Don't Just Paste Your Stacktrace: Shaping Discussion Forums in Introductory CS Courses

Amogh Mannekote, Mehmet Celepkolu, Aisha Chung Galdo, Kristy Elizabeth Boyer, Maya Israel
University of Florida
Florida, USA

Sarah Heckman
North Carolina State University
North Carolina, USA

Kristin Stephens-Martinez
Duke University
North Carolina, USA

Abstract

Discussion forums are invaluable resources when scaling up undergraduate CS courses to larger class sizes. However, passive incorporation of discussion forums is not a silver bullet, as these platforms tend to devolve into places of shallow engagement. To aid our understanding of the factors that influence the nature of these interactions, we collected data from three CS1/CS2 forums. We obtained survey responses from the course instructors and performed a content analysis of the question-response pairs across all the courses. The results suggest that students' help-seeking patterns are influenced by the course curriculum, mode of delivery, and the existence of other help-seeking avenues. The findings also shed light on common strategies used by instructors to incentivize productive student-teaching staff and student-student interactions (e.g., instructing students to describe their debugging questions in detail, asking teaching staff to respond with hints/questions instead of direct answers). This poster presents a series of takeaways that can inform CS educators' choices around discussion forums.

CCS Concepts

• **Social and professional topics → Computing education**.

Keywords

Discussion forums; teaching assistants; CS1; CS2; help-seeking

1 Introduction

Online discussion forums hold great potential to encourage peer discussion, offer students a low-pressure environment with fewer barriers for participation, and offer teaching staff a granular view into student experiences at large scales [2]. However, without a concerted effort on the part of instructors, these platforms can devolve into places of low levels of engagement [1]. Previous work has looked into mapping posts to Bloom's taxonomy [4] and applying the ICAP framework [3] as approaches to analyze student posts. However, there is still a gap in the literature in analyzing teaching staff responses and the approaches that instructors can take to influence forum interactions. In this work, we compare student-teaching staff interactions on these forums across three CS courses through the lens of instructors' objectives, pedagogical best practices, and help-seeking avenues.

2 Methods and Results

The data was collected from two CS1 courses and one CS2 course. The aggregate dataset contains 1,942 top-level forum posts from 422 students. We used two separate schemes to annotate the student questions and the teaching staff responses. The scheme for the student questions differentiated *Debugging*, *Conceptual Questions*, *Dev-Tool Issues*, *Logistical Questions*, *How-To Questions*, and *Clarifications*. The scheme for the teaching staff responses labeled posts as *Direct Answer*, *Explanation*, *Elaboration*, *Hint*, *Counter Question*, and *Closed-Ended Reply*. We compared the interactions across the courses by looking at both the marginal distribution of the question tags and the conditional distribution of the response tags given a specific question tag.

The results showed that the number of posts was largely determined by (1) the extent to which the instructor encouraged their students to post to the forum, (2) the availability of alternative modes of help (e.g., office hours, email), and (3) the complexity and open-endedness of the course assignments. All three forums displayed a low prevalence of *Conceptual* questions. The number of peer responses was an order of magnitude smaller than that of teaching staff responses. One way for teaching staff to shore up this number could be to delay their response, which can induce more peer-interactions (the median delay in the TA-responses was 3.4 hours greater for posts with peer-responses). Teaching staff were also found to make use of Socratic strategies such as *Counter Questions*, *Hints*, and *Explanations* in their responses more often when explicitly instructed to do so.

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