Department of Computer Science, Mathematics, Physics, and Statistics

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

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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 third year core course in the Computer Science program at UBCO. Traditionally, it has a prerequisite of third year standing, but now, it also has an introductory programming course as a prerequisite. In addition, since COSC 341 is the only HCI course in the department, it is often cross-listed as COSC 541.

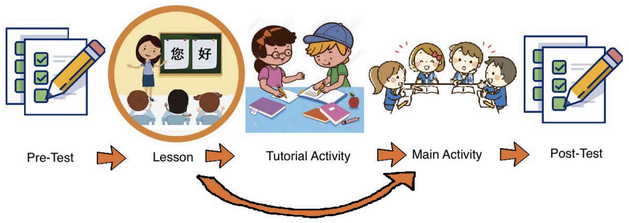
Students come from other programs, have different academic goals, and are not used to thinking about design concepts in computing.

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 in case studies to counteract these issues include using projects with real users, evaluation that is process rather than outcome focused, work that interest-driven, among others.

Module Design

Every module has a pre-test and a post-test. The pre-test helps students identify learning objectives. Lost marks on the pre-test can be made up by doing a tutorial activity, but it is otherwise optional. Tutorial activities are designed to help students achieve basic competencies in the module. Every module has a required main activity which is a team exercise designed to help students apply and master module concepts.

Module Structure



Learning Modules

More optional modules still need to be developed. Currently, the following are offered as core modules:

- 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

Synchronous Aspects

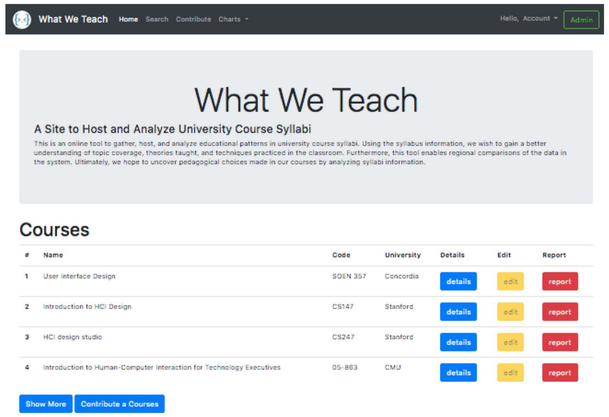
The recommended schedule was M/W/F.

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

Lessons were provided in advance and students were able to read them at their own pace. Pre-tests were due before the tutorials, and readings were due by main activities.

Research Publications

- J. Bulmer, M. Fritter, Y. Gao & B. Hui. **FASTT: Team Formation Using Fair Division.** In Proceedings of the 33rd Canadian Conference of Artificial Intelligence. May 2020.
- K. Khademi & B. Hui. **Towards Understanding the HCI Education Landscape.** In Proceedings of the 20th Koli Calling International Conference on Computing Education. Nov. 2020.
- B. Hui. **Lessons from Teaching HCI for a Diverse Student Population.** In Proceedings of the 20th Koli Calling International Conference on Computing Education. Nov. 2020.

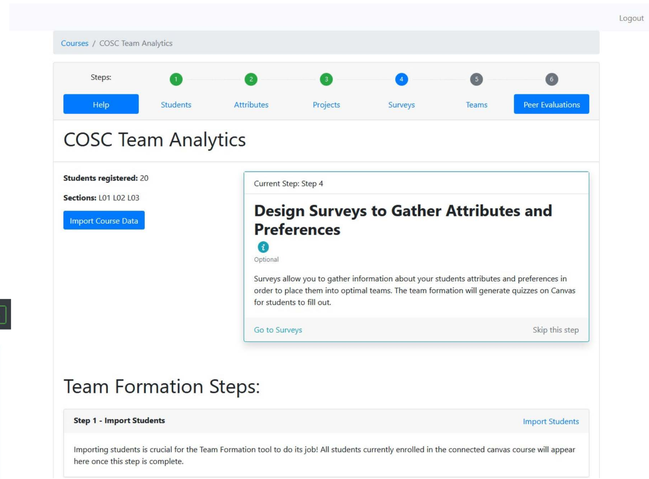


http://whatweteach.herokuapp.com/

Canvas Integrated Team Formation and Analytics Tool

To support team activities, we built a team formation and analytics tool that is fully integrated with the Canvas LMS. The main features include:

- Creating surveys to elicit student information
- Customizing instructor preferences for teams
- Forming teams based on student attributes
- Forming teams based on project needs
- Reviewing teams on the analytics dashboard
- Changing team membership manually
- Monitoring team performance through visual analytics
- Gathering peer evaluation student feedback
- Reconfiguring teams based on student peer evaluations



Acknowledgements

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