
First Year Programming: Using Competition for Motivation

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Abstract

This paper explores the use of an optional programming competition as motivation for first year programming students through examination of a case study. The case study involved monitoring student interest and involvement in an optional programming competition that was introduced to students at the start of the semester. Students were surveyed at the beginning and at the end of the semester with the results being compared with the actual number of competition participants. The study found that although student interest was initially very high, actual participation was much lower with students commonly citing time constraints and a lack of inspiration as reasons for not submitting competition entries. Although final submissions were lower than expected, the overall

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experience was found to be positive, and also provided additional beneficial from a lecturer's perspective.

Keywords

Programming, competition

Introduction

The motivation of first year programming students on IT related degrees often rests at varying levels. Experience has shown, and research agrees that enrolled students come from a variety of backgrounds with varying levels of programming knowledge (Roberts, 2000) (Ladd & Harcourt, 2005). At one end of the spectrum are students with minimal programming knowledge who can often find the course content very challenging. At the other end of the spectrum are students with extensive programming knowledge who can find themselves unchallenged and even bored by the course content (Roberts, 2000), which can result in lowered motivation (Race, 2001). Coupled with this wide spectrum of student abilities, programming is often gets a bad rap as a 'boring' subject (Jenkins, 2002). From a lecturer's perspective, it can become a difficult task managing and motivating such a wide range of abilities (Ramsden, 1992). Time must be spent teaching the core group of students and helping those who are struggling. But at the same

time, the top students need to be occupied and encouraged to further their programming skills. It is the motivation of these top students which forms the focus of this paper.

Previous research has suggested that using an optional programming competition is a good way to engage, challenge and occupy top students in first year programming courses (Roberts, 2000; Ladd & Harcourt, 2005). This paper presents the results of a case study that introduced an optional programming competition to UCOL's first year programming paper. The paper will proceed by detailing the how the competition was introduced and how student interests and opinions were gauged, next the results of the experience will be present, and finally conclusions about the case study will be given.

Approach

D101 Software Development ran during the second semester of 2009 for 16 weeks, and had a total of 60 students who engaged for the duration of the semester. The paper consisted of four summative assessments:

- Theory Test – 20%
- Assignment – 30%
- Practical Test – 20%
- Final Exam – 30%

The optional programming competition was introduced to the class during the first lecture of the semester. The competition was open to any type of program so long as it was original and written using the C# programming language. The slide shown in figure 1 was used to introduce the competition.

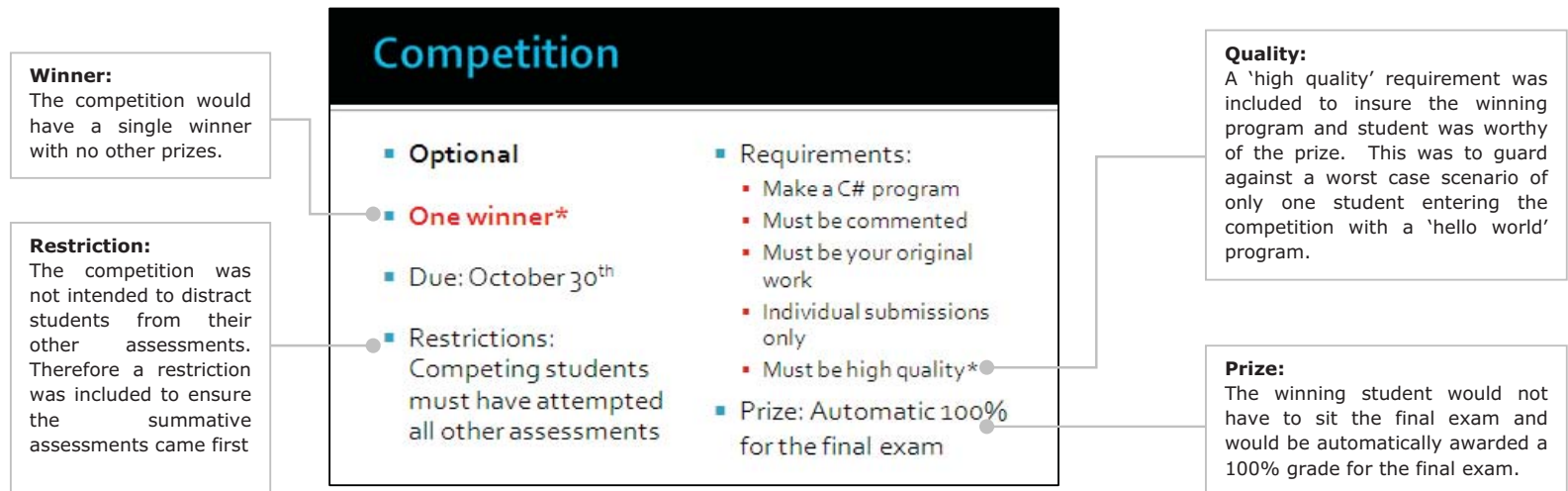


Figure 1. Competition introduction slide

After introducing the competition, the students were anonymously surveyed during week 3 to gauge interest. Figure 2 shows the survey used, the results of the survey are presented in the next section.

D101 Competition:

Are you planning to enter? (circle one)

Yes Probably Possibly No

Comments:

Figure 2. Initial survey given in week 3

Did you enter the competition? Yes No

If you didn't, why?

- I started, but didn't finish
- I couldn't think of an idea
- I didn't have enough time
- Other: _____

Figure 3. Survey given after the competition closed

Throughout the semester students were reminded and encouraged to participate in the competition during lecturers and practicals. After the competition closed

the students were again anonymously surveyed primarily to ascertain reasons for why they did not participate. Figure 3 shows the survey used.

Finally, survey results were compiled and analyzed in light of the actual number of submissions and the experience as a whole was reflected upon. The next section presents these results.

Results

Figure 4 shows the results of the initial survey given in week 3. The initial survey was given in class with 59 students participating.

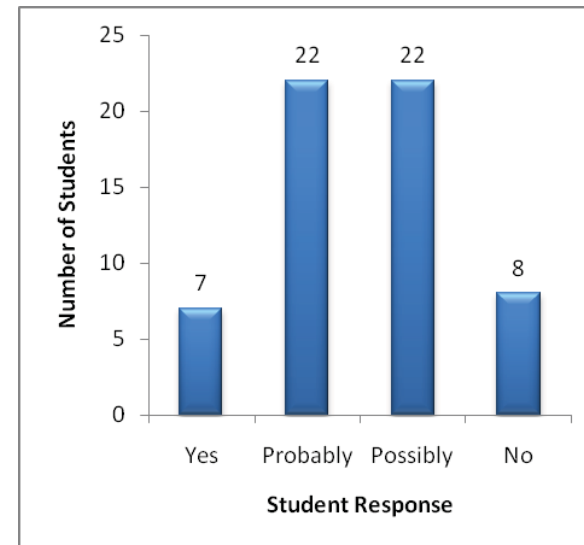


Figure 4. Student responses to initial competition survey

The results of the initial survey indicated a high amount of interest among the students surveyed with only eight students (13%) responding with a definite no. The results also show that almost half of the class (49%) was either planning or probably planning to enter the competition. Of the students who made comments, eight focused on needing to think of an idea first, and

ten focused on not having enough confidence or skills necessary to compete.

Figure 5 shows the number of students who actually submitted competition entries compared to those who didn't (the total number of students is based on the number of students still engaging by the end of the course).

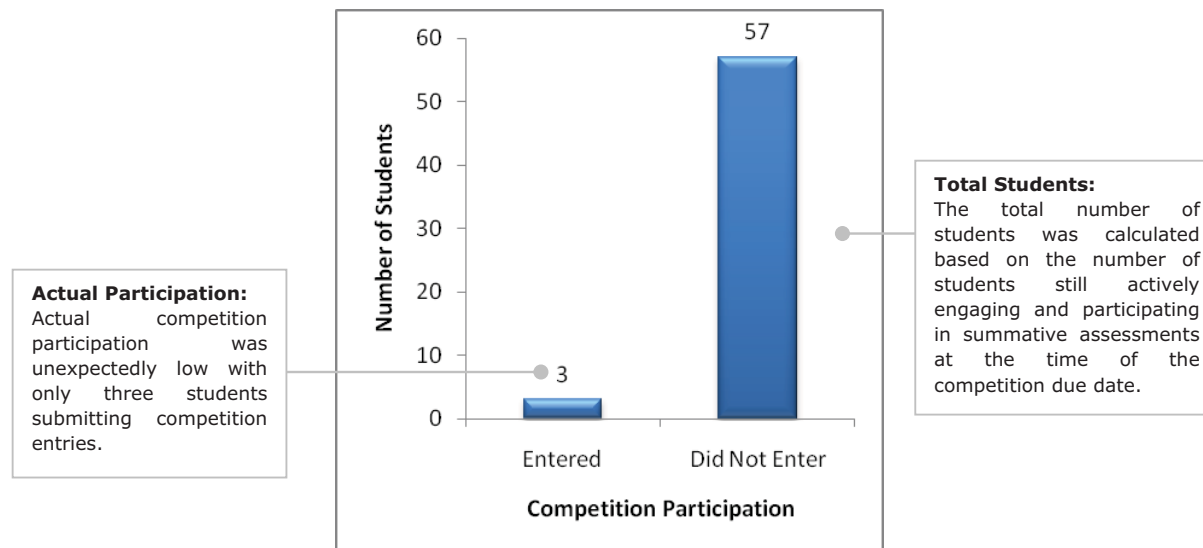


Figure 5. Actual Competition Participation

Figure 5 clearly shows that the rate of actual competition participation was much lower than what could reasonably be expected given the initial survey results. The initial survey indicated that 49% of the students were either planning, or were probably planning to enter the competition, compared with an actual participation rate of 5%.

Figure 6 shows the results of the survey given after the closing of the competition. Figure 6 gives some insight into why the actual competition participation rate was so much lower than what was expected. Figure 6 shows that eight students (15% of those surveyed) began work on competition entries but did not finish. In addition, Figure 6 also shows that 20 students

(38%) cited not being able to think of an idea as the reason for not participating. Students who gave different reasons (i.e. students in the 'other' category) commonly cited a lack of knowledge for not

participating (7 of the 12). The remaining 13 students indicated a lack of time as their reason for not participating in the competition.

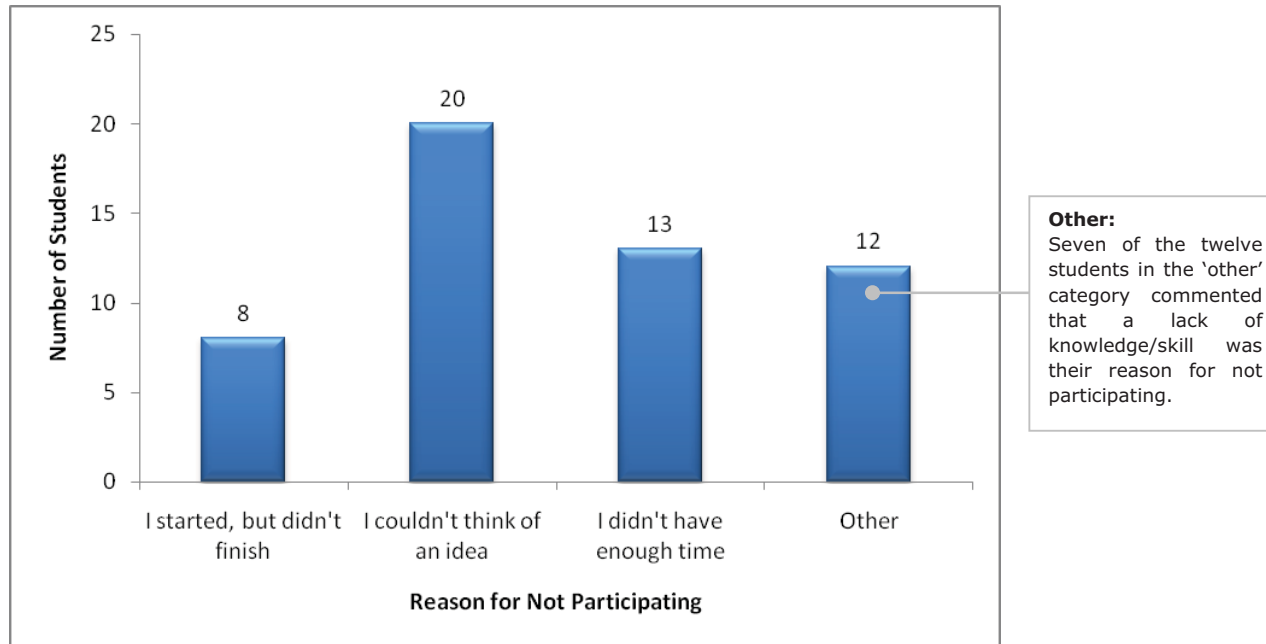


Figure 6. Student Reasons for Not Participating

Conclusions

The surprisingly low number of entries raised the question of whether or not to award the competition prize. The possibility of not awarding the prize was an option due to the 'high quality' requirement of the competition (i.e. if none of the entries were considered worthy of the prize it would not be given out). The three entries consisted of a currency conversion

application, a 3D Tic Tac Toe game, and an APA referencing tool. Fortunately, the APA referencing tool was a significantly complex and high quality application which could be used to produce correctly formatted APA references. As a consequence, the student who submitted the APA referencing tool was awarded the competition prize. As expected, the student had

already gained A-, A, and A+ grades for the other three summative assessments for the paper.

Although the initial survey results indicated high interest in the competition, the actual competition participation rate was low (only three students entering). The post competition survey revealed that an additional eight students had also been working on competition entries but did not finish. It also revealed that a large number of students (38%) cited not having an idea as the reason for not participating.

Anecdotal evidence suggests that providing a theme for the competition would make it easier for students to come up with an idea, and would hopefully increase the participation rate. A themed optional programming competition is expected to run again during semester two, 2010. In addition, providing some type of reward for all participants (instead of just the winner) could also help improve student participation, an idea gleaned from related research (Cormack, Munro, Vasiga, & Kemkes, 2006).

Moving beyond the statistical view of the competition the lecturer observed some unquantifiable benefits associated with running the optional programming competition. Firstly, the introduction of the competition and associated prize seemed to create a buzz of enthusiasm and interest amongst the students. The near end of semester lecturer, when the competition winner was to be announced, enjoyed huge attendance. Students were also very eager to see the winning application and code, and a significant class discussion ensued. Secondly, from a lecturer's perspective the

presence of the competition throughout the semester became an extremely useful tool when managing top students who often finished class work ahead of schedule. The top students were often directed to the competition upon completion of their set work. Overall, the optional programming competition proved to be positive experience and will become a fixture of the D101 Software Development paper.

References

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