CONCERNS OF SAMPLE-BASED MARKING IN CANADIAN
COMPUTER SCIENCE

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Sample-Based Marking in Computer Science Courses

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This article summarizes an open letter I sent on September 2, 2023, to the Head of the Department of Computer Science at The University of Regina, Dr. Orland Hoeber. The full letter is posted at: https://dr-page.pagewizardgames.com/Letter_URegina_CS_Dept_on_Grading_2023.pdf

In September 2023, I wrote an open letter as a former faculty member of the Department of Computer Science at The University of Regina (2021-2022) expressing my concern about a decline in academic standards in teaching. I addressed my letter to Dr. Orland Hoeber, the Head of the department. My letter is posted at *https://drpage.pagewizardgames.com/Letter_URegina_CS_Dept_on_Grading_2023.pdf*

Despite my short time with the institution, I had been entrusted with the role of course architect for CS 210, a data structures course integral to the Computer Science undergraduate program. I was well-liked by students, delivering high-quality courses online. Students to this date continue to reach out to me for guidance often share my educational materials with each other.

I wrote my letter after receiving an e-mail communication sent on August 30, 2023 to all Computer Science students and faculty at The University of Regina. Below is the main part of the message:

> *"As the demand for computer science education has grown in the last few years, the size of our student body has expanded to nearly 1000 CS majors. This has resulted in the need for increased class sizes.*

> *"With large classes come large amount of marking that needs to be done in a short period of time. In an effort to provide timely feedback on student work, some of our courses will be moving to a sample-based marking approach. You will still be expected to complete all elements of any assignments provided. However, the course instructor will choose a subset of the elements to be marked. Which elements that are marked will only be revealed after the marking is complete. In order to help you assess how you have done on other unmarked elements of the assignment, either complete solutions will be provided or the assignment solution will be reviewed (either in-class or in supplemental instruction sessions). As always, if you have questions about the difference between your solution and the one expected, you are welcome to attend the office hours of the course instructor.*

> *"If sample-based marking is to be used, this will be made clear in the assignment instructions. You will also find further information in the course syllabus."*

Sample-based grading, I fear, will both lower academic standards and compromise academic freedom.

Presently, Computer Science is a popular academic field, so trade-offs exist between the administration and faculty with regard to how courses are offered. As many post-secondary institutions now serve objectives different than primarily academic goals, my worry is that faculty may be overburdened or pressured to lower the standards of their courses; or, perhaps as resources grow scarce, the courses themselves will be delivered in an inadequate manner. In addition, the pressure to increase class sizes and messages communicated in this manner may suggest to faculty, especially those who

are inexperienced, that sample-based assessment may be just as effective as assessing the whole of a student's assigned work.

Computer Science courses assess students based on what is explored in lectures and labs. Almost always a student is assigned a final grade that is believed to reflect the whole of a student's performance in a term. As I outlined in my letter:

"A fundamental flaw of 'sample-based' grading is that it cannot provide feedback on the whole of an assignment submitted by a student. Ultimately, if the goal of an assignment is to assess the work of a student as a whole and to assign a grade to said work, picking and choosing parts of the assignment may make it difficult to holistically assess the performance of a student. Assessments of work should have clear expectations of what exactly is assigned a grade and what is not prior to submitting work. It may as well be that the parts that are not assessed can be omitted if they are not a part of the overall work/assessment of a student in the context of an assignment."

One major concern about sample-based grading is whether standards will remain as high as in previous offerings. Another concern is unclear outcomes for students prior to submission of work. As I discussed:

"The reason given for moving to this grading approach seems to be increased class sizes, implying that students would have received grades and feedback on ungraded parts of assignments in other, more regular circumstances. This means students are not receiving the same quality of assessment for their education as previous students did."

I believe sample-based grading is flawed. An easier-to-implement, alternative method could be employed to address larger student counts:

"1. Foster independent study with additional exercise sets and readings for students to practise outside of the typical assignment framework. Assignments typically are meant to assess a student's understanding of material. Assigning, for instance, an exercise set that students can work on outside of assignments places

clear distinctions/boundaries and expectations (mutually) around what will be or not be graded as part of course marks.

2. Create fewer (larger) but more substantive assignments that can be entirely graded.

3. Hire qualified sessional instructors and/or faculty with university teaching experience, capable of teaching and successfully executing large classes/sections."

Another possibility, should resources be too limited to deliver a course in a competent manner, is to simply not offer a course.

Finally, when a Department Head's directive is sent to a whole Department, it may suggest that instructors are expected to fall in line.

"Ultimately, the academic freedom for faculty/instructors to choose the best way to assess their students is one that such a method could fall under for use; however, potentially flawed, unproven, and unconventional methods of assessments such as 'sampling' like this may have undesirable effects. When communicated to the students at large, while transparent and clear, it may create a compulsion among faculty or sessional staff to go along with that particular assessment technique. This may come into conflict with the academic freedom of the instructor."

In the last few years much experimentation has occurred in course delivery at institutions. I caution Computer Science Departments to maintain high-quality academic standards in their attempts to deal with new problems., They should not lower generally agreed-upon assessment standards. Students should be assured that when they explore topics and receive feedback during their studies, they are being held to the same high standards as the students before them.

Despite being positively received by Computer Science students and alumni, my letter has received neither a response nor acknowledgement of receipt.

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