Department of Computer Science, Mathematics, Physics, and Statistics

Developing Learning Modules to Support Personalized Pathways for Students with Diverse Academic Backgrounds

Primary Investigator: Dr. Bowen Hui Collaborators: Dr. Yves Lucet, Dr. Miles Thorogood, Dr. Ray Taheri-Ardebili, Josh Vance, Dr. Karon MacLean

Project Scope

The goal is to modularize the Human Computer Interaction (HCI) course at UBCO that shares common modules with several other courses. Module design and delivery should accommodate diverse student backgrounds and support design thinking activities.

Course Context

COSC 341 is a core course in the Computer Science program at UBCO with only had a third-year standing as a prerequisite. Since COSC 341 is the only HCI course offered, it is often cross-listed as COSC 541.

Students come from other programs, have different academic goals, and are not used to thinking about design concepts in computing.

Literature in HCI education reported that students come to the course with negative preconceptions about HCI and thought that the content was too easy, the grading was too subjective, and the difficulty level to be not challenging enough. Various pedagogical strategies attempted to counteract these issues include using projects with real users, evaluation that is process rather than outcome focused, work that interest-driven, among others.

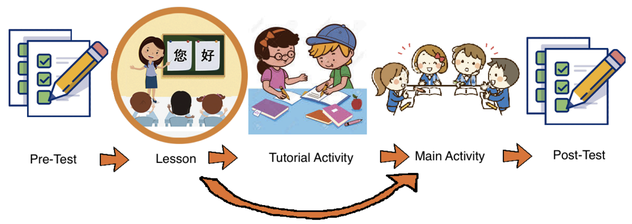
Synchronous Aspects

- Mondays: Asynchronous lectures
- Wednesdays: In-class tutorial activities
- Fridays: In-class main activities

Modules with Personalized Pathways

Every module has a pre-test and a post-test. Pre-tests help students identify learning objectives. Tutorials can earn back lost marks on pre-tests. Tutorials are designed to target basic competencies while main activities done in teams target module mastery.

Module Structure



Learning Modules

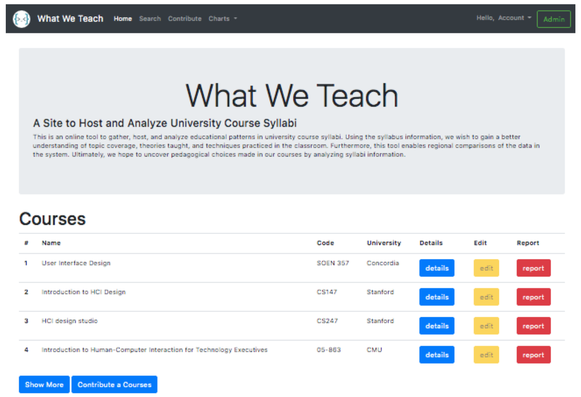
Lessons were provided in advance so students read them at their pace. The core modules are:

- What is HCI
- Course Logistics
- User Centered Design
- Design Rationale
- Usability Principles, Guidelines, Heuristics
- Prototyping
- Formal Models
- Alternative Interfaces
- Evaluation Methodology
- Heuristic Evaluation
- Accessibility
- Course Summary

These modules have been used in other classes and universities impacting over 1,000+ students.

Research Publications

- J. Bulmer, M. Fritter, Y. Gao & B. Hui. **FASTT: Team Formation Using Fair Division.** Canadian Conf. on AI, 2020.
- K. Khademi & B. Hui. **Towards Understanding the HCI Education Landscape.** Koli Calling, 2020.
- B. Hui. **Lessons from Teaching HCI for a Diverse Student Population.** Koli Calling, 2020.
- B. Hui, O. Adeyemi, M. de Vin, B. Marshinew, K. Khademi, J. Bulmer, & C. Takasaka. **Teamable Analytics: A Team Formation and Analytics Tool.** Learning Analytics and Knowledge Conf. 2022. **Best Demo Award.**
- B. Hui. **Design Guidelines for a Team Formation and Analytics Software.** Computer Supported EDU. 2022.
- B. Hui. **Design Guidelines and Research Directions for Team Analytics.** Int. Journal of Information and Learning Tech. 2022.
- N. Fan & B. Hui. **Understanding the Data Needs for Developing a Computational Model of Team Dynamics.** Frontiers in Education (FIE). 2023.
- B. Hui. **A Personalized Learning Approach to Support Students with Diverse Academic Backgrounds.** FIE. 2023.



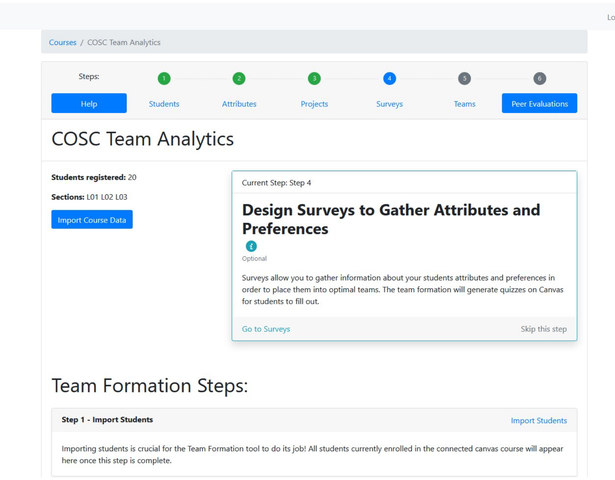
http://whatweteach.herokuapp.com/

Canvas-Integrated Team Formation and Analytics Tool

To support team activities, we built Teamable Analytics that is fully integrated with the Canvas LMS. Features include:

- Creating surveys to elicit student information
- Forming teams based on custom student attributes and project needs
- Diagnosing team compositions using visual analytics
- Augmenting team membership manually
- Monitoring team performance through visual analytics
- Conducting peer evaluation student feedback
- Reconfiguring teams based on student peer evaluations

Teamable Analytics has been used in 39 classes with 15 to 200+ students at UBCV/O since 2021.



https://teamableanalytics.ok.ubc.ca/homepage/

Acknowledgements

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