

Design Odyssey: A Co-Curricular Design Innovation and Entrepreneurship Program for Systemic Change in Design Education

Presentation Abstract ASME IDETC – DEC Conference

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Abstract

A mentorship and training program led by the SUTD-MIT International Design Center (IDC, idc.sutd.edu.sg), and referred to as Design Odyssey (<https://idc.sutd.edu.sg/programmes/design-odyssey/>) [1] (Figs. 1-2), is a co-curricular program that helps students apply the principles of design innovation, human-centric design and making, and bridge the gap between theory and practice to unleash innovation, social awareness, and social entrepreneurship [2-10] (Fig. 3). The mission is to groom change agents and social entrepreneurs to be champions of Design Innovation (DI) in Singapore, the ASEAN region, and beyond. The program is sponsored by the **JP Morgan Foundation**.

In this presentation, we present the Design Odyssey program and associated educational research findings aligned with the programmatic and organizational goals of the program:

- The workforce development of cohorts of interdisciplinary, university students across four years, with a clear transformation in design innovation and 21st Century skill sets and mindsets.
- An impact on the community and region with the execution of design innovation, social innovation, and enterprise projects, with spinoffs into social entrepreneurship and with competitive submissions to competitions, award programs, and crowdfunding.
- Organizational development of Design Odyssey staff with a focus on serving and empowering students and the community, in addition to continuous evolution and improvement in the Design Odyssey program.
- Transferring the workforce development of university students into leadership opportunities for them to transfer design innovation skill sets and mindsets to middle school and high school partnerships, leading projects with teachers and students in these environments.
- Developing a confidence and positive self-efficacy in a diverse set of interdisciplinary students to be innovators, with the necessary critical thinking, creative thinking, complex problems decision making, and emotional intelligence to succeed in the future workforce and make an impact in their communities.

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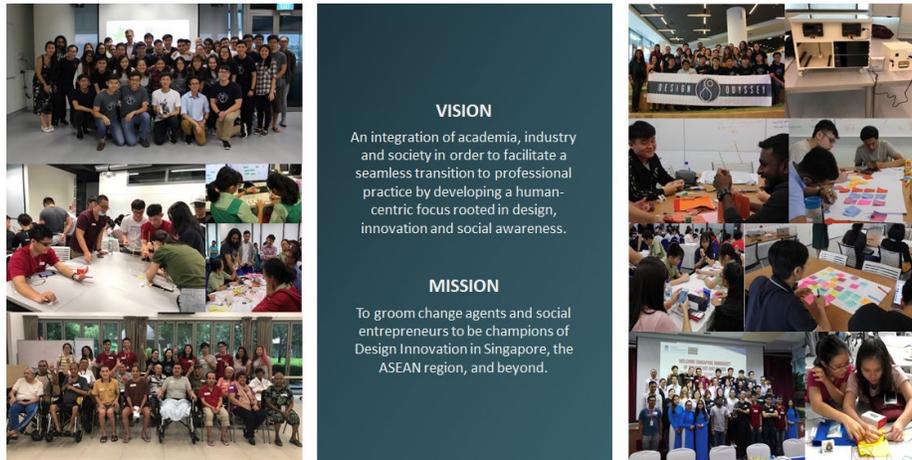


Figure 1. *Design Odyssey* program, vision & mission.

Design Odyssey Program

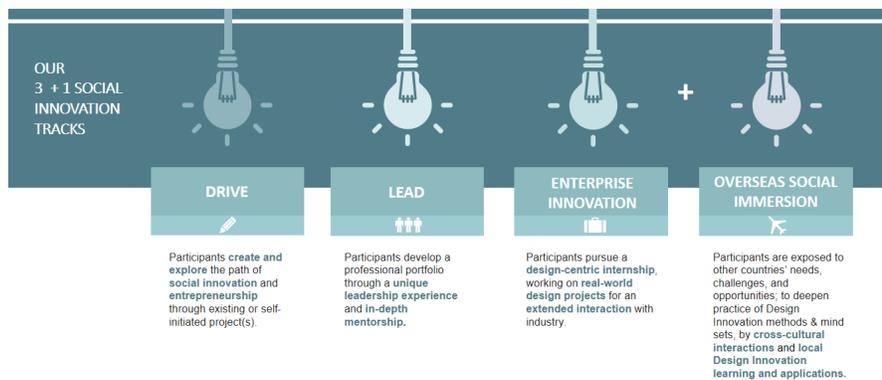


Figure 2. *Design Odyssey* program elements.

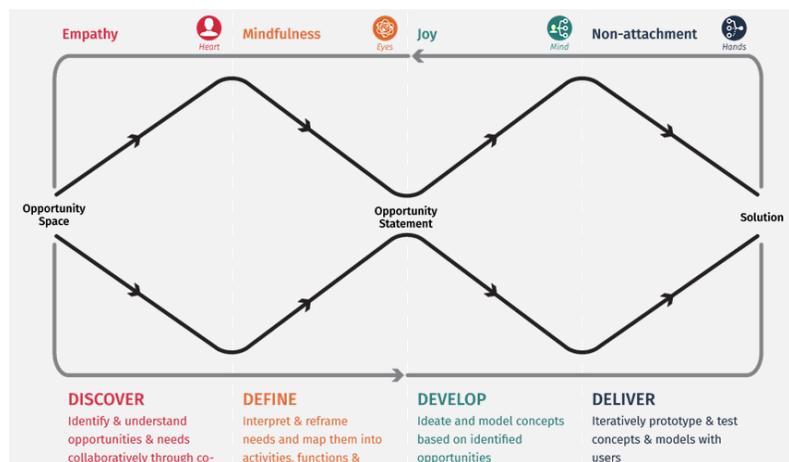


Figure 3. Design Innovation (DI) 4D process used within *Design Odyssey* [2-4, 7].

The Design Odyssey Program is a tremendously impactful way to engage students in real world based opportunity/problem-solving, used Design-Based Learning (DBL) and Maker-Based Learning (MBL) [11-13]. This is a voluntary, co-curricular, and outside-the-classroom mentorship and training program, where college school students, high school (junior college and polytechnic) students, and middle school (secondary school) students learn and apply principles of human-centric design. The mission of the program is accomplished as the student participants (1) network with mentors from both academia and professionals from top public and private enterprises; (2) acquire design, computing and technical skills that are highly in demand by the knowledge- and innovation-based workforce; (3) contribute to the betterment of society through meaningful opportunities that allow them to apply these skills and qualities; and (4) learn to encourage other students to pursue degrees in higher education. Through this process, students advance their skill sets and mindsets in critical thinking, inventive thinking, and emotional intelligence, all identified as key 21st-century skills [14].

We offer three different and distinctive programs, each of them thoughtfully designed to benefit students with different goals. The three project modules are strategically developed for different scales of offerings and range from cutting-edge bootcamps to a year-round program.

Social Innovation DRIVE – The Social Innovation DRIVE program is recommended for students who have the desire to create, discover, and explore the path of social innovation and entrepreneurship. This program lasts 9–12 months and engages students in a single long-term project addressing a specific societal need or problem. Through Design Odyssey’s DRIVE program, students are exposed to social issues and opportunities that can inspire their social interventions. They are provided suggested opportunity statements, or they can choose their area of study. For example, they may choose to focus on the elderly, climate issues, or mental and health issues. Students will be taught discovery methods and mindsets, and they will be given the opportunity to research and interview end-users and stakeholders. Based on our DI Framework of the 4D process—Discover, Define, Develop, and Deliver—training is provided to students throughout the program. Students are exposed to soft skills such as design thinking, discovery methods, system thinking, business pitching, and mindsets. Students will also be exposed to technical skills such as Business Model development, Makey Makey, Microbit, App Inventor, Prototyping Kits, and Portfolio development.

During Term 1, students are afforded the opportunity to deep dive into the DI process with a 3-day boot camp. Throughout the program, students work under the mentorship by the Design Odyssey team, faculty members, and external volunteers from various enterprises. Mentors are not expected to take part in the group’s research; instead, mentors are encouraged to guide the teams in the right direction, ask good questions to help students uncover their blind spots, provide clarity and clarification when doubts and ambiguities arise, and check whether students are embodying the mindsets of empathy, mindfulness, joy, and non-attachment through the project. Besides project guidance, mentors may help students develop professionally and grow the students’ self-awareness beyond the social projects, e.g. their summer internships or coursework during the term. Mentors are also free to guide and share their professional experiences in the working world with students and point students to where they may further develop themselves.

Students showcase their project and prototypes in Term 2 at the Odyssey Pitch. Each team presents their social innovation to stakeholders and external panelists. We strongly encourage all students to fully utilize the Design Odyssey DRIVE platform to further develop their projects and become change-makers and social entrepreneurs.

Social Innovation LEAD – The Social Innovation LEAD program is recommended for university students who aspire to develop their portfolio through a unique leadership experience. The program targets university students from rural or diverse backgrounds and works with them on social innovation projects through in-depth mentorship. This program lasts 6–12 months.

Design Odyssey’s LEAD program extends its platform, training, and mentorship to pre-university-level students in elementary schools, junior high schools, high schools, and community colleges. DRIVE program students are strongly encouraged to participate in the LEAD program as student mentors and engage in a meaningful way with the younger students as they journey through the DI process. With the skill sets obtained through the DRIVE program, university students co-create and co-lead with instructors by taking on a leadership role in the guidance of the younger generation. LEAD students will also have the opportunity to extend their network by providing mentorship in student competitions and project work.

An example of this program is a partnership with middle school schools, students, and teachers. LEAD participants work closely in the schools to bring DI into the classrooms, where the LEAD students and teachers have been trained to direct, manage, and train the new students and teachers in their setting. In some cases, the LEAD participants engage in immersive experiences on the university campus and then bring back the experiences, skill sets, and mindsets to the schools, in concert with the Social Innovation DRIVE program.

Enterprise Innovation – The last track offered is Enterprise Innovation, which provides an opportunity for extended interaction with industry, voluntary welfare organizations, non-profit organizations, and government-public sectors. This program is recommended for students who would like to challenge their design acumen and work on real-world design projects on campus, followed by a paid internship at the enterprise. These are aimed at partnering with enterprises that are engaging in the students’ communities in a positive way and are intentional partners for workforce development. Students have the opportunity to apply their learned skill sets to real-life projects run by our industry or community partners. The Enterprise Innovation program is a pre-internship project that transitions into a formal internship. Students have the opportunity to be matched to a preferred project proposed by various enterprises and work under a mentor or mentors from the enterprise.

Enterprise Innovation provides the perfect opportunity for students to prepare themselves for the workforce and provides networking opportunities for career development. The Enterprise Innovation program offers opportunities to partner with local, national, and international companies and organizations.

In addition to these three primary programs within DO, there is a fabulous “plus one”: **Overseas Social Innovation (OSI) Trips**. Each year, approximately 50 participants across the three programs apply for an overseas trip, focusing on social innovation projects in the local country’s communities. These trips were scheduled for 1-2 weeks, and include cross-cultural interactions and local design innovation learning and applications. Partners in this “plus one” included: Vietnam - Nguyễn, Tất Thành University, NHC Social Enterprise, Thien Thanh Social Enterprise, and People’s Committee of Ben Tre Province; and Myanmar - Hla Day Myanmar.

In this presentation, exemplar research findings aligned with the programmatic and organizational goals of Design Odyssey are presented across a four year period (Fig. 4). Key program output and

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