

Overview

In an effort to expand educational options for students with interests in global health, the University of Michigan College of Engineering launched a Minor in Multidisciplinary Design Specialization in Global Health Design (GHD) in 2009 that incorporates core design principles such as co-creation and opportunity for technology introduction and redesign. The core of the GHD specialization is an intense two-semester design course featuring project scoping, co-creation with the community it intends to serve, technology introduction, and redesign. This educational approach leverages existing University relationships in Ghana (project scoping field site can be domestic or international), prior experiences by the GHD organizers in leading international clinical field site experiences, and a multi-semester design course centered on bioinnovation.

Specialization Objectives

- Emphasize the importance of co-creating with the community versus simplistic needs assessment
- Understand the implications of introducing technologies to the community
- Teach for sustainability
 - Avoid the “hit and run”
 - Leverage existing university relationships
 - Build local capacity
- Understand cultural influences on health care

Specialization Requirements

- “Cornerstone” course related to cohort theme (i.e. Health and Illness in Africa)
- Two-semester global health design course
 - Project scoping
 - Technology introduction
 - Redesign
- International Engineering or Social Entrepreneurial Seminar Series
- Formal leadership/mentorship experience

Clinical Project Scoping Experience Co-creative Ideation & Design Technology Introduction Redesign

Clinical Project Scoping Experience

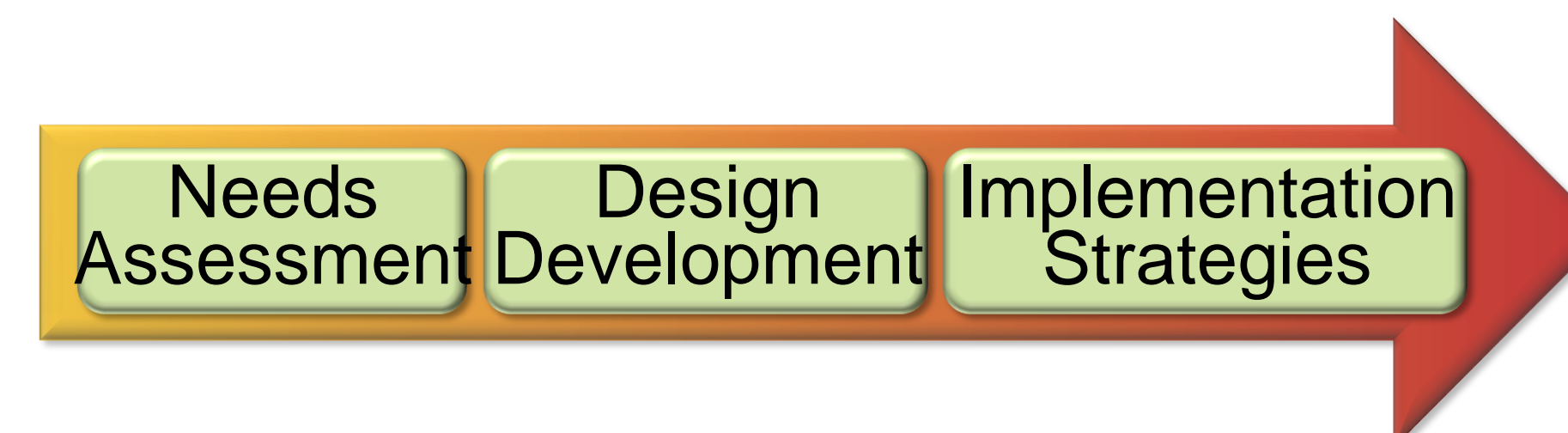
The Global Intercultural Experience for Undergraduates (GIEU) Program at the University of Michigan provides opportunities for short-term faculty-led intercultural study emphasizing the development of intercultural skills, global perspective, cultural sensitivity, critical self-reflection, and navigation within an intercultural setting. Prof. Sienko participated in this program to:

- 1) Create a clinical immersion experience for undergraduates that served as a dry run for a GHD Clinical Project Scoping Experience,
- 2) Work with a group of academically diverse students
- 3) Develop sustainable research collaborations with Ghanaian clinicians.



History of Innovation Sustainable Designs

- Prior to this work, the UM Medical School had an established presence in resource-limited settings, but the UM College of Engineering did not; aspects of health care related to technology design were thus absent.
- Undergraduate and graduate-level courses as well as a minor program in global health design were created to establish an educational platform for medical device design appropriate for resource-limited settings.
- Collaborations with several groups at the UM Medical School were initiated to gain insight on their experiences in health care delivery in resource-limited settings.
- Field visits to urban and rural areas in Ghana and Nicaragua were used to identify technological needs, and local partners were identified for subsequent creation and implementation stages of device design.



Field Visits

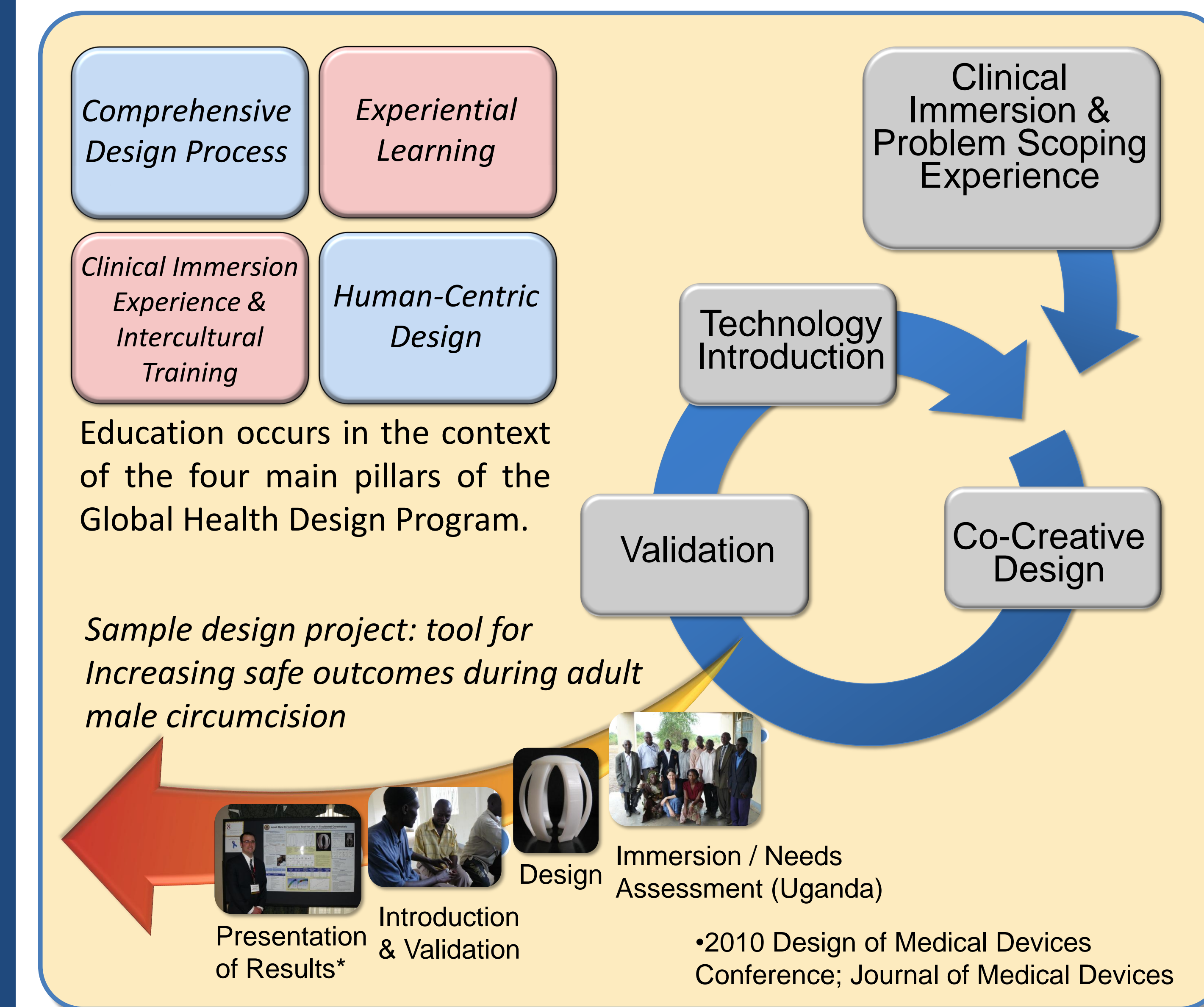
- Ghana: Summers 2008, 2009, and 2010
- Nicaragua: Winter 2010

Courses Offered

- Undergraduate Senior Design (ME450)
- Design for Global Health: Sustainable Technologies for the Developing World
- Minor in Global Health Design
- Clinical observation and needs assessment workshops

Innovative Sustainable Designs

- Emphasize the importance of co-creating with the community versus simplistic needs assessment
- Understand the implications of introducing technologies to the community
- Teach for sustainability
 - Avoid the “hit and run”
 - Leverage existing university relationships
 - Build local capacity
- Understand cultural influences on health care



Sample Past Design Projects

- Autologous blood transfusion device
- Reconfigurable labor and delivery bed
- Newborn respiration monitor

Acknowledgements

Support for this work was provided by the University of Michigan College of Engineering, the UM Center for Global Health, the UM Minor in Multidisciplinary Design, the National Collegiate Inventors and Innovators Alliance, the National Science Foundation, African Studies Center, International Institute, and the Gates Foundation through a Grand Challenges Exploration Grant. The contributions of Timothy Johnson, Kofi Gyan, Amir Sabet, and Kwabena Danso are also acknowledged.