Innovations in CYC: Service-Learning with Technology

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Abstract
My Teaching Excellence Program (TEP) professional learning project explored how a service-learning initiative leveraging Humber's Idea Lab could enhance student learning objectives in the Child and Youth Care (CYC) diploma program. An existing assignment in a Therapeutic Activities Programming course was revised to include an opportunity for students to create assistive devices. Students participated in two workshops where they learned how to 3D print adaptive switch components and assemble them using basic soldering. Students then applied these skills to build switches and adapt battery-operated toys for clients with physical and cognitive disabilities. At the end of the project, the adapted toys were donated to a local pre-school serving children with special needs. To assess the impact of this experience, pre- and post-activity reflection questions were planned to measure changes in students' attitudes, beliefs, and confidence using maker technologies in their CYC practice; however, low participation in the evaluation components prevented meaningful analysis. Despite this result, the project demonstrated the potential of maker-based service-learning to build students' confidence with maker and digital technologies and to increase their awareness of DIY assistive technology solutions relevant to their practice.

*Recent graduates of Humber Polytechnic's **Teaching Excellence Program (TEP)** were invited to select and submit work from their time in the program to JIPE. This sample of reflective essays offers an engaging glimpse into faculty perspectives, their approaches to teaching and learning, and their experiences as Humber educators.

Context and Rationale

Service-learning is an educational approach in which students participate in community service activities that meet social needs, while also reflecting on their experiences (Jacoby, 2015). Service-learning projects involving 3D printing in higher education are commonly found in STEM-related disciplines such as engineering (Kellam et al., 2019) and occupational therapy (Benham & San, 2020). However, as Pearson and Dubé (2022) highlight, 3D printing supports "domain general" learning outcomes, such as critical thinking, problem-solving, and collaboration, suggesting it has value beyond technical fields.

My project set out to examine how a service-learning approach using 3D printing could enhance student learning outcomes in a field that is not tech-focused. I collaborated with an instructor in the Child and Youth Care (CYC) diploma program

to revise an existing assignment in a first-year Therapeutic Activities Programming course, shifting it from a theory-based exercise on adapting play-based activities to a hands-on experience that introduced students to 3D printing and basic circuitry. The intention was to enable students not only to evaluate adaptive solutions, but also to build solutions for clients. Through this work, I also hoped to raise awareness of the Idea Lab as a campus resource for building maker and digital fluency skills across faculties.

Professional Learning Plan Journey

I worked closely with several partners throughout this project's development. The course instructor, Chrissy Deckers, was a key collaborator whose cooperation and willingness to augment the assignment made this project possible. I was also supported by Daniel Bear, Director at the Centre for Social Innovation (CSI), who facilitated connections to the CYC program and Humber's Advancement office, which led to a donation of toys.

Completing SEED Research and Innovation Fund and Research Ethics Board (REB) applications were important milestones in the journey. Working through these processes not only secured the necessary institutional approval and funding but also prompted me to think more deeply about the purpose, scope, and structure of my project. Beyond designing the hands-on instructional activities, I spent considerable time crafting the research and data collection components to assess the project's impact on student learning. I also sourced materials that were not part of the Idea Lab's standard inventory, such as soldering irons, wire strippers, screws, and fasteners.

Early in the semester, I facilitated two in-class workshops to introduce students to toy hacking, soldering, assistive switch-building, and 3D printing through hands-on, low-stakes practice (see Figure 1). A key partner in this was the Neil Squire Society's Makers Making Change (MMC) program, a nonprofit that supports makers in creating open-source assistive devices. Stephan Dobri, MMC's Ontario representative, facilitated the soldering part of the workshop and provided insight into the benefits of low-cost, open-source adaptive technologies. MMC's involvement also helped ground the assignment in real-world application and highlighted its relevance to students' future work as CYC practitioners.

After the workshops, students worked in small groups to select a battery-operated toy and adapt it for a hypothetical client. While I initially planned for students to modify toys for real clients of the Neil Squire Society, privacy concerns led to the use of fictional profiles created by the course instructor, with the understanding that the toys would ultimately be donated to support children in the community. Students assessed the cognitive and/or physical limitations that would prevent the client from independently operating the toy and selected a solution from the Makers Making Change online library of assistive switch designs. They then built the switch and added a switch jack to the toy using the Idea Lab's 3D printing and soldering equipment (see Figure 2). Although students were initially given four weeks to complete the hands-on work, the deadline was extended to ensure all groups successfully finished their adapted toys by the end of the semester.

Figure 1. Students practice soldering a 3D printed low-profile adaptive switch in the Makers Making Change workshop.

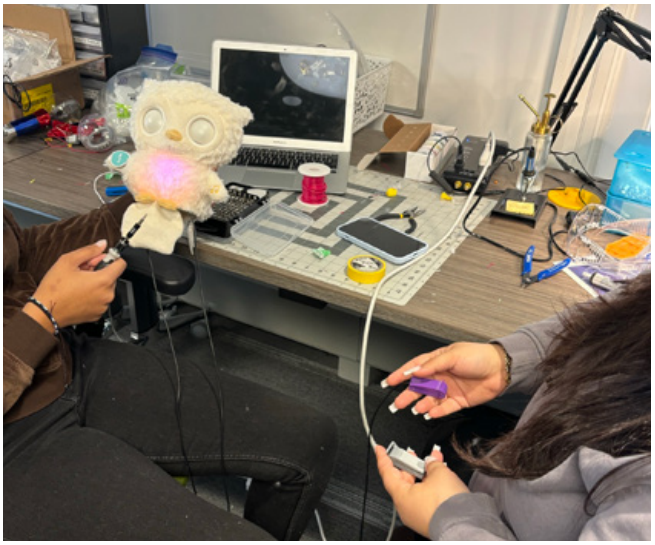

Figure 2. Students testing a toy switch at the Idea Lab.

Reflections and Impact

Despite being required components of the assignment, low pre- and post-survey response rates prevented an in-depth analysis of student reflections. That said, two post-activity open-ended reflections suggested a general increase in student confidence. For example, "I am confident enough as long as there is assistance," and "I am now a bit more confident in identifying and addressing the unique needs of young people with mobility challenges than before." Although I was disappointed that we did not collect enough reflection responses for a more comprehensive analysis, I still feel accomplished knowing that all groups successfully created fully functional adapted toys and switches. The toys were donated to Silver Creek Pre-School, where they were distributed to children with physical and developmental challenges, realizing the positive community impact that is central to service-learning projects (see Figure 3).

As a Librarian, my interactions with students are typically limited to one-shot in-class instruction or brief assignment-support appointments. This semester-long collaboration gave me deeper insight into how students approached and adapted to technology over time. The most significant challenge I confronted was students' initial attitudes toward digital and maker tools. When introducing the project, I heard comments such as, "I'm not good with this tech stuff," and "3D printing is too complicated." Encountering these perspectives prompted me to refine my approach early on, paying close attention to the motivational factors that affect students' readiness to learn. It was rewarding to see attitudes shift once students began to engage in the workshops and building phases. It was a privilege to witness high-fives and cheers of delight when a group's switch activated a toy (see Figure 4). Moments like these affirm for me the value of hands-on, purpose-driven learning and highlight the positive impact that meaningful and well-supported technology-integrated experiences can have on student engagement.

Conclusion

I hope that my project will serve as a foundation for future iterations. I would welcome the opportunity to attempt this research again, ideally with a larger sample size, a control group, and a revised approach to data collection. I see potential for alignment not only within the CYC diploma curriculum but also with programs across the Faculty of Social & Community Services and beyond. Makers Making Change's adaptive gaming initiative is another opportunity at the intersection of technology and service-learning that could be explored. More recently, MMC launched a "Clubs That Care" micro-grant to support youth ages 15-30 in organizing assistive technology build events in their communities. I would also be happy for the Idea Lab to support a co-curricular, student-led iteration of this project at Humber.

Figure 3. Donation of toys to Silver Creek Pre-School.

Figure 4. The six completed adapted toys.

Note on Contributor

Erin Walker, MLIS, is a Digital Fluency Librarian at the Idea Lab, Humber Polytechnic's library makerspace.

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