

CS0 vs. CS1: Understanding Fears and Confidence amongst Non-majors in Introductory CS Courses

Hogan, Li & Soosai Raj (2023)

Summary

This paper explores the fears and confidence levels of non-majors enrolled in a CS0 and CS1 course. The students are given surveys with an open-ended question about their fears, as well as several Likert responses to gauge their self-efficacy. Overall, students in CS0 and CS1 share many of the same fears that are consistent with prior work. Non-majors in CS0 saw a significantly higher increase in their confidence compared to CS1 students. Both CS0 and CS1 students saw increases in confidence in similar areas.

Familiarity

I have read and reviewed many papers on this subject, and I have both taught and developed curriculum for CS0 and CS1 courses.

Strengths & Weaknesses

Strengths:

- The paper clearly lists research questions and provides ample data and analysis to answer them
- The comparison of CS0 and CS1 courses for non-majors is very clearly motivated
- The authors provide links to the full surveys used, which aids in replication

Weaknesses:

- The paper implies that the student population consists of non-majors, but it is not clearly stated or measured (e.g. is this data from a spring or fall semester CS1 course?)
- It feels like the paper is using non-majors as a stand-in for students with little prior experience. It would be good to measure that directly somehow
- Student self-efficacy data is reported but not correlated with student grades. Just because CS1 students had lower increases in self-efficacy may not mean that they did poorly in the course since CS1 is typically much more difficult and demanding than CS0.

Research Papers

For full research papers, address each of the following items. (1-2 paragraphs for each)

Motivation/Research Questions

Research questions are clearly stated and defined.

Prior & Related Work

Some prior work is referenced, but not discussed in much detail. No information is provided on the source of the surveys used (but they are included).

Scientific Approach

The scientific approach used seems valid for the research questions and data analyzed. The authors could provide a bit more discussion about the use of the Mann-Whitney U test (specifically what the U variable denotes in their analysis, though p and r are the most useful).

Evidence

The evidence collected and the analysis done by the authors seems to answer the research questions and support their overall findings.

Impact

This paper presents some valuable confirmation of existing knowledge since it aligns well with prior work regarding fears of non-majors in engineering courses. There are some new outcomes looking at non-majors specifically in CS0 and CS1 and comparing the two courses as possible starting points for non-majors to explore CS.

Presentation/Grammar

No major issues.

Audience

This paper is most useful for teachers of CS0 and CS1 courses to better understand the fears and struggles of non-majors. It is also helpful for advisors and non-majors themselves when deciding on which CS course to start with. It may also help inform curriculum developers, making sure that there is a CS0 course available for non-majors as a starting point.

Overall

Overall, this paper provides a clear set of research questions and does a good job collecting and analyzing data to address them. I have some concerns with the population selection process – it is not wholly clear whether all responses are from non-majors now how that was selected. I would like to see more information included about the student population to better understand the results.

The information provided is still valuable confirmation of prior knowledge and some new insights into the struggles and successes of non-majors in both CS0 and CS1 courses.