

MEMO

To: Lucy Lee, Dean of Science
From: Ian Affleck, Math & Stats Department Head
CC:
Date: 2020-05-21
Re: Program Review 2018 – Update on external panel recommendations

The Department of Mathematics and Statistics underwent a program review in 2018, and the external review panel made 14 recommendations. Below is an itemized summary of our progress towards addressing each of those recommendations, two years later.

1. The department should undergo a review of its pedagogical practices and where necessary revise approaches to teaching and learning to align with contemporary evidence-based, student-centred pedagogy and the institution’s stated goals.

A committee to draft a teaching survey was struck. A draft of this survey was presented to the department in December 2019, and circulated in January 2020. A summary of the responses is forthcoming. The same survey will be used periodically in the future to assess how our approaches to teaching and learning evolve over time.

In March 2020, face-to-face meetings of all UFV classes running in the Winter 2020 semester were suspended due to the threat of COVID-19, and instructors were tasked with developing plans to complete instruction and assessment online. Online delivery of all courses is mandatory in Summer 2019, and this is anticipated to continue for Fall 2020 as well.

As a result, there has been a great deal of communication and collaboration between department members regarding techniques for effective online delivery of course material and support of students. Many of these pedagogical practices, such as sharing of video tutorials and other resources, and live screen sharing of virtual whiteboards, will continue to be used effectively even after face-to-face classes resume.

2. To better support student learning and the implementation of evidence-based, student-centred pedagogy, the department should create detailed learning outcomes for each course.

This recommendation has generally not been implemented, for a few reasons. First, we have some concern that attempting to provide students with an exhaustive list of precise learning outcomes could lead to students expecting that they need to know how to answer only a fixed list of question types. This could lead to pressure on instructors to cater to this expectation, limiting their creativity in designing assessments.

Second, first-year courses at UFV do not have a designated “course coordinator”, as many first-year courses have at some other institutions. Faculty members have agreed on the general learning

outcomes that are included in each course's official course outline, but this agreement does not necessarily extend to an agreement on precise, detailed learning outcomes that most effectively lead to satisfactory completion of the general ones. An attempt to create a shared list of detailed learning outcomes for any course, accepted by all department members who have taught the course, or may do so in the future, would be challenging at best, perhaps impossible.

That said, some instructors have recently assembled detailed lists of learning outcomes for certain courses, to share with their own students.

3. Monitor data that are accessible on MATH/STAT 1xx courses with the aims of measuring student engagement and identifying what measures, if any, can predict non-completion.

This recommendation has not been implemented broadly across all first-year Math and Stats courses, although some instructors make use of class surveys to monitor student engagement.

Most first-year courses in Math and Stats use online homework systems to motivate students to complete practice problem sets. It is widely accepted that students who can and do complete these assessments on time are generally much more likely to successfully complete the course than are those who neglect them. One advantage of online homework systems is that an assignment that assesses the learning outcomes of one class meeting can be due before the next meeting, helping to ensure that engaged students are prepared to build upon those learning outcomes at the next meeting. Another advantage is that instructors can very quickly find out which students have been keeping up with the material, and which ones could use more encouragement to do so.

One instructor received a research release and hired a work-study student, to conduct a project comparing STAT104 students who use online homework with STAT104 students who use traditional homework, in terms of performance, attitude towards statistics, and study habits. The results of this project will help us determine whether written homework or online homework is more effective in predicting student success.

4. The Data Analysis Certificate should be continued to be supported, though ways to increase enrolment and to improve the attractiveness of the courses should be explored.

The DAC has been well supported by the Faculty of Science, the Faculty of Professional Studies, and the University overall. Our department has had two full-time Statistics instructor positions approved for posting in the past two years. One of these resulted in a full-time hire, which began in Fall 2019, and the other led to a completed selection process, but the offer of employment to the recommended candidate has been deferred by one year (until Spring 2021) due to budgetary uncertainty resulting from the COVID-19 pandemic.

It has been more challenging than was initially anticipated to connect DAC Co-op students with Summer Co-op job placements. The Faculty of Science has been very supportive in helping to arrange and fund Co-op positions at UFV, as research students and assistants in the Math & Stats Centres. Meanwhile, a new course has been developed (STAT 307), which will better prepare DAC students for industry positions by providing them with data visualization skills using Tableau software. STAT 307 will be offered each Winter semester, beginning in 2021.

5. The department is encouraged to liaise with other departments at UFV to explore possible collaborations and synergies.

Beginning in Fall 2018, our department has been working with the Indigenous Affairs Office, faculty in the Teacher Education Program, and the Teaching and Learning Centre to organize and host the first

and second Fraser Valley Math Education Sq'ep conferences – held in February 2019 and February 2020. We have also discussed the possibility of developing a Math Education minor with instructors in the Teacher Education Program.

Meanwhile, Statistics faculty members have connected with staff in the Athletics regarding statistical analysis of team and athletic performance, with an instructor in Trades regarding the development of a Statistics for Electronics course for students in the [Automation & Robotics program](#), and with an instructor in Kinesiology regarding statistical consulting for a project completed by student in their Honours program.

6. Faculty in the department should attempt to raise their visibility outside of the university by, for example, further involvement with professional bodies, conferences, and other institutions.

Several department members took leadership roles in organizing and hosting the first and second annual Fraser Valley Math Education Sq'ep conferences, which attracted roughly 60 and 90 attendees respectively, from elementary, secondary, and post-secondary institutions throughout the Lower Mainland and the Fraser Valley.

One faculty member from our department ran a section of MATH 105 for students of the Nuxalk Nation in Bella Coola, in Fall 2018.

One faculty member from our department took on the role of Chair of the BC Committee on the Undergraduate Program in Mathematics and Statistics, and another has recently joined that committee as the Statistics representative from UFV.

In 2019, our department began sponsoring two annual awards (one in Math, one in Stats) at the Fraser Valley Regional Science Fair.

In May 2019, one faculty member from our department attended the MacMillan Teaching & Learning event and the 9th Indigenous Math K-12 Symposium at UBC.

7. Where possible, the department should seek professional and external accreditation for its courses and programs.

One faculty member from our department has reviewed our Statistics courses to determine which are appropriate for advancement toward actuarial accreditation.

8. Revisions to minor programs should be considered with a view to reducing the lower level requirements.

The Math minor for BSc students and the Math minor for BA and BIS students were merged into one single Math minor program in 2020, and the lower level requirements of each were reduced in the process. The Department of Computer Information Systems has indicated that it will discontinue the Math minor for BCIS students, and encourage those students seeking a Math credential to pursue the new Math minor instead. This will result in a reduction of lower level requirements for those students as well.

The department plans to propose changes to the Math minor (Stats Option) program, including changing its name to Statistics minor. We are still discussing if and how the lower level requirements for this program should be updated.

9. The department should be supported in its work in staffing the Math and Stats Centres; the staffing of these centres should be reviewed by the department within the general framework of supporting students on MATH/STAT courses at the university.

Budgetary support from the Faculty of Science for the Math and Stats Centre has continued, with an increase in the budgeted amount for the hiring of student monitors.

We still hope to find a way to hire a part-time Math and Stats Centre Statistics Coordinator. Until that is possible, we are fortunate to have 2.5 sections worth of annual funding for Statistics faculty or sessional instructors to work in the Centres, 1.5 sections of annual funding for Math faculty or sessional instructors, along with funding for 10-12 80-minute blocks per week of work by student monitors. 10-15 80-minute blocks per week of work are volunteered by faculty members and sessional instructors.

While the Centres have been closed since March 16, 2020, due to the COVID-19 threat, support for students has continued online, via online platforms set up by the Math and Stats Centre Coordinator.

10. The department should expand and refine its use of technology in its teaching, where possible making use of resources that come at little or no cost to students

Beginning in Fall 2019, MATH 265 began including LaTeX proficiency as a learning outcome. (LaTeX is a free, open source scientific document preparation system.)

STAT 307 is a new course, to run for the first time in Winter 2021, which will teach proficiency with Tableau data visualization software.

Many more expansions and refinements of our use of technology in teaching are underway at present, as instructors experiment with and share ideas about effective methods and platforms for online instruction and assessment. Because the use of technology in teaching is now *mandatory*, at least until the end of 2020, and is thus part of every student's learning environment, we are all looking for resources that not only come at little or no cost to the students, but also are easy for students to acquire and become familiar with, and are effective for multiple courses.

11. The university should continue to provide teaching spaces that are conducive to student-centred learning, and be responsive to requests from the department relating to inexpensive modifications to rooms and their fittings

In Fall 2019 and Winter 2020, several instructors in our department took advantage of the opportunity to schedule their classes in a pod-style classroom in the new K Building.

The Faculty of Science has been responsive to our requests for capital purchases of resources that improve effectiveness of classroom instruction, such as whiteboards, computers, 3D printers, and other non-consumable teaching supplies.

12. The university should explore ways in which the faculty in the department can be accommodated in offices that are in closer proximity than at present.

No office locations have changed in the past two years. While renovations are done on D Building in the coming year, it may be possible to accommodate some office changes that bring our department's offices closer together.

13. The department should explore consulting and collaborative research opportunities, both within the university and beyond.

There have been a significant number of research and consulting opportunities in the past two years. Department members have worked with the following parties:

- Viking Aviation, regarding an optimization problem;
- A resident physician at UBC, who was looking for some statistical analysis;
- A newspaper reporter, who was seeking a statistician's viewpoint;
- A faculty member in Electronics, who is seeking to build a Statistics for Electricians course;
- A staff member in Athletics, who is looking for statistical expertise on sports data analytics for UFV teams and athletes;
- Employees of the BC Cancer Agency at Abbotsford Regional Hospital, looking for some help with data analysis;
- A faculty member in Kinesiology, who was seeking statistical advice for a student completing an Honours project.

14. Faculty in the department should be encouraged to achieve their career goals and progress through the academic ranks.

We expect two faculty members to apply for Associate Professor status in the 2020/2021 academic year. So far, no faculty members have applied for Professor status.