

# OPP: APPLICATION FIELDS & INNOVATIVE TECHNOLOGIES

## Bridging experiential learning and empathy in co-design of gerontechnology

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**Purpose** There is a growing need for affordable and accessible gerontechnology to be developed locally in Singapore for our elderly communities, yet no course exists in local universities that builds talent capacity in design and development of gerontechnology. Furthermore, most engineering courses involved in technology development are conventionally taught in campus through classes, workshops and laboratories with limited outside community engagement to apply these domain-specific knowledge and skills to relevant people groups that these technologies are designed for. Such integration between learning and community engagement could be a strong learning motivator given our Gen Z students' inclination to find meaning and social impact with their learning (Turner, 2015).

**Method** An undergraduate course on Gerontechnology in Ageing was started in January 2020 as a technical elective under our undergraduate curriculum. Instead of adopting a conventional lecture-tutorial-laboratory strategy, a design-based project was blended with community engagement into a unique experiential community-based learning (CBL) strategy that involves co-design with older adults. CBL is grounded in the notion that learning is more effective if it is not just theoretical but also experiential (Morris, 2020). Such active learning fosters higher order learning (Asok et al., 2016) as knowledge is applied in real-world practice. Learners also develop empathy as they interact with community "need-knowers" and are more engaged if they observe their learning could impact people's lives (Parsons & Taylor, 2011). Here, students worked in groups to partner an older adult from our network of thirteen different community partners to identify and analyze an unmet need before applying their learning to define technical specifications, create a prototype, and subsequently evaluate it. These higher order learning activities (Krathwohl, 2002) collectively formed the main components of the courses. In place of an examination, this open-ended design-based project where students performed real-world tasks allowed their prototype to be an authentic assessment of their learning (Ashford-Rowe et al., 2014) which is highly relevant in an engineering education (Reynolds et al., 2009). The expectation for students to present their prototype as a gift to their client and the community partners to participate in their assessment ensured sustained engagements throughout the process (Parsons & Taylor, 2011). **Results and Discussion** There were five runs of the course to date over the last five years with a total of 233 undergraduates attended. Students were able to apply and integrate their learning to create quality prototypes<sup>1</sup> that met the client's specifications and addressed their unmet needs. The groups eventually passed their prototype to their client as a gift and our community partners affirmed the quality and potential of their prototypes for community deployment. Some project prototypes were adopted by their client for daily use, including an assistive stretcher "Super Stretcher 3000" for a wheelchair user or sold, such as exergames "TACGO" and "Happy Feet" used by seniors at Active Ageing Centres. Students also gained empathy as they had to place themselves in their clients' shoes when co-designing the solutions with older adults. These outcomes are evidence of higher order learning in value-creation for users, which is critical in engineering. Selected prototypes arising from the course were then further developed into products, validated by more users within our community network, refined and manufactured for sale or community deployment at-scale. While such an "idea-to-deployment" through co-design within an undergraduate course is uncommon, it showcases the potential of student's work in gerontechnology development towards community translation.

### References

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**Keywords:** gerontechnology, experiential learning, empathy, co-design, community engagement

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**Acknowledgement** This research was supported by The Moh Foundation.

<sup>1</sup> Visit our [bGood website](#) which showcases all the prototypes developed by students from the undergraduate courses BN4102 Gerontechnology in Ageing and BN4103 Assistive Technology for Persons with Disability over the years. It provides a brief write-up and product video clip produced by the students.