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MEMORANDUM

ATTENTION	Senate	**DATE**	September 19, 2024
FROM	Dilson Rassier, Provost and Vice-President Academic, and Chair, SCUP	**PAGES**	1/14
RE:	External Review Mid-Cycle Report for the School of Computing Science (SCUP 24-40)		

At its meeting on September 11, 2024, SCUP reviewed the External Review Mid-Cycle Report for the School of Computing Science that resulted from its 2020 External Review.

The following documents are attached for the information of Senate:

- Update on the Action Plan
- Assessment of Educational Goals
- SCUTL's feedback on the assessment of Educational Goals

C: Oliver Schulte, Director, School of Computing Science
Rob Cameron, Former Director, School of Computing Science

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MEMORANDUM

ATTENTION Dilson Rassier, Chair, SCUP
DATE August 14, 2024
FROM Peter Hall, Vice-Provost and Associate Vice-President, Academic
PAGES
RE: External Review Mid-Cycle Report for the School of Computing Science

The External Review of the School of Computing Science was undertaken in March 2020. As per the Senate guidelines, the unit is required to submit a mid-cycle report describing its progress in implementing the external review action plan and the assessment of its educational goals. The action plan update has been reviewed by the faculty dean. The Senate Committee on University Teaching and Learning (SCUTL) has provided constructive feedback to the unit on the assessment of its educational goals. The recommendations from SCUTL will be incorporated into the unit's self-study report for the next external review.

The following documents are attached for the information of SCUP:

- Action Plan Update
- Assessment of Educational Goals
- SCUTL's Feedback on the Assessment of Educational Goals

c: Rob Cameron, Director, School of Computing Science
Eugene Fiume, Dean, Faculty of Applied Sciences

FACULTY OF APPLIED SCIENCES
School of Computing Science

MEMORANDUM

ATTENTION	Peter Hall, Vice-Provost and Associate Vice-President, Academic	**DATE**	July 2, 2024
FROM	Robert Cameron, Director, School of Computing Science		
RE:	CMPT External Review Mid-Cycle Report		

Please find attached the completed Mid-Cycle Report for the School of Computing Science.

Robert Cameron
Professor and Director
School of Computing Science
/enclosures

External Review Mid-Cycle Report for the School of Computing Science

Action	Progress Made
1. Programming **1.1 Action to be taken**	
1.1.1 Undergraduate Program	
• *Reduce Degree Completion Time*: – The current average completion time is 17.3 terms (~5.77 years) for the Computer Science (CS) major, which is too high even if most students do 1—3 terms of co-op. The main bottlenecks are course availability, lab space, and limited TA budget. – We plan to offer more sections of the required courses of our major programs. – We plan to introduce more elective courses, especially 3rd and 4th year courses to give students more options. – We have recently developed a 2-year teaching plan and made it available online so that students can plan the completion of their programs on time. We will continue analyzing and updating this plan to help students.	• The average completion time for students admitted from secondary school has been reduced slightly to 17.2 terms in 2022/23 as a result of increased seats, more elective options and planning documents made available to students. • However, for direct admits to computing science, the average completion time has reduced from 16.9 in 2019/20 to 16.3 in 2022/23. Counterbalancing this, for students admitted by internal transfer the average completion time has increased to 18.9 in 2022/23. • Considering registered semesters rather than elapsed semesters may be a better measure. On this measure, we see a reduction from 15.5 terms in 2019/20 to 15.1 terms in 2022/23. For direct admits, the average number of registered terms is now down to 14.5. • Data taken from Undergraduate Retention and Performance portal of IRP.
• *Update and Align Curricula of Various Programs:* – Two main programs are offered in the School: CS and Software Systems (SoSy) majors. SoSy is offered at Surrey. There were several complexities of the SoSy program that did not allow many CS students to take some of its core courses. – We have recently revised the SoSy curriculum and streamlined it with the CS curriculum, which will improve the efficiency of course offerings across the Burnaby and	• Substantial improvements have been made to align curriculum of the SoSy and CS majors. In particular, CS majors are now able to more easily access SoSy upper division courses. • Several initiatives have been taken to improve the lower division curriculum, including streamlining the programming sequence to eliminate CMPT 127, building on core discrete mathematics (MACM 101), with a new course CMPT 210 Probabilty and Computing (replaces MACM 201), negotiating with the Statistics department to introduce STAT 271 Probability and Statistics for Computing Science (building on CMPT 210), and introducing a new

Surrey campuses, which will also help in reducing the degree completion time. – We plan to update various aspects of the CS major, including its first-year programming and mathematics courses.	systems programming course CMPT 201, as better preparation for upper division courses in operating systems, distributed computing and so on.
• *Enhance Student's Experience:* – We plan to improve the TA support provided to our students, by for example adding tutorials to lower-division courses and reducing the number of students managed by each TA. We also plan to revise the process for selecting and evaluating TAs. – We plan to increase and improve the academic advising services provided to our students. – We plan to increase the engagement with the undergraduate students and their representatives through periodic meetings.	• We have substantially increased TA support for our courses, increasing TA base units from 1032 in 2018/19 to 1594 in 2022/23. This is a 56% increase compared to a 15% increase in AFTE enrolment over the same period. • We have instituted TA awards to encourage excellence among our TAs. • Academic advising issues is an area of ongoing work (see below).
• *Academic Advisers Moved back to the School:* – The academic advisers were moved from the School to the Faculty several years ago. As reported by the external reviewers and frequently mentioned by our students, this has created inefficiency and lack of attention to CS students' needs. – We propose to work with the Dean's office to move the academic advisers to the School to better serve our students.	• One specialist advisor for the dual degree program was brought back into the School. • Working with the Dean's office to improve communications with the FAS student advisors is an area of ongoing work.
1.1.2 Graduate Program	
• *Recruit More and Stronger PhD Students:* – We plan to provide more and larger entrance scholarships to attract better and diverse students. – We plan to promote the PhD-Direct entry path for exceptional undergraduate students.	• Through improved funding support and other measures, we have increased the number of PhD students from 108 in 2018/2019 to 148 in 2022/23.

– We plan to promote our Accelerated BSc/MSc program to recruit more domestic students into our graduate programs.	• The accelerated BSc/MSc program is still a work in progress; we are looking at options for accelerated options with partner schools.
• *Improve Graduate Student's Experience:* – We plan to increase the financial support for graduate students, by for example allowing PhD students to augment their RA salary with partial TA and providing a salary ladder for PhD students as they progress through their program. – We plan to design and offer more core graduate courses to strengthen our PhD and MSc programs. – We plan to organize more social events for graduate students and engage in periodic discussions with their representatives.	• In 2021, the funding promise for PhD students was increased from $22K per year for 4 years to $24K per year for 4 years. We are presently considering a further increase in guaranteed support (on top of the recent PhD Research Scholarship provided by SFU). • We have substantially updated the graduate curriculum with over a dozen new courses to strength our offerings. • Social events for grad students were put on hold during the pandemic period, but we now have several research groups organizing such events.
• *Improve the Quality of the Professional Master's Program (PMP):* – Currently, we offer two concentrations in the PMP: Big Data and Visual Computing. A third concentration on Cybersecurity will start in Fall 2020. This premium program has grown from an intake of 13 students per year in 2014 to more than 130 in 2019. – We plan to develop a unified model for all PMP concentrations to efficiently support its growth and improve its quality. This model will aggregate essential skills and foundations in a few required courses for all concentrations. The domain-specific knowledge for each concentration will be emphasized in two 6-credit lab courses and elective courses. – We also plan to improve the students experience by providing more and better advising and co-op services.	• The Cybersecurity program has been developed and is now in regular operation. • We now have a unified model for all three programs with each program having its separate 18-credit core (first two semester), followed by a co-op semester and then a final semester of elective courses. • We are continuing to work on improving program administration. • We have made considerable progress in improving the Co-op experience for professional Master's students, working the Computing Science co-op team of central Co-op.

• *Better Co-op Support for all Students (PMP and Undergraduates):* – We propose to work with SFU Administration and FAS to create a consolidated co-op team dedicated to serve all CS programs, including PMP and undergraduate programs. This will provide efficiency and flexibility in allocating co-op resources, since various programs have different periods of peak demand for their services.	
2. Research **2.1 Action to be taken**	
• *Form a Research Award and Advancement Committee in the School:* – The Committee will consist of senior members of the School who are well-connected and have received significant awards in the past. The mandates of the Committee: a) to promote our faculty members in competitions for national and international awards and recognitions, and b) to develop plans for advancement opportunities and initiatives to improve external recognition of the School, e.g., by organizing CS-sponsored events and by attracting prominent scholars to visit SFU.	• The School has established a research awards subcommittee that has been successful in promoting several faculty members for well-deserved external recognition. • The School now regularly organizes a Distinguished Speakers lecture series to attract prominent scholars to SFU. • A new initiative currently being planned is a Rising Stars lecture series to bring in junior people in various hot research areas.
• *Increase the Number of Chaired Professors in the School:* – Chaired professors will improve the quality and visibility of the research conducted in the School, as well as address the faculty retention challenge.	• The School has made considerable progress in the development of chaired professorships. • The School now has several externally-supported Chaired Professors – 3 CRC chairs (one tier 1 and two tier 2) – 2 CIFAR AI chairs – 2 SFU Distinguished Professors

	• Endowments have now allowed us to establish several internal chaired professorships. – 1 Ebco Eppich Chair – 4 Visual Computing Chairs – 2 Rajan Family Scholars
• *Establish an SFU AI Institute:* – The School and SFU in general have substantial experience in various aspects of AI. Consolidating all such experience in a university-wide AI Institute will improve the recognition of SFU researchers, help in recruiting top talents (faculty and students), and create more opportunities to attract major research funding to SFU.	• Working with colleagues in other units, the School of Computing Science has established VINCI, the Visual and Interactive Computing Institute at SFU in 2022. Although not the original focus of an AI institute in the action plan, we believe that VINCI fulfills many of the same objectives.
3. Administration **3.1 Action to be taken**	
• *Restore the Autonomy of the School:* – In the last two years, the School has become very dependent on the Faculty for many of its operational details. This occurred mostly because of the new (centralized) budget model introduced in the Faculty, in which budgeted items are given to the School, with very limited flexibility. The School lost control over important items such as the salary recovery of faculty on leave, which is substantial in our case. The School also was given much smaller amounts for TA and IT support than it needs. The School had to go to the Dean's office for basic operations such as hiring temporary staff and buying IT equipment to implement its well-established cycle of renewing the infrastructure of its teaching labs. This has created long delays and frustration in the	• Progress has been made with the Dean's office in making more discretionary funds available. • TA base units have increased substantially over 2018/2019. • Working on budget revenue and expenditure models is an ongoing area of work.

School. This serious issue has been emphasized by the external reviewers.	
• *Improve IT and Admin Support:* – The external reviewers commented on the very weak admin and IT support in the School. While the situation has improved since the site visit of the external reviewers, much needs to be done to bring the admin and IT support in the School close to its peer Canadian schools.	• A new program coordinator position for DDP/MPCS has been created in the School, as well as a financial assistant position for the Surrey campus. • Other administration needs are being supported by temporary staffing. • Addressing IT needs are an area for further work.
4. Working Environment **4.1 Action to be taken**	
– The School has a good and collegial working environment. – The only major concern is the high workload on faculty and staff, because of the substantial demands for our programs and the large number of students we teach. Allocating the resources requested in other sections of this report will address this important issue.	• The School has recently updated its School Constitution and is making an effort to ensure that collegial governance is maintained through the mechanisms established therein. • Issues of high workload persist, with continued high demand for our programs.

Computing Science Director's Signature

Date

__July 2, 2024_____

Dean's Comments on the Mid-Cycle Report

The School of Computing Science continues to be a beacon of excellence at SFU. This mid-cycle report indicates that considerable progress has been made by the school in addressing the recommendations of the review team.

I have heard and understand the school's argument for greater autonomy and increased concentration of resources within the school. As always, a balance must be struck between facilitating the worthy ambitions of the school and providing equitable services and opportunities to the other three schools in FAS. That said, the success of the school's professional master's programmes has formed the basis for increased discretionary revenue, in addition to covering some of its operating expenses. Likewise, greater domain expertise is being applied to areas such as the co-op experience and research facilitation.

Reducing time-to-completion within undergraduate programmes in CS remains a concern, although we have been seeing some improvement over the past three years. As with other challenges in CS, such as the overall student experience and the participation rate of women, the size of the operation in CS can make large scale changes difficult to implement.

I note that the review team recommended four years ago that as an institution we consider bringing together the spectrum of AI expertise across the university. I will be working on this with my colleagues in FAS and beyond.

Overall, the mid-cycle report for the School of Computing Science reflects excellent progress.

Dean's Signature

Date

28 June 2024

SFU OFFICE OF THE VICE-PROVOST, LEARNING & TEACHING

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MEMORANDUM

ATTENTION: School of Computing Science; SCUP; Senate
FROM: Paul Kingsbury, Special Advisor to the Associate Vice-President, Learning and Teaching and Alice Campbell, Senior Consultant, Program Assessment, Learning Experiences Assessment and Planning
RE: School of Computing Science Action Plan for Educational Goals associated with 2023/24 Mid-cycle Assessment Report
DATE: July 29, 2024

The School of Computing Science (CMPT) has recently submitted its mid-cycle Educational Goals (EG) assessment report, which is outlined below and for SCUTL's information.

We appreciate the School's thoughtful approach to developing this report and plan. There are many commendable elements to this work, including the combination of direct and indirect assessment, and plans to tie this work to a review of the core undergraduate curriculum.

The School's EGs as written in the assessment plan are sparse, and don't specify what students will learn in their CMPT program. We note that the School's EGs, as published here (https://www.cs.sfu.ca/~bbart/LO/pub/LOs.html) offer rich detail as to the specific skills and practices that the School hopes students will have attained by the end of their programs. We appreciate that many of these are integrative in nature, combining both granular technical details and a description of how a skillful graduate approaches their work (e.g. knowing that the selecting a solution for a problem is "not a purely technical activity" as it can have real-life effects).

If these are not yet publicly available to students, we recommend publishing these on the School's website so that current and prospective students have a clear picture of what they can expect to gain through their CMPT program of study.

It is promising that you are surveying students to elicit their perceptions of your programs. As you are experiencing a low response rate to the exit survey (this is not uncommon), it may be worthwhile either considering either different survey timing, or how students can be incentivized to participate. Students often have good ideas as to what incentives may be of interest. While surveys offer breadth, a different methodology (focus groups, interviews) may

provide greater depth, and may be useful if you want to know the experiences of particular groups of students. If that is of interest, the Learning Experiences Assessment & Planning (LEAP) team has capacity to do the data collection and analysis.

We strongly appreciate that, should you revise the core curriculum, you will look at how it impacts student performance. In your planned assessment work, it is great that you are considering leveraging Crowdmark, in concert with mapping exam questions to Educational Goals, to collect evidence of student attainment of the EGs. As the volume of data could quickly become overwhelming, we recommend focusing on required courses.

We note that many of your goals are integrative in nature, with one specifically about project experience. In addition to exam questions which offer important granular data, we recommend also looking at projects where students demonstrate these goals, perhaps in senior level or capstone courses, if you have them. A single set of senior level projects could potentially illuminate student attainment of several of these goals (e.g. software development (if applicable), project experience, problem solving skills, communication and organizational skills).

Staff in the AVPLT portfolio are well equipped to support you in this work and want to help ensure it is meaningful and manageable for the School. The LEAP team supports program and Educational Goals assessment. Their supports include assessment design, quantitative and qualitative data collection and analysis, and support with data interpretation. The Centre for Educational Excellence can help with program revisions and course design.

Once again, we appreciate your attention to your Educational Goals work; we hope that you will find our comments and suggestions both encouraging and helpful.

Computing Science Mid-Cycle Assessment Plan Report

Educational Goals

The 2019 assessment of educational goals identified ten core program goals for the CS Major. Additional goals were identified for the Software Systems and dual Degree programs.

- Technical understanding of computer science
- Problem solving skills
- Software development skills
- Mathematics: theory and practice
- Project experience
- Commitment to professional responsibility
- Professional conduct
- Communication and organizational skills
- Awareness of the broad applicability of computing
- Commitment to life-long learning

Additional Software Systems goals

- Software development methodologies
- Computer systems
- Project experience

Additional Dual Degree program goals

- Multicultural/multilingual experience
- Personal growth
- Global leadership

Numerous assessment tools were identified as relating to these program goals. The majority of these are typical course assessments, primarily assignments, projects, labs, in-class activities, and exams. Additionally, exit surveys were listed as a qualitative assessment tool for program level goals.

Course Assessment and Educational Goals

To date, course assessment has not been analyzed to assess whether specific assessment goals are being met. Typically, courses are assessed only on their grade distributions which are compared to the grade distributions of other course sections. However, many instructors are using Crowdmark to mark final exams. This would allow the school to analyze the marks for individual exam questions which could be tied to educational goals.

Exit Surveys and Program Level Goals

CS started performing exit surveys of graduating students in Summer 2022. The surveys asked ten questions.

1. What program were you in?
2. How many years did you take to complete your program?
3. Where did you come from before completing your program at SFU?

4. How satisfied were you with the program overall?
5. What are the strengths of the program? Select any from a list of seven options (Course content, instructors, networking opportunities, financial aid, career opportunities, quantity of available courses and other).
6. How many co-op semesters did you complete during the program?
7. Where are you going next?
8. Which course(s) did you find most useful when looking for co-op or during job interviews?
9. What part of the Computing Science degree needs to be improved? This question was open-ended rather than asking students to select from a pre-determined set of options.
10. Which instructor(s) had the most positive impact on your learning or student experience?

These questions are not specifically aligned to the educational goals, although questions five and nine are related, and provided some interesting data. On average, twelve students replied to each survey, so the response rate is relatively low.

Next Steps

A review of the core undergraduate curriculum is being considered. If this goes ahead, assessing whether the new curriculum is improving student performance is an important part of the process. Student performance can be broken down and analyzed in terms of the educational goals.

In addition, the School should consider collecting and analyzing Crowdmark data and encouraging instructors to tie exam questions to specific goals.

Going forward, exit surveys can be amended to include questions specifically related to the measurement of program goals.