

Examining Students' Concerns Related to Online Delivery of an Introductory Computer Programming Course

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Abstract—Many institutions are offering online courses, as part of their regular schedule, to provide more flexible course offerings to students with the hope of some cost savings in the end. In this paper, we will focus on examining some of the students' ratings and comments that have been reported in student rating of teaching effectiveness (SRTE) surveys, for an online introductory programming course, during the past five years. We will look at the issues that we have identified to play a role in the SRTE surveys of our online course and examine the teaching from several different perspectives that include effectiveness/appropriateness of online courses for students. The paper includes a set of specific and general recommendations to address the legitimate students' concerns that, we believe, would make the course delivery more effective and enjoyable for students.

Keywords—online delivery; Student evaluation of teaching; hybrid delivery

I. INTRODUCTION

We are at a point that online and hybrid course offerings for undergraduates are quickly becoming an integrated and regular part of engineering departments' course offerings. They provide added flexibility in course scheduling for students and, perhaps, some cost savings in the end for the institutions. We are also witnessing that a growing number of institutions are moving toward offering complete online undergraduate degrees and a degree in computer science is on the top of their list [1]-[3].

Student rating of teaching effectiveness (SRTE) surveys are collected for a range of purposes, most notably: as diagnostic feedback to improve the quality of teaching and learning; as an input to hiring, promotion, or tenure decisions related to teaching effectiveness; to provide information to prospective students in their selection of courses and programs; and as a source of data for research on teaching. [4] notes that much of the published research on SRTE relates to traditional classroom settings, and in an analysis of qualitative SRTE data (open-ended student written comments). It also indicates a significant difference between the responses of students completing a wholly online version of a course compared to students completing an on-campus version of the same course; online students gave a more negative rating. [5] notes the lack of research on the use of SRTE to evaluate online teaching, provides a study indicating significantly lower SRTE ratings

for online classes compared to on-campus classes, and calls for additional research in this area.

In this paper, based on our experience that started with hybrid delivery and ultimately extended to a full online offering, we will focus on addressing some of the students' comments that have been reported in SRTE surveys, for an online introductory programming course, during the past five years. We will look at the issue of online teaching from several different perspectives that include effectiveness/appropriateness of online courses for students; examining "internal factors" such as the design of the online course; and examining "external factors" such as students' prior experience with online courses and students' academic performance, by looking at class grade point average (GPA); among others. The paper includes a set of specific and general recommendations to address the legitimate students' concerns that, we believe, would make the course delivery more effective and enjoyable for students. Given the nature of online course offerings, recommendations are mostly focused on actions that need to be initiated prior to the start of the course. Identifying potentially "at risk" students and providing a "more engaged" pathway with the instructor plays an important role in our recommendations.

II. STUDENT RATING OF TEACHING EFFECTIVENESS (SRTE)

There is no shortage of research on the subject of student rating of teaching effectiveness or student evaluation of teaching (SET). A casual search of the ERIC database (institute of education sciences) for "student evaluation of teaching performance" reveals over 79,000 citations related to higher education ([6] in 2003 found over 5,000). Not surprisingly, colleges and universities differ in their approaches to the student evaluation of teaching in distance education courses. In his study of institutions offering telecourses, [7] found that institutions consider evaluation of teaching important and that many had mechanisms in place for conducting evaluations; however, methods and success varied among institutions. Some experts suggest that we should view the Internet merely as a different delivery method. The teaching behaviors and strategies required for effective online teaching are not the same as those required for face-to-face (FTF) teaching. Unfortunately, in the race to put classes online to meet rapidly increasing demand, some institutions failed to consider these differences in the SRTE system. [8] suggested that many

institutions might use the same or slightly modified versions of instruments developed for FTF classes, instead of developing and validating separate SRTE instruments for online classes. Using evaluation forms designed for on-campus classes to evaluate online classes gives rise to the concern that online teaching may affect faculty negatively in terms of administrative decisions. Some institutions report that SRTE ratings for online classes are significantly lower than the ratings given in on-campus classes [5]. Our data, which are included in this paper, supports this finding. [8] contends that the criteria measured by traditional student evaluation forms are not the cause of the observed difference in scores. The authors suggest that the same general criteria for effective teaching apply equally to online and on-campus classes. However, the faculty behaviors and characteristics that students consider when assigning a rating and the relative importance of each criterion may differ significantly between online and on-campus classes. Thus, it is important for online faculty to understand how online students might interpret and assess the major criteria for effective teaching. Our data does not fully support this claim and suggests that the SRTE question set may play a bigger role than has been reported.

III. OUR SAMPLE DATA

As it was mentioned, our full online delivery of an introductory computer science course started from a hybrid format and ultimately extended to a full online offering. The following data sets reflect this process. Each set follows with related comments and observations, which are the bases for our recommendations. SRTE scale is from 1 (lowest) – 7 (highest).

A. Fall 2011 – Hybrid Delivery

SRTE Questions	Rating
Rate the overall quality of this course	1.86
Rate the overall quality of the instructor.	3.14
Rate the clarity of the instructor's presentations.	2.71
Rate the instructor's willingness to help students make progress.	3.71
Rate the instructor's skill in using class time effectively.	3.42
Rate the effectiveness of the instructor in stimulating your thinking.	3.00

Sample Negative Comments:

The class should not be taught online.
Don't offer online programming course
Number of responses: 7; Class size: 8

This was the first time we offered a hybrid programming-course and students were not properly prepared for the delivery and the course lacked the ideal structure. The class GPA was around 2.8. Students taking this course needed a lot more hand-holding and the course delivery did provide that. The SRTE question set was the same as a regular FTF course. We believe these played a significant role in the low ratings that were received.

B. Fall 2012 – Online Delivery

SRTE Questions	Rating
Rate the overall quality of this course	3.2; 6.33
Rate the overall quality of the instructor.	3.4; 6.67
Rate the clarity of the syllabus in stating course objectives, course outline, and criteria for grades	5.0; 6.0
Rate the organization of the course in terms of its logical arrangement of material and activities.	2.8; 6.67
Rate the organization of course material.	3.2; 6.00
Rate the instructor's willingness to help students make progress.	5.2; 6.33

Sample of General Comments:

Have tutor sessions for this class and homework/project help
I wish there were more example problems and solutions posted

Sample of Negative Comments:

That it was online, also how we had something due everyday.
Also how we never knew our grades they took a while to be posted.

Sample of Positive Comments:

It was good.
We had an online forum for questions that I used a lot

Number of responses: 5/7 and 3/4; Class size: 11

The course included two groups of students from different locations. The higher rating (the second numbers in each cell) reflects students with GPA > 3.0 and the lower rating from students with overall GPA around 2.8. The higher ratings were from students who connected remotely and expected a full online course. The local students (lower ratings) were not adequately prepared for the online experience. Course structure was modified from the previous offerings. We included online problem solving sessions. SRTE question set included questions related to the course structure but it was still derived from a FTF course question set.

C. Summer 2013 – Online Delivery

SRTE Questions	Rating
Rate the overall quality of this course	5.43
Rate the overall quality of the instructor.	5.71
Rate the clarity of the syllabus in stating course objectives, course outline, and criteria for grades	5.86
Rate the organization of the course in terms of its logical arrangement of material and activities.	6
Rate the effectiveness of homework and out-of-class assignments as contributing to the learning process	5.86
Rate the organization of course material.	5.86
Rate the effectiveness of the instructor's explanations of what students were expected to	6.14

learn.	
Rate the effectiveness of the instructor's responses to student questions.	6.71
Sample of General Comments: It was very concentrated... lots of work in a relatively short amount of time (which is to be expected in summer). Sample of Positive Comments The discussion forum was very helpful	

Number of responses: 7; Class size: 23

This was a 6-week version of the course, without any online problem solving sessions. The course site was redesigned and included a good number of recorded solved-problems. A discussion forum was added. SRTE question set focused on important points related to an online course. Students were notified about the nature of the course and expectations, via an email three weeks before the start of the course. Overall GPA of students taking the course was above 3.2.

D. Fall 2013 – Online Delivery

SRTE Questions	Rating
Rate the overall quality of this course	5.86
Rate the overall quality of the instructor.	5.14
Rate the clarity of the syllabus in stating course objectives, course outline, and criteria for grades	6.00
Rate the organization of the course in terms of its logical arrangement of material and activities.	6.14
Rate the effectiveness of homework and out-of-class assignments as contributing to the learning process	6.43
Rate the organization of course material.	6.14
Rate the effectiveness of the instructor's explanations of what students were expected to learn.	5.43
Rate the effectiveness of the instructor's responses to student questions.	5.43
Sample of Negative Comments: I did not like the online nature of the course and would have preferred constant interaction with the instructor in the classroom. Sample of Positive Comments: Online forum	

Number of responses: 7; Class size: 8

This was a regular semester long version of the course, without any online problem solving sessions. SRTE question set focused on important points related to an online course. Students were notified about the nature of the course and expectations, via an email three weeks before the start of the semester. Overall GPA of students taking the course was around 3.1.

E. Fall 2014 – Online Delivery

SRTE Questions	Rating
Rate the overall quality of this course	3.33

Rate the overall quality of the instructor.	2.83
Rate the clarity of the instructor's presentations.	3
Rate the instructor's willingness to help students make progress.	3.33
Rate the effectiveness of the instructor in stimulating your thinking.	2.83
Sample of Negative Comments Each topic was gone over in a seemingly random fashion and topics were poorly related to each other. I felt very alone in this class and wish I had more help available to me The teacher never taught	

Number of responses: 6; Class size: 11

Again, this was a regular semester long version of the course, without any online problem solving sessions. SRTE question set used was the same as a regular FTF course. Students were notified about the nature of the course and expectations, via an email two weeks before the start of the semester. Overall GPA of students taking the course was around 2.7. As it shows, there is a significant difference between the SRTE scores for fall 2013 and fall 2014. Since the structure of the courses was identical, we believe the difference in SRTE scores is related to the choice of SRTE questions and academic preparedness of students.

IV. REMARKS AND CONCLUSION

Student ratings for the course have revealed several interesting points that can be further studied to analyze the current models used for online teachings and the reliability of student ratings and evaluations. Factors affecting the SRTE scores that have been identified in our initial study include: (i) course structure, (ii) student readiness/willingness/knowledge about online course requirements, (iii) availability of support mechanisms such as discussion forum, (iv) student GPA, (v) SRTE questions and its relevance to the delivery approach.

Our results indicate that using an identical course structure with different groups of students may produce noticeable differences in students' evaluation if the aforementioned factors are not considered. Some of the identified points, such as course structure, and choosing the right SRTE questions can be addressed with some effort, but we believe the readiness and willingness factor cannot be adequately addressed unless we can accommodate different learning styles and preferences, which may not be possible unless we spend considerable resources. A possible solution may include, identifying potentially "at risk" students and providing a "more engaged" pathway; details about this pathway are not the focus of this paper. These students are initially identified based on their prior experience with online learning and programming, before the start of the course. The list will be updated regularly based on students' performance in the course. Furthermore, our experience shows that the students' scholastic record, similar to a face-to-face course offering, is a good indicator of the level of engagement, overall performance, and satisfaction with the course. Given the nature of the online courses that require more self-discipline and self-motivation by students, it is important that those with lower GPA are identified, before the

start of the course, and included with the other “at risk” students. We believe this would address a good number of “complaints.”

Finally, our relatively small scale of the investigation means that, rather than being definitive, the findings are an indicator for future work to further characterize the impact of any observed systematic influences on SRTE ratings for online courses, and for the development of methods to most effectively use collected SRTE data in the improvement of learning and teaching in engineering.

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