On-Demand Student Support with Virtual Labs and Help Desk

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Improving Lab Attendance

Pre-COVID lab attendance in the database courses in computer science was 10 to 40% with lower attendance early in the day.

This results in students not learning the lab material as effectively and considerable wasted computer lab resources and TA time.

COVID Changed Expectations

Students want flexible learning in time and space and will attend lab sessions based on their measure of learning value.

Labs should provide real-time feedback and require limited TA grading. Focus on helping students rather than evaluating.

Technology

Virtual office hours utilize Zoom at regular times as well as on-demand by students.

Labs use virtualization technology (i.e. Docker) to eliminate use of computer hardware and software at UBC.

Labs use auto-marking for programming code with unit tests to eliminate TA marking.

New question types developed for activities such as design and data analysis that improve upon Canvas question types.

Accomplishments

Removed scheduled labs for two courses (COSC 304&404) freeing up 24 hours per week of valuable computer lab time.

Replaced all in-person labs for database courses with virtual labs allowing completion anywhere at students’ convenience.

Reduced overall TA lab hours by 25% by decreasing marking time by 40%. More time spent helping students rather than marking.

Introduced flexible virtual office hours on Zoom for student support on demand.

Developed software for generating new design questions that can be auto-marked and unique for each student.

Student Feedback

67% of students strongly agreed or agreed that virtual labs/help desk was preferable to scheduled, in-person labs.

89% of students strongly agreed or agreed that virtual labs were beneficial.

Virtual lab attendance varied widely with 27% not attending at all and 37% attending most weeks. Students appreciated attending only when they needed help.

Performance on labs and overall course was unchanged (within +/- 3%).

Next Steps

Improve some virtual lab content to answer common questions and add video walkthroughs. Examine new Q+A system.

Integrate auto-marking system with Canvas.

Discuss virtual lab approach with other instructors that can benefit.

Research Publication


Auto-Marking Design Diagrams

Virtual Lab Attendance COSC 304 Fall 2020:

- Every week, 6%
- Almost every week, 11%
- Every 2nd week, 20%
- A Few Times, 36%
- Never, 27%

Virtual Lab Attendance COSC 404 April 2022:

- Every week, 30%
- Every 2nd week, 6%
- 5-10 Times, 15%
- A Few Times, 36%
- Never, 13%

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