Students' Domain Confidence and their Participation in Optional Learnersourcing Activities

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ABSTRACT: Generating multiple-choice questions (MCQs) is a popular form of learnersourcing that benefits both the students' higher-order thinking and the instructors' collection of assessment items. However, student participation with such learnersourcing activities has often varied when the activities are optional. To better understand how student confidence impacts their engagement with learnersourcing activities, we deployed multiple optional MCQ generation activities across three courses at two community colleges. In an effort to measure if these interventions were reaching all students, we analyzed how students' perceived confidence in the course domain influenced their participation in a set of optional MCQ generation tasks. We found that these optional learnersourcing activities were attempted by students from a wide range of confidence levels.

Keywords: Confidence, Participation, Optional Activities, Learnersourcing

1 INTRODUCTION

The confidence a student has in their own ability to succeed in a domain impacts the motivation they have towards the course, subsequently influencing their participation (Barak et al., 2016). When students are motivated to participate and engage, it leads to higher learning gains, particularly when learning activities are optional and student participation might be decreased. For instance, students may be asked to develop an assessment question, such as a multiple-choice question (MCQ), which will then be answered by another student. This is known as a form of *learnersourcing*, where students complete activities that produce new content that can be leveraged by future students (Moore et al., 2022). These types of question generation activities give us rich student data and help to improve courseware (Moore et al., 2022). However, they are sometimes presented to students in an optional manner depending on the context of the course and learning platform. In this research, we look to better understand how students' confidence in a domain influences their participation with such optional activities.

Previous research has demonstrated that students with greater confidence in their academic abilities often have higher performance and participation rates in courses (Akbari & Sahibzada, 2020). There are several verified methods used by these studies to measure student confidence, such as a survey instrument which asks students to self-report their beliefs in how well they can do in the course domain (Honicke & Broadbent, 2016). These surveys provide an effective and low-stakes method to measure perceived confidence, which often correlates with academic performance. Student confidence has been linked to participation, impacting how often students complete optional activities found in courses (Makhija et al., 2018). In the present study, we investigate: How does a student's self-perceived confidence in the domain affect their participation with optional activities?

2 METHODS

This study was conducted in three different courses at two 2-year community colleges located on the west coast of the United States. All three courses took place online during the fall 2021 semester. The three courses were introductory chemistry, advanced chemistry, and introductory statistics. There were a total of 64 unique students across all three courses. We utilize data that came from four to five week-long units that were used towards the beginning of each course. All three courses were deployed on the same learning platform, which has been used in previous studies involving online learning at community colleges (Moore at al., 2021). Each unit in these courses consists of five to ten related topics and takes roughly one week to cover. The units contain multiple pages of instructional content featuring text and brief instructional videos, along with formative assessments interspersed throughout intended as practice opportunities. They include multiple-choice, short answer, essay, matching, and fill-in-the-blank style questions. In addition to these standard activities, we placed a learnersourcing activity towards the end of each unit in each course that prompts students to generate an MCQ targeting any concept they learned from the unit. The MCQ generation activity can viewed here[1]. Finally, at the conclusion of each unit, students completed a summative quiz that assessed them on the topics covered in the given unit. At the beginning of each course, students were prompted to answer a set of 5-point Likert scale questions assessing their confidence in the course's domain, followed by a brief demographic survey. The five confidence questions were adapted from a verified instrument for measuring confidence in different domains that has been utilized by previous research (Honicke & Broadbent, 2016).

3 RESULTS

The average student rankings (on a scale from 1 to 5) from the five confidence questions were 3.31, 3.85, 4.15, 3.00 and 3.76 respectively. An unpaired two sample t-test revealed no significant difference in the average reported confidence between female (*M=3.59, SD=.32*) and male (*M=3.69, SD=.14*) students; *t(57)=.61*, *p=.548*. There was likewise no significant difference in the confidence between first-gen students (*M=3.61, SD=.28*) and others (*M=3.62, SD=.29*); *t(57)=.101, p=.921*. A Kruskal-Wallis test was conducted to examine the differences of self-reported confidence and student ethnicities, which revealed no significant difference, *H(2)=2.03, p=.363*. To determine if more confident students were more likely to participate in the learnersourcing activities, we conducted an unpaired two-tailed t-test. There was not a significant difference in confidence between students that participated in the activities (*M=3.62, SD=.19*) and those that did not participate (*M=3.61, SD=.46*); *t(57)=-.05, p=.961*. For the 37 students that did participate in some of the learnersourcing activities, there was no significant correlation between their average confidence score and the percentage of learnersourcing activities done out of the five available opportunities they had, *r(35)= -.005, p=.976*. We then investigated if a students' self-reported confidence had an impact on their participation and performance with the formative and summative assessments found in the courses. We found no significant correlation between student confidence and quiz scores, *r(57)= -.15, p=.267*, or between their confidence and the number of formative assessments they worked on, *r(57)=-.02, p=.869*.

[1] https://github.com/StevenJamesMoorer/LAK2023/blob/main/learnersourcing_interface.png

4 DISCUSSION & CONCLUSION

We originally expected that more confident students would both participate in a greater number of formative assessments and learnersourcing activities, in addition to performing higher in the course overall. However, our analysis revealed no significant effect of confidence on any of these participation or performance variables. It is unclear if the disconnect observed with the results of the confidence measures reflect discrepancies between self-reported measures, which have been used for years, and behavioral measures, which have more recently become the focus with improvements made to learning analytics (Quick et al., 2020). Students' responses to survey items about their domain confidence are indirect measures, relying on introspective reports of one's own beliefs and behavior, rather than direct measures of it. While being verified instruments for measuring student confidence, it is possible that the self-report measures themselves systematically biased the responses of the students, encouraging them to report higher levels of confidence in line with a more socially-desirable response (Podsakoff et al., 2003). Future learnersourcing efforts should continue to collect information regarding student confidence, which could be supported by incorporating participation and performance analytics, in addition to self-report measures, to gain a better understanding of how they might influence students' contributions to learnersourcing tasks.

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