How CS1 Students Experienced COVID-19 In the Moment: Using An Experience Sampling Approach to Understand the Transition to Emergency Remote Instruction

Alex Lishinski
University of Tennessee
Knoxville, TN, USA

Joshua Rosenberg
University of Tennessee
Knoxville, TN, USA

Michael Mann
University of Tennessee
Knoxville, TN, USA

Omiya Sultana
University of Tennessee
Knoxville, TN, USA

Joshua Dunn
University of Tennessee
Knoxville, TN, USA

ABSTRACT

Our work involves studying the in-the-moment experiences had by CS1 students as they begin their CS studies. Halfway through the semester in spring 2020, University classes were disrupted and went to emergency remote instruction due to COVID-19. Our ongoing data collection, which used the Experience Sampling Method (ESM) to collect data weekly on students' feelings towards their CS1 class, provided a unique opportunity to examine the real-time impact of this unexpected shift. We examined how students' feelings of frustration, accomplishment, challenge, and confidence changed weekly over the course of the semester, particularly with regard to the shift to online instruction. We also surveyed students at the end of the semester and asked them how difficult they found the shift and what particular difficulties they had related to the shift.

KEYWORDS

CS1, Motivation, Interest

1 INTRODUCTION

While computer science (CS) education researchers have frequently examined what happens in courses, programs of study, or occupations in general, they have less frequently addressed finer-grained experiences that spark students' interest in CS. One excellent way to study these types of student experiences is the Experience Sampling Method (ESM). ESM involves collecting data on individuals' experiences at much more frequent intervals than traditional survey research. This aspect of ESM makes it well-suited to examine time-specific aspects of students' experiences, as well as changes due to the disruptive effects of COVID-19.

2 METHODS

Participants were 32 students in one of four laboratory sections of a CS1 class at a large university in the Southeastern United States in the spring semester of 2020. The measures used in the study included 4 ESM items that students were asked to complete on a weekly basis (14 times over the course of the semester) immediately after class via text message, using an open-source application for research that we developed, called Short Message Survey. These 5-point Likert scale items asked students to rate their current feelings of frustration, accomplishment, challenge, and confidence in their ability to do the work going forward in the CS1 course. We also asked students a set of rating scale and open-ended items in the post-survey relating to the challenges of the switch to online instruction.

3 RESULTS

From before to after the shift to emergency remote instruction, there was not a significant difference in the levels of frustration, accomplishment, challenge, and confidence reported by students. Students were divided on whether they found the shift to online instruction in the wake of COVID-19 to be difficult. 40% of students said the shift was somewhat or very difficult, versus 50% who said that it was somewhat or very easy, with 10% undecided. Students were more aligned, however, in their view that the online mode of instruction post-COVID-19 was not as effective as in-person instruction. Around 30% of the students, however, reported no significant difficulties with the switch.

4 CONTRIBUTIONS AND FUTURE WORK

Using ESM for our research methodology helped us to understand students' experiences in the moment. In particular, we found that students' experiences were not significantly different during the transition to emergency remote instruction because of the COVID-19 pandemic. Qualitative responses revealed that students' preferred the face-to-face instruction taking place prior to the pandemic. Data collection is ongoing for Fall semester 2020 with a larger group of students across two courses to examine students' experiences in CS1, and we are analyzing qualitative interview data from spring students on their experiences in the CS1 course.