Alleviating the Negative Effect of Up and Downvoting on Help Seeking in MOOC Discussion Forums

Iris Howley, Gaurav Tomar, Diyi Yang, Oliver Ferschke, Carolyn Penstein Rosé

5000 Forbes Ave. Pittsburgh, PA USA
{ihowley, gtomar, diyiy, ferschke, cprose}@cs.cmu.edu

Abstract. Through the lens of Expectancy Value Theory, we examine the effect of help giver badges, information about helper expertise, and up- and downvoting on help seeking in a MOOC discussion forum. Results show that badges alleviated the negative impact on help seeking introduced by up- and downvoting.

Keywords: help seeking, MOOCs, reputation systems, discussion forums

1 Introduction

Recent years have seen the rapidly rising popularity of Massive Open Online Courses (MOOC), and with the growing number of MOOCs there is also a growing demand for supporting students' learning in a scalable manner. In particular, students use discussion forums to have their questions answered by classmates and instructors, but often those questions end up buried underneath other students' posts. Our Quick Helper uses a social recommendation algorithm to connect help seeking students with peers who could help them. However, many factors influence whether learners seek help, and requesting help from a peer increases the salience of some of these factors.

Leveraging artificial intelligence methods to acquire data from MOOC hosting sites, we can determine a variety of features that would influence a help seeker's expectations and values of the help source that would affect whether or not she seeks help. Of particular interest is (1) the helper's propensity to give help (i.e., the expectation that help will be offered), (2) the helper's expertise (i.e., the accuracy or quality of the help), and (3) whether the helper evaluates the question being asked (i.e., costs of being judged by a social other). Our corresponding research hypotheses are:

1. Emphasizing a potential helper's propensity to give help increases the likelihood of the student seeking help from more recommended peers.
2. Emphasizing a potential helper's ability to provide quality help will increase the number of helpers invited to a public forum thread.
3. Presenting a potential helper as an evaluator of the question being asked increases the cost of the help, resulting in fewer helpers being selected by the help-seeker.
4. Knowing the selected usernames of potential helpers may interfere with the hypotheses derived from Expectancy Value Theory.

2 Related Work

The large scale of MOOCs introduces several issues related to help seeking, learning, and social networking that are relevant to our research questions. Forums are a common means of developing communication and community within MOOCs, but they often lose participation due to poor thread management and an overwhelming number of discussion forum threads [5]. When these forums fail to properly sustain a sense of community, high rates of student dropout often follow. To address this issue, we developed a social recommendation algorithm based on our work in Yang et al. (2014) for automatically identifying appropriate helpers to answer student queries, but were then confronted with how to present these potential helpers. For this we build on the work of reputation systems. Coetzee et al (2014) determined that the usage of reputation systems in a MOOC increases the response time and number of responses to discussion threads. In this instance, voting and other reputation system features lead to improved student engagement, but there are additional outcomes that affect student learning and participation that were not specifically explored in this paper. Our experiment looks explicitly at how voting affects help seeking.

Makara & Karabenick (2013) adapted a model of Expectancy Value Theory specifically for help seeking in which expectations of the help source are based upon the belief that the source will make help available or accessible [3]. Values for the help source consist of whether the help provided will be of an appropriate quality and accuracy. In this model, expectations and values of the source interact to impact the likelihood of students asking for help and actually using the help that is provided. We incorporate costs of seeking help into the value of the help. There are certain public and private costs to seeking help [4] that can reduce the perceived value of the help. There is often implicit evaluation from others from asking a question in a public forum, but this evaluation becomes explicit with the popular usage of up and down voting in which readers upvote contributions they believe to be more worthwhile, interesting, etc. Students may place varying values and perceive varying costs on help originating from their potential helpers that influence how they obtain help from both.

3 Study Design and Methodology

Students in a learning analytics course hosted on the edX[1] platform had the option to post their questions directly to the course discussion forums, or to click our "Quick Helper" button. Using the Quick Helper would still post the question to the public discussion forum, but would also privately invite selected peers to the thread. We integrated our Quick Helper in the edX platform via a novel method that allowed us to maintain our own codebase without deploying any code to the edX servers. When our QuickHelper Javascript button was clicked, it called the edX discussion forum client. Using jquery's ajaxComplete API, we watched for these calls and then triggered our own external Quick Helper client. Then our context-aware matrix factorization model

[1] https://www.edx.org/

would predict students' preferences for answering a given question by taking into account features from students, questions, and student connections as described in [5]. Because the recommender system requires information about the students in order to provide appropriate matches, we used a "TA Version" of Quick Helper for the initial two weeks of the course. This solves the cold start problem by recommending TAs as helpers until enough data has been gathered about the other users.

Our experiment investigates student help seeking decisions in a MOOC through the lens of Expectancy Value Theory. Students are given the option to select up to three potential helpers as their question is posted to the course discussion board, and it is through the presentation of these potential helpers that we apply our expectancy value lens. Our three main experimental dimensions consist of components of the expectancy value theory: an expectancy emphasis, a value emphasis, and a cost emphasis. To investigate how these expectations, value, and costs influence help seeking in MOOCs, we performed a 2 (expectancy) X 2 (value) X 2 (cost) X 2 (username) factorial experiment in the context of MOOC discussion forums. Our experiment manipulates how potential helpers are presented to the help-seeking student. Number of helpers selected is the main help seeking outcome we are investigating.

In order to emphasize the expectation that a helper will provide help, we used a Help Giver badge system. The number of stars on the help giver badge is determined by ranking the three potential helpers. We based these badges on the visual appearance of the OLDS MOOC badges [2], but our Help Giver badges were only displayed within our Quick Helper system and not rewarded to students external display

We emphasized the value of the help source by providing insight into the helper's knowledge. The student could then evaluate the potential helpers' ability to provide accurate help. The sentence displayed was "This student has been participating in the course for <#> weeks and the matching of his/her knowledge and the topic of your query is <#>%." The numbers were provided by the social recommendation algorithm. If not assigned to the value emphasis condition, students were shown one of four less value-evident sentences about their potential helper similar to the following sentence: "This colleague is involved in the course."

We emphasized a potential cost of seeking help through asking the selected helpers to evaluate whether the student's question was good. We did this through a common upvote/downvote interactional archetype. Knowing that one's post will explicitly be evaluated by any selected helpers should increase public threats to self-esteem, thereby producing an emphasis on the costs of selecting helpers.

4 Results

Throughout the duration of the learning analytics MOOC, approximately 20,000 individuals were enrolled, although after the initial three weeks no more than 2,493 students were active in a given week. 285 MOOC students posted a total of 671 threads to the discussion forum throughout the entire course and 96 of these students used the Quick Helper at least once. Due to initial set up complications, our dataset included only 161 of the Quick Helper instances by 66 users, selecting a mean of 0.79 helpers.

Participants were randomly assigned to 2^4 conditions. Prior to our analysis we removed instances that were not relevant to our hypotheses about help seeking.

An ANOVA analysis revealed a trend between our up/downvoting manipulation and number of helpers selected, $F(1, 148) = 2.05$, $p=0.16$, but no effect of badges. There was a significant interaction between expectancy emphasis (badges) and cost emphasis, $F(3,143) = 3.81$, $p = 0.05$ with a post-hoc analysis revealing that voting only appears to have an effect when no badges are present. Fewer helpers are selected in the up/downvoting condition, but this effect is eliminated when Help Giver badges are shown. There was also a marginal effect of the value emphasis condition on number of helpers selected, $F(1,150) = 3.42$, $p < 0.07$. A Student's t post-hoc analysis revealed that students in the value emphasis condition selected marginally more helpers to be invited to their help request thread.

5 Conclusion

Future work involves a deeper analysis of student help seeking in our MOOC, including a more generalized evaluation of help seeking in the discussion. We are also investigating how our operationalizations of expectancy, value, and cost are linked to their theoretical foundations through a self-report survey in a follow-up study.

Our model of Expectancy Value Theory of help seeking is partly supported by our results in a MOOC which suggest important effects that should be considered in order to place MOOC designers in a better position to design course infrastructure that support important interactions such as help exchange. Being provided with information about the value of a helper's knowledge and knowing one's forum post will be upvoted/downvoted in the absence of help giver badges both have an impact on the number of helpers the students select to help them. Courseware designers must think critically about the features they implement in their online courses, and how they might interact to influence student behaviors including help seeking. Design implications of our results include providing insight into helper expertise and pairing help giver badges with the usage of up and downvoting.

6 References

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