development-related concepts, and she saw the efforts faculty had made to decenter the European theory that dominates the field. At the same time, she identified a knowledge gap that she wanted to respond to through creating spaces for newcomer knowledges on topics covered over the semester. She and another designer formed a small group to work on this problem, and they proposed a digital knowledge-mapping activity that would be “not just the boring one-way street of an instructor talking *at* the students,” an activity that would allow learners to self-select and share knowledge they deemed relevant to the course content. They put the mapping activity through several iterations, asking for and receiving feedback on how the activity might be facilitated and what trouble-shooting might need to take place during its implementation.

7.1.2 The “Cam’s Granny” avatar.

“From the first time I saw them in class I loved the idea behind the avatars. In my mind I wished I could create one.”

Student co-designer, Week Four.

Two designers focused in on the five avatar videos created for this course as the element they wished to work on. The animated short videos illustrate the lives of five children and youth, and they are intended to provide cognitive pegs upon which learners hang their learning over the semester. The avatars and videos had been developed the previous year by a team of designers and educators with input from graduates and second-year students, five of whom had provided the avatars’ voices as well as much unprompted (but welcome) feedback on the avatars themselves. I had expected that students would have a lot to say about the avatars during the Discovery process and fully anticipated that they might want to create a sixth avatar and video. Informal comments made during Discovery—and indeed throughout the four weeks— about the experience of working with the avatars in class focused on how much learners enjoyed them and found them useful to their learning. While I had imagined that students might want to create a new avatar, this was not the case. The two students who chose to work on avatars identified the need for an additional character in the existing narrative for Cam, a four-year old who has two homes and two sets of parents—two moms and two dads. Cam’s mama is Tamil-Canadian, and the students noted the absence in the video of what they labelled “traditional” cultural knowledge and the ways it might play out in Cam’s life. They created a new character, Cam’s granny, whose presence in the narrative would open up the possibility for layered and nuanced conversation among students working with Cam’s avatar. Using the digital animation program used to create the avatars, and working through

several iterations, the small group designed the character of Cam's granny and wrote the script for a new scene in which she makes a birthday visit to Cam's home. This turned out to be the most fully realized of the four concepts; it received more feedback and went through more iterations than any other.

7.1.3 Design for inclusive classroom set-up for this course.

"Our classroom felt a little like a dungeon."

"It [the classroom] was designed to be Victorian: eyes front."

Student designers, Session Two

Early on in the process, four co-designers identified the classroom setting for the course as inaccessible due to "physical needs, mobility needs, learning needs and visual needs". They noted that at least one student having impaired mobility would, on the occasions when they arrived just as class was starting, wait outside the classroom until the break because of the difficulty of finding and getting to a place to sit. Drawing attention to the long, tight rows of seating and the loud ventilation system in the classroom, one designer noted that "it was jarring to go from open collaborative spaces into *that* classroom. All of a sudden nobody was talking to one another." This group envisioned a classroom that would meet the demands they identified for: a) access based on learning and physical needs that they were aware of, and b) accommodating the many collaborative activities built into the course. They sketched designs for a more inclusive classroom layout and, rather than inventing a classroom from scratch, they chose the classroom in which we were meeting as the basis for a more workable design.

There was a critical incident involving this team and their commitment to the group agreements for collaboration that we had co-created back in the Configuring an Inclusive Process stage. I had suggested to the group that I could provide their team with personas, or that they might create personas, which they could then run through scenarios involving their classroom design. The use of personas is so common in co-design circles that I did not stop to think of how it might conflict with their “speak to your own experience” agreement. And while the team did not reject my effort to create personas for them outright, they did let me know, when I asked about it again towards the end of Session 2, that they had more than enough material to explore based on their own varied inclusion and accommodation requirements. I noted in my journal that night: “I’m glad they didn’t accept a tool from me that clearly wasn’t going to work for them, and that went against one of their agreements. I’m also wryly appreciative that they were so *kind* about it - even though they didn’t need to be!”

7.1.4 Group work in the classroom: an inclusive process.

This was the last concept to be developed. The team working on it consisted of student designers who had wrapped up their prototype work on other concepts, and a student who had missed an early session. Designers in this group identified that when they worked in small groups in their classes, as they often did in this course, their own and others’ awareness about access needs and inclusion seemed to vanish. It is interesting to note that Price’s (2016) study exploring black student experiences in community services programs identified group work as an “area where program structure and mode of delivery present[s] significant challenges,” and where students feel faculty members fail to intervene when group dynamics take on hostile or racist overtones” (p. 17). Student co-designers engaged in complex dialogue concerning how

they might create a process that would support inclusive practice in small groups, trying out a variety of design responses including: drafting an outline for a “verbal contract” among group members; listing possible group agreements; and creating tools such as a “talking stick” or another object intended to prevent interruption. They decided after the second co-design session that their goal was to create a formalized group inclusion process to be used during the first meetings of the course with the intention being that the process would become normalized over time.

During the third session, this group came to a critical realization when, unprompted by me, they measured their rough inclusion process prototypes against the inclusive design goals of the project. As they reported back to the larger group, they had decided they were not—and could not be, as four students out of nearly one hundred—representative enough of the membership of the class to prototype a useful process for small group inclusion. They shifted their challenge to developing “a process to *establish* a fully inclusive process” and worked on concrete steps to be taken including: consulting with the instructors in the program who teach the three mandatory group dynamics and facilitation courses; and intentionally seeking the involvement of an even wider team of learners, including—as one designer put it—“the students who get really quiet and sit at the edges.” This comment about students who are quiet at the edges led the team to *revisit* the design team’s profile (this kind of back and forwards movement throughout the process is indicated through arrows on the Proposed Process for Co-design chart shown below in **Fig. 3**) and recognize that despite the many differences in their lived experience and identities, with multiple and intersecting experiences of “outlier” knowledge in relation to race, abilities, ethnicity, religion, gender and sexual identity, socioeconomic class, levels of education, age, and family composition, there was not good

representation on the design team from students who did not speak in class, and who sat at “the edges” of small groups. The team identified this absence as a deficit, and the conversation about designing a process to establish a *more* inclusive process was one that the larger team referred to several times as an example of their growing relationship to design.

7.2 Process model for inclusive co-design in college programs.

Below, in **Fig. 3**, I have provided a chart of the process model for inclusive co-design with college learners that emerged from this research. The model is not meant to be prescriptive; it is presented in light of the one-size-fits one dimension of Inclusive Design, recognizing Herriott’s (2015) reflection on inclusive design modelling: “if we decide to ...accept that no design process model is complete or final, we can define a design methodology as being a set of more general suggestions (some of which are optional) with a sequence that cannot be fixed in advance” (p. 140).

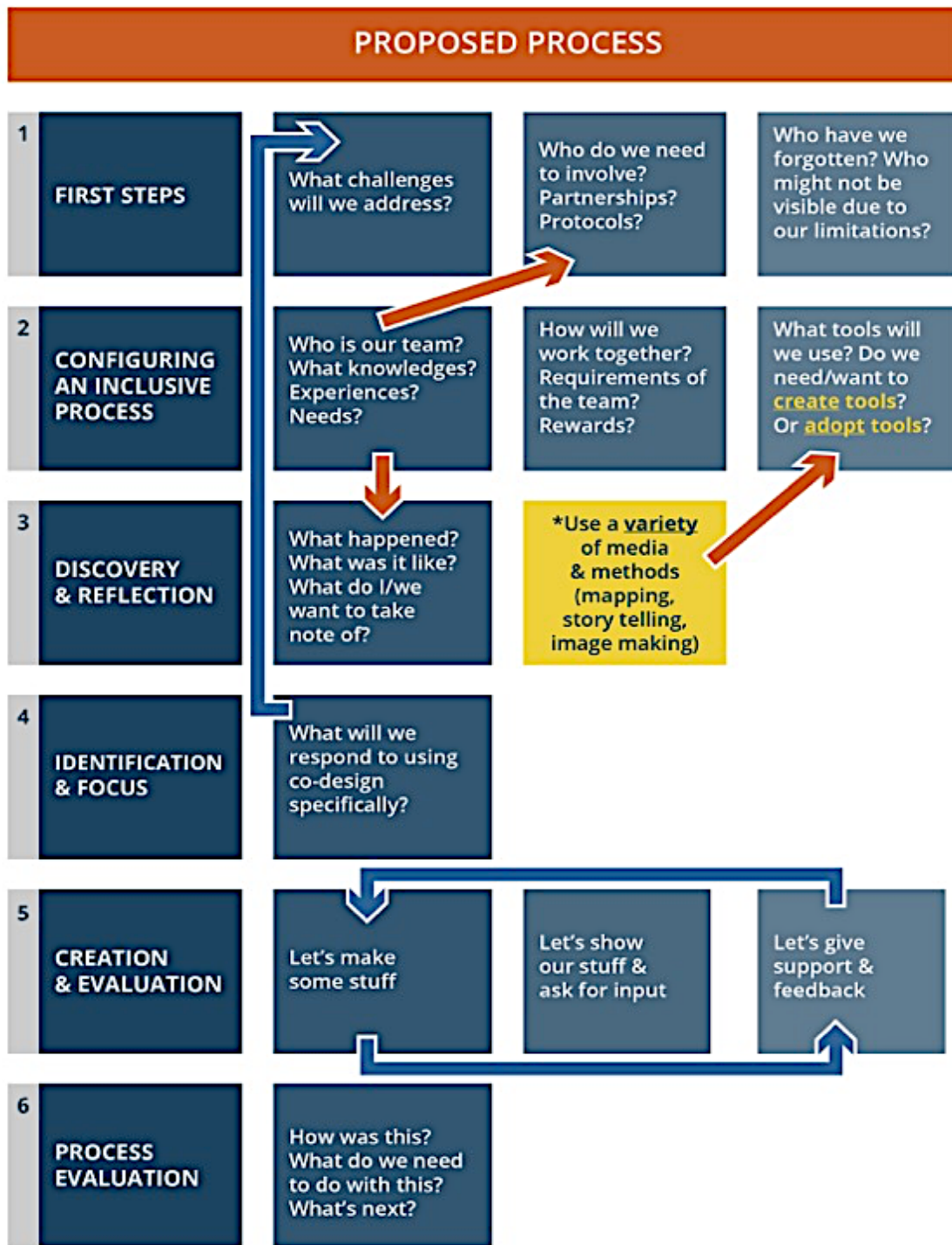


Figure 3. The Proposed Process Model.

7.2.1 Stage One: Drafting the model

I was not able to find a pre-existing model for co-design with students at a post-secondary level, and to the best of my knowledge, design research has not been applied to curriculum in the college where I work. In drafting the process model for co-design, I drew upon several relevant sources. The seven process steps outlined by Roschelle et al. (2006) in their co-design work with teachers reflect many of the constraints faced when dealing with academic cycles and deadlines. The emphasis on a co-design practice that includes facilitation and central responsibility for design decisions reflects the realities of co-design within the strict hierarchies and power imbalances inherent in post-secondary education. The Cambridge Engineering Design Centre's model for an inclusive design process (2011) is clearly intended for use in a business rather than educational setting; however, the model's emphasis on the importance of the Discovery phase influenced my decision to devote a significant amount of time in the first session to journey and experience mapping as well as reflection on mapping. The waterfall aspect of the Cambridge design, which "emphasizes the need for constant evaluation" (Herriott, p. 143) was useful in thinking about the necessity for feedback at several stages throughout the four co-design sessions. My own experience as a group facilitator, including as a facilitator of support groups in rape crisis centres and HIV/AIDS organizations, and as a facilitator of focus groups in several PAR projects focused on the effects of violence on learning, strongly influenced my choices of activities for the different stages of the model. I also benefitted immeasurably from the feedback of facilitator colleagues when planning the first co-design session.

7.2.2 Working with and adjusting the model.

I adjusted the model as we worked through the co-design process. Student co-designers wanted more sessions than the two I had planned, and we ended up with four. This allowed us to extend the Creation and Evaluation phase over three sessions, and several of the participants commented in the final evaluation that they would have valued spending even more time working through this stage of repeated iteration. Although I had anticipated that the Creation and Evaluation stage would involve moving through at least a few feedback cycles, I had not envisioned how many. Additionally, I had envisioned a more linear process for the other stages. The arrows on the process model show the reality, which was that we needed flexibility to allow for back and forwards motion through the model as the student designers checked their work against inclusive design requirements and made necessary adjustments before moving forward. I had also envisioned a shorter process. The high degree of reflexivity built into this model no doubt connects to the very positive nature of the experience that participants mapped in the final session; at the same time, supporting reflexivity requires a design model that recognizes strong social architecture and time for individual and shared reflection as critical elements to the process.

8 Verifying Design Decisions

There is no question that this research benefited from the frequent evaluation and feedback processes demanded by PAR methodology and co-design practice. Arrows

shown in **Fig. 3** of this document demonstrate points at which feedback and evaluation are of particular importance in the process.

8.1 Verifying design decisions for each of the four models.

“Action research has been proven a valuable method to evaluate design artifacts and design methods in a qualitative way.” (Thoring et al., p. 247).

“...in contrast to the standard expert model of research where subjects have little opportunity to check facts, offer alternative explanations or verify researcher interpretations, inclusive approaches facilitate such interaction. As a result, inclusive approaches, far from diminishing the academic rigour of research, enforce a rigorous approach that is cross-checked at all stages of the research process through participant co-researchers.” (Kitchin, 2002, p.4)

Throughout the creation and evaluation process, the co-design team checked the decisions they were making against the design challenge to “increase the inclusivity of the Child and Youth Development course by re/designing key aspects of the course to reflect the unique insights and knowledge of students who have taken the course”.

Each group used a concept development template to identify the specific inclusion issue their concept responded to and what they hoped to accomplish. Team members provided feedback on concepts and prototypes in large group circle discussions, using a feedback template, in the second and third sessions. Designers also checked their work against the three requirements of inclusion described in Section 5.1: diverse team; inclusive tools; and inclusive process. The example documented In Section 7.1.4, in which the designers working on a process for inclusion in small groups determined

that their team was not inclusive enough to meet their goals, is one of several examples of a team recalibrating after reviewing requirements for inclusion.

For me as a researcher-designer who also teaches in the program, it was critical to ensure that I was not directing or unintentionally influencing students' design decisions. For this reason, I worked to ensure the traceability of concepts and design responses by mapping them in my journals, using templates that the student-designers completed in the Creation and Evaluation stage, along with materials they generated in the Discovery and Reflection and the Identification and Focus stages. In one instance, I had trouble locating the origin of a concept. I presented my concern to the design team, who traced the concept back to its earliest appearance in an informal conversation held on a break, reconstructing the process by which they had identified the challenge. **Fig. 4** below illustrates this process of tracing the concept back through various design activities and artifacts such as the concept template.

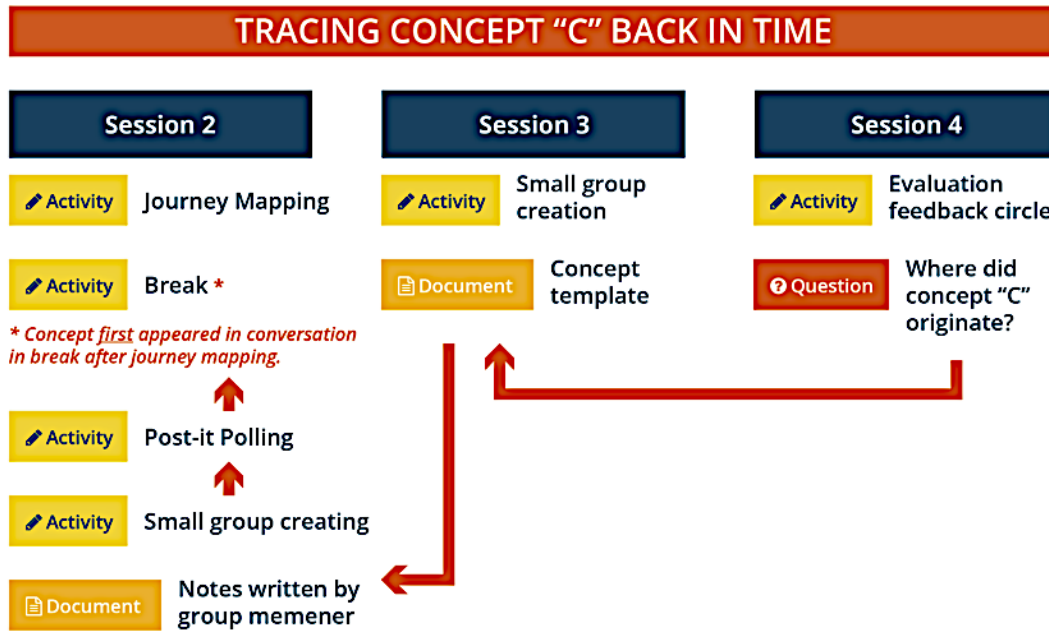


Figure 4. Traceability of design concepts.

Arrows demonstrate the **backward** movement tracing Concept "C" from a conversation about its origin in Session 4, to its appearance on a concept template during Session 3, to notes produced in a small group creation session in Session 2, to the Post-it Polling activity in Session 2, to its actual origin in a conversation on a Session 2 break right after Journey Mapping and before Post-It polling.

Efforts to ensure traceability opened up opportunities for the entire team reflect on ways in which all team members participated in various stages of the process and also allowed for the team to adjust before moving forward.

8.2 Validating the co-design process model:

The team reflected on, adjusted, and provided feedback on the process model throughout the four sessions, and in a variety of formats. Team members provided

feedback on the various stages of the larger process model as we worked our way through them and then evaluated the model as a whole in Session Four. Initial feedback on the different stages took the form of reflections in circle conversations at the end of each session; I also invited team members to share their thoughts on the various activities in which we participated as a routine part of debriefing the activity. This routine practice of debriefing activities helped to build the final evaluation process: for example, the journey and experience mapping tool used early in the Discovery and Reflection stage was clearly so useful to participants in the early stages that we decided to use it again in the Session Four, this time as a tool for mapping team members' journeys through the larger process model.

When it came to evaluating the process model in the final session, all seven participants located their experiences towards the top fifth of the scale (which ranged from lows of "frustrated, needs not met, not engaged" at the bottom, to highs of "fabulous, engaged and involved" at the top) *consistently* across the Journey Map of the four sessions. Team members also participated in a final circle debriefing conversation and filled out an anonymous written feedback form, provided to them digitally and on paper. Journey and experience mapping, along with the subsequent debriefing circle produced by far the most elaborate comments and the largest volume of feedback. Most participants *did* fill out the form as well; none of them wrote anything on the forms, however, that they did not also bring up in the journey mapping activity and debrief activities.

9 Discussion and Insights

9.1 Making + Learning: a match made in constructivist heaven

Sanders and Stappers (2014b) have observed that a “key ingredient of the designerly ways of doing research is that they involve creative acts of making” that produce the “construction and transformation of meaning” (p. 6). The student-designer's evaluations of their experience are in keeping with this observation in that they spoke not only about how much they enjoyed *making*, but also about how much they had learned through their participation. Their own constructed identities shifted from student to student-designer, a shift that was formally acknowledged at the end of the project with the digital co-design badges created for them by the college's Office of Research and Innovation. When I reflected in my research journals on the participants' comments about learning I found myself revisiting my own understandings of what it means to teach and to learn. Platitudes commonly voiced by educators, including the often-repeated “I learn more from the students than they do from me” acquired new relevance when I found myself with student-designed teaching materials and activities that I could not possibly have created myself. When I first read Martin's (2015) list of seven reasons why making can constitute a valuable learning activity for students, I was excited but not entirely convinced that making could have a prominent role in the college courses I taught; having now experienced a making process with students I better understand the potential value making holds not only for students, particularly

for students who do not “fit” into mainstream models of education and are eager to “hack” the curriculum and the classroom, but also for educators like myself who are looking to bring design research into the classroom as a way of gaining knowledge.

9.2 Hierarchies are challenging; accountability is good; blurring is ok

I was initially prepared for the possibility that the differences in power, roles and responsibilities between me and the student designers might create issues that would be time consuming to address and that might affect students’ creativity. It was certainly the case that I borrowed from the clear articulation of roles and accountability that Roschelle et al. (2006) used in their definition of co-design in educational systems. Once I had clarified and acknowledged my roles as the research-designer and as an educator in the program hosting the research, it then followed that I would play a facilitator-researcher role that would become less prominent over time and also that I would provide student-designers with scaffolding in relation to design tasks. While I would have preferred to have worked on a collaborative facilitation team rather than on my own for many of the same reasons that I am drawn to collaborative knowledge construction in the classroom, having multiple facilitators might have overwhelmed or drowned out the seven students’ voices in this case. I did find in the absence of a peer co-facilitation team that my decision to use autoethnographic methods and my practice of reviewing notes for traceability of concepts after each session supported me in checking my work against the project goals and in acting in accordance with the co-design team’s agreements.

Although I advocate for clear roles and accountability structures, I also want, conversely, to advocate for porous boundaries between roles. This seems contradictory, but it is necessary in a world where understandings of education, research and design are rapidly transforming. Sanders and Stappers (2014a) have envisioned the coming of a “design/research blur,” predicting a proliferation of hybrid design researchers and research designers at the fuzzy front end of the design cycle (p. 15), and back in 1995 Wilson foretold the “mixing up” of traditional roles of designer, teacher, student and subject matter expert in the design process (Abstract). While colleges have been slow to incorporate students into this mix, the intentional creation of inclusive and communicative spaces, as discussed in Section 5 of this paper, will perhaps hasten their inclusion; certainly, it can assist future co-design teams in coping with the inevitable discomfort arising from blurred roles and fuzzy front ends.

9.3 A model is just a model....and not a magic bullet.

Large institutions by their very nature contend with myriad problems, challenges, and threats to their relevance. Martin (2014) references the “pervasive desire in education for silver bullets that can solve big problems through simple means” (p. 37). Although I passionately urge educators, learners, staff and administrators in post-secondary institutions to explore co-design, I assert with equal passion that inclusive co-design with students is *not* a magic bullet to be deployed scattershot against complex problems. Magic bullets do *not*, for example, require collaborative configuration by their users, unlike co-design. The process model arrived at in this project is not

intended to be prescriptive; hopefully it will inspire other educators and learners to experiment, and with any luck it will spark debate, dialogue, and the creation of more models and inclusive tools.

Separating an inclusive design model from the context in which it is generated and from the social architecture surrounding it is likely impossible. The student co-designers' prior experiences in developing communicative spaces, and my own training and experience in PAR facilitation and design are inextricably connected to our work together and to the prototypes and process model that resulted. Participatory action researchers and co-designers caution against ignoring the role of facilitation (Roschelle et al., 2006, Van Mechelen et al., 2017), with Thoring et. al (2017) going so far as to argue that their toolkit “not only consist[s] of the ‘hardware’ materials, but also the trained facilitators”. There is a tension here that requires further exploration, however. Constraining the use of models and tools to teams with professionally trained designers and facilitators results in: a) the creation of hierarchies of access to tools, with many potential users never having the opportunity to engage in co-design; and b) less adaptation, hacking and evolution of the tools than there would be if they were in wide circulation.

9.4 Collaboration might be a sort of magic bullet, if only we could do it well.

While training materials for educators may encourage them to use group work because of the persuasive evidence supporting its role in learning, it is also the case that “[our]

systems of education focus on individual excellence, we do not reward or teach collaborative excellence” (Treviranus, 2016, Section 5.1). It is therefore fascinating to me that the seven students, educated around the globe in schools that, for the most part, did not reward them for collaborative excellence, not only chose to engage in a time-consuming collaborative process held during their college intersession break, but also chose to design responses to the gaps and challenges they identified by constructing activities and processes that *support* collaborative knowledge building. As black students interviewed in *The Path Forward* (Price, 2016) noted, and as student researchers on this project pointed out during the Discovery and Reflection phase, group work shines a spotlight on problems, inequities and tensions that exist among students. As an educator, I am used to hearing groans when group work is assigned in class. However, at no point in the Discovery and Reflection or in the Identification and Focus stages did the student designers suggest removing group work from the curriculum. The problem the student designers identified and worked to address was this: how can we do group work more inclusively?

9.5 Learning from Indigenous Knowledges can only enhance inclusive design for education.

Indigenous epistemologies, ontologies and axiologies demonstrate that knowledge construction can be rooted in clearly articulated practices based on relationality and respectful partnership (Wilson, 2016). While I am not suggesting that educational institutions “discover” collaboration, I *am* advocating for dialogue and respectful

partnership with the bodies established by First Nations, Inuit and Metis peoples of Turtle Island, and with the people who comprise those bodies. The four OCAP® principles of ownership, control, access and possession (First Nations Information Governance Centre, n.d.) provide guidance for researchers, and as academic institutions work through their responses to calls for Truth and Reconciliation, many have established offices for Indigenous education from which design researchers can learn and seek guidance.

9.6 Inclusive co-design can support learners in disrupting dominant narratives.

“The best part was that we were doing it! Until then it was in my head. I couldn’t believe we were actually *doing* it!”

Student designer, describing the Creation and Evaluation stage of the process.

In the early days of designing this research, I was inspired by the portrait Barton and Tan (2017) paint of middle school learners who are routinely marginalized because of race, economics and gender inequities, who used design research to engineer solutions to problems they had defined and explored, “pushing[ing] back against normative structures” (p. 8). Months later, I stood in a classroom watching women and non-binary college students who in no way fit the mainstream profile of ‘makers’ (see Leah Buechley’s Closing Address to the 2017 *FabLearn Conference* for more on this profile) as they worked with animation software, charted options for interactive digital mapping activities, and sketched designs for an accessible and inclusive classroom. They were indeed designing. That alone is transgressive. Their responses through design to the

challenges that they connected to their experiences of exclusion, their possession of outlier knowledge that had no place in the curriculum, and their very tangible struggles to fit themselves into learning spaces that were not structured to include them certainly constitute challenges to dominant narratives about post-secondary education, and about who gets to generate knowledge, what counts as knowledge, and how it is produced.

10 Next Steps

I have framed the next steps that emerge from the research as a series of questions:

- What strategies will those of us who are committed to bringing learners into design research for inclusive education, and who are committed to using research *with* not *on* paradigms, use to involve learners at the front end of planning so that they may be central to establishing research questions and design challenges?
- Given the constraints of academic calendar cycles, how might we involve student co-designers in the implementation and evaluation of their creations? Are there ways that learners can build on the knowledge generated by previous generations of students without having to start fresh each co-design cycle? What if we had an expectation that students would carry out design research as part of learning, leaving their insights and next steps for the cohort that will follow?

- How can inclusive design research enhance the social architecture that supports the use of inclusive tools and processes without becoming prescriptive or universalizing? Knowing that the literature focuses less on the interpersonal aspects of co-design than other elements, how can we encourage more discussion and more knowledge construction in this domain?
- What means of engagement will most effectively support post-secondary educators and instructional designers, particularly those already working from constructivist pedagogies, in exploring possibilities for inclusive co-design with learners? It could be argued that there are already educators who engage students in co-design activities in the absence of a co-design lens. An additional question, therefore, is how do we create spaces for the knowledge and experience of those educators who are *already* co-designing with learners as we work to further inclusive design practices?
- What motivates non-Indigenous educators to move beyond the constraints of Western methods by: a) opening ourselves to learn from the existing body of work on Indigenous design and knowledge; and b) approaching the Indigenous research and knowledge-keeping bodies located in our institutions and our communities, as well as the First Nations, Inuit and Metis bodies working in partnership with our governments, to co-create partnerships and priorities for designing education? In Section 1 of this paper, I quoted Munroe et al. (2013) commenting on how pockets of educational innovation around the world are applying approaches that reflect the tenets

of Indigenous knowledges (p. 332). How can our educational institutions step away from the legacy of the flattening, standardizing, Taylorist models of 20th century Western education we have inherited into a world where, rather than resisting that wave of innovation, we are supporting and participating in it?

11 Conclusion

I want to conclude this process by returning to the place from which I started. I can see that my frustration with the situation I described earlier, in which students shared their unique experience and knowledge only in the cracks and crannies of the formal curriculum, can be traced to educational design methodologies that could not hold multiple truths and perspectives. I yearned, but did not have the opportunity to co-create structures and processes through which learners' knowledge could blossom and expand, no matter how socially unacceptable or counter to dominant narratives that knowledge might be. My dogged efforts to shift the situation in the moments when I could snatch time to consult with colleagues, or when I gathered learners' input through increasingly lengthy end-of-semester questionnaires and debriefs, could not provide the structural change that was required. I am reminded of the words of my parents, both of whom worked in design environments, when I was upset or frustrated with broken toys as a child: "It's not *you*, it's bad design."

Co-design with students has allowed me to explore ways of potentially transforming some of the design flaws in the North American educational system that employs me.

This study, inspired by the work of educators, designers and participatory action researchers working to transform educational environments and to design a just and inclusive world, contributes to the literature on co-design in educational settings by responding to B. Wilson's (1995) call to include students in the design process. It moves Roschelle et al.'s (2006) process steps directly into the co-creation of curriculum and classroom design. It illustrates the importance of paying attention to processes for creating safer and inclusive spaces at every step of the design cycle, and puts forward a model for doing inclusive co-design with students in a college environment.

My work on this project has reinforced my desire to find ways off of the islands to which Western models of education have relegated my colleagues and I to work alone, despite our best efforts to dialogue with others on neighbouring shores. I was excited about the research because it allowed me to explore the viewpoints of the many visionary thinkers, designers, makers and educators whose work I have referenced throughout, and most notably to work with the notion that education is in the midst of a profound transformation, one that has the potential to create a more just world certainly, but also one that requires individuals to move beyond the structures that we have inherited from 20th century models of education. Those of us who choose to venture into this collaborative new/old world will require inclusive tools and processes; we will also need to support one another in building and maintaining the skills to design, evaluate and use them. The experience of co-design with seven

remarkable students has left me better prepared for the journey, and also well fuelled to continue along the way.

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