

# **Instruments Used to Capture Instructors' Experiences During a Forced Move to Remote Instruction**

## **Abstract**

Instructional change in higher education has been historically slow. However, the COVID-19 pandemic propelled unprecedented change when instructors were forced to transition to remote course delivery in the middle of an academic semester. This forced-change is atypical of higher education and provided a rare opportunity to study instructor change through the lens of adaptability. A hybrid convergent and sequential mixed-methods study was used to track instructor change related to teaching along the dimensions of cognition, behavior, and emotions during the Spring 2020 semester using a combination of data collection instruments including surveys and interviews. These data collection instruments are described in detail and a one-week slice of the data is presented to demonstrate the nature of the findings these instruments can provide.

## **Introduction**

The alarming spread of the COVID-19 pandemic spurred a national emergency, forcing many universities to announce in mid-March 2020 that all face-to-face courses would be delivered remotely for the remainder of the semester. The fact that instructors were left with no choice but to change their practices to complete the semester is unprecedented, perhaps marking a critical juncture in engineering education with significant shifts in teaching practices and communities. The unfolding response to this mandate provided a unique, one-time opportunity to study instructors' teaching experiences at an R1 University during the initial period of this crisis-induced (forced) change to instruction. Studying this forced change will provide insight into instructors' adaptability.

The overall goal of this project was to identify cognitive and emotional themes concerning instructors' teaching-related activities and community engagement during a forced change. The purpose of this paper is to describe the data collection instruments used to capture instructor adaptability during a crisis and demonstrate the nature of the findings that may be garnered from their use by examining a one-week slice of the data.

## **Background**

Reform efforts in engineering education explicitly state the need for a shift in cultural norms (e.g. [1]), yet the adoption of evidence-based teaching practices, including instructional technologies, and instructor engagement in teaching communities have historically been difficult to change. Under normal circumstances, it has been found that an instructors' personal attributes (i.e., self-efficacy and innovativeness), their network (supportive community, professional social system, etc.), and their thoughts regarding teaching (place value on teaching in addition to research) can support or deter adoption of educational innovations [2]. Intrinsic (e.g., satisfaction) and extrinsic (e.g., rewards) motivations have also been found to support or deter adoption of new practices and community engagement.

Change is often modeled as a progression through different stages. In the innovation-decision process, Rogers' [3] model begins with knowledge of the innovation (awareness) and progresses through persuasion (evidence), decision, implementation, and finally the confirmation stage (on-going use of the adopted material). Change models, similar to Rogers' [3], assume an individual has choice and time, both of which are severely limited during a

crisis. Therefore, the research presented here did not align well with commonly used change models but instead used adaptability as a framework to investigate how individuals experienced the transition to remote instruction during the COVID-19 crisis.

Individual adaptability, as defined by Martin, Nejad, Colmar, and Liem [4], is an individual's ability to “constructively regulate psychobehavioral functions in response to new, changing, and/or uncertain circumstances, conditions and situations” (p. 66). Martin et al. model adaptability along three different dimensions: cognitive, behavioral, and emotional [4]. According to this model, determining how a person responds to change by analyzing their thinking, behavior, and emotions can provide insight into their level of adaptability. Each of these dimensions were included in the design of the data collection instruments used in this study.

## **Methods**

The overall project was a hybrid convergent and sequential mixed-methods study [5] to track instructors' teaching experiences during the part of the Spring 2020 semester in which the COVID-19 pandemic forced universities to move to remote instruction. The analysis presented here focuses on the data collected from the fourth of seven weekly surveys as a way to demonstrate what can be revealed about instructors' experiences with preparing to teach and teaching, community engagement around teaching, and emotions related to teaching. The fourth survey occurred at the end of the 15<sup>th</sup> week of the semester, where a semester includes 16 weeks of instruction, a week of final examinations, and a week of grading. This data collection period was selected because all data collection tools were used in this period. Further, this period represented a point in time where instructors were past the initial transition to remote instruction and the associated start-up technical issues for them and their students.

### ***Setting & Participants***

The setting of this study is a College of Engineering (COE) at a R1 university. At this university, a semester of instruction runs for 16 weeks with a one week break and an additional week for final examinations.

On Thursday March 12, 2020 (week 9), the university announced that classes would be suspended as of the following Monday. That week and the following week (Spring Break) were to be used by instructors to transition to remote instruction which began on Monday, March 30<sup>th</sup> (week 12). Until April 8<sup>th</sup> (week 13), instructors were allowed access to university facilities. Past this date and for the remainder of the semester, instructors had to conduct all teaching related activities from locations other than university premises.

Participants in this study were instructors teaching undergraduate courses in one of seven engineering departments in the COE. In Spring 2020, 161 instructors contributing to the undergraduate education mission were invited to participate in the overall project; 57 instructors agreed to participate in the overall project. Instructors with position codes other than tenure-track or tenured professors or professors of practice ( $n = 18$ ) were removed from the analysis due to differences in incentive structures that may have differentially impacted their teaching experience. Of the remaining 39 participants with eligible position codes, 33 completed the end-of week 15 survey (Table 1). Of these 33 participants, 15 participated in interviews.

**Table 1. Spring 2020 Survey Participants Demographics Who Completed Survey 4 ( $n = 33$ )**

Category	Subgroup	<i>n</i>	%
<b>Gender</b>	Male	23	69.7%
	Female	10	30.3%
<b>Position</b>	Assistant Tenure-Track Professor	12	36.4%
	Associate and Full Professor	13	39.4%
	All Ranks Professor of Practice	8	24.3%
<b>Department</b>	Architectural & Construction Engineering	3	9.1%
	Biological Systems Engineering	7	21.2%
	Civil & Environmental Engineering	10	30.3%
	Computer Science & Engineering	4	12.1%
	Mechanical & Materials Engineering	6	18.2%
	Other*	3	9.1%

*\*Chemical & Biomolecular Engineering and Electrical & Computer Engineering departments were combined to ensure confidentiality due to low participation rates.*

### **Data Collection**

For the overall project, data collection consisted of brief weekly surveys. Seven surveys were administered starting at the end of week 12. In addition, three semi-structured phenomenographic interviews were conducted in weeks 13-14, 16, and during the grading week. IRB approval for this work was sought and approved.

The survey data collection of concern for this paper was initiated April 24th (end of week 15) and concluded following a reminder on April 28th (start of week 16). The interviews of concern were conducted in week 16.

**Instructor Surveys.** A short weekly survey, administered through Qualtrics, consisted of four closed-ended items and three open-ended items. The first closed-ended item asked instructors to check all of the teaching related self-directed learning activities and community engagement activities they had participated in during the past week (Table 2).

**Table 2. Activities Listed in the Survey**

Survey Items	Abbreviations	Self vs. Community
I taught myself something new.	TaughtSelf	
I referred to [university based] online resources for teaching.	UNIRes	
I referred to other online [non-university] based resources.	nonUNIRes	Self-Directed Activities
I attended a teaching related workshop.	Workshop	
I read about effective teaching practices.	Read	
I sought help on something specific from a colleague.	GotHelpColl	
I had a casual conversation about teaching with one or more colleagues.	CasConvo	
I sought help from professional teaching and learning staff.	GotHelpStaff	Community-based Activities
I pointed one or more colleagues to resources on teaching.	DirectedColl	
I actively helped one or more colleagues.	HelpedColl	

The second closed-ended item asked instructors to indicate whether the collection of activities they selected were similar to those they had engaged in a typical week prior to the COVID-19 mandate for remote instruction.

The third closed-ended item asked instructors to check all the emotions in a list of 50 that they had felt about teaching over the previous week. The list was comprised of an equal mix of positive emotions (e.g., calm, joy) and negative emotions (e.g., sad, fearful) of varying degree in intensity.

The last closed-ended item asked instructors to indicate whether the collection of feelings they selected were similar to those they experienced in a typical week prior to the COVID-19 mandate for remote instruction.

For the open-ended items, instructors were asked to describe a teaching success and a teaching challenge from the past week. For the teaching challenge, the instructors were also asked how they planned to address the challenge.

**Instructor Interviews.** Instructors were interviewed for approximately 30 minutes via web conferencing. Interviews were recorded, initially transcribed by the web conferencing software, and then manually checked for accuracy. The interview protocols were designed to complement the surveys and allowed participants to provide context for their responses with regards to their experiences with preparing to teach and actually teaching, community engagement around teaching, and emotions related to teaching.

## ***Data Analysis***

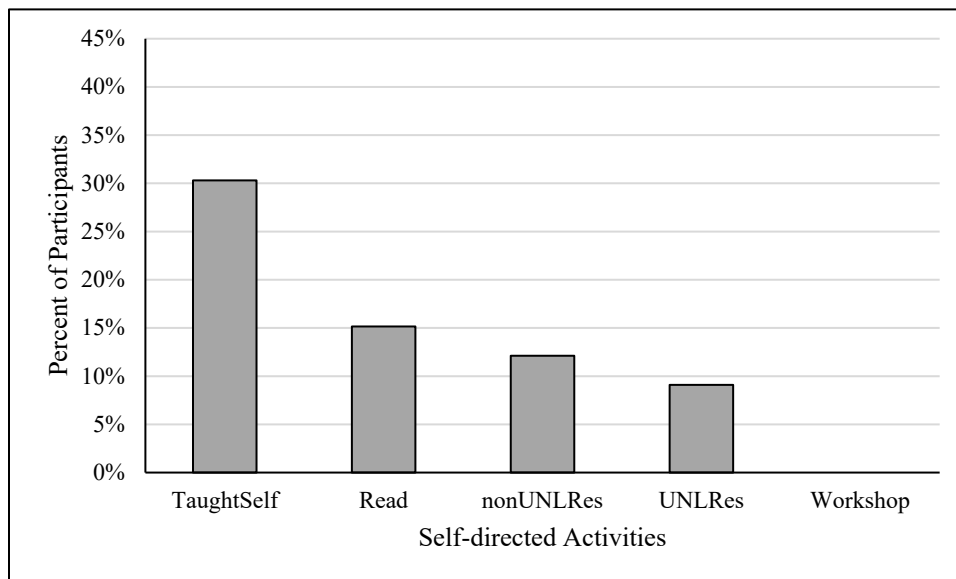
To demonstrate the nature of the findings that may be garnered from the data collected, end-of-week 15 closed-ended survey items were analyzed using descriptive statistics, specifically frequency counts. Open-ended survey responses were thematically analyzed [6]. In addition, to show the depth of insight that may be gained from the interview data, select quotes are drawn from one interview.

### **Nature of Study Data**

At the end of week 15, as compared to the full survey period, there was a general lull in activity related to supporting one's teaching and an increase in feeling that activities and emotions were typical [7]. Twenty-five (75.8%) participants reported engaging in at least one self-directed or community-based activity; 8 participants did not participate in any activity. Instructors indicated that they felt that week 15 activities and emotions represented a more business-as-usual state than the first two and last two weeks of the seven week survey period. Two-thirds (66.7%) of the participants thought self-directed and community-based engagement activities were typical for this week in the semester in non-COVID times, while 48.5% of the participants thought their emotions were typical.

### ***Self-Directed Activities***

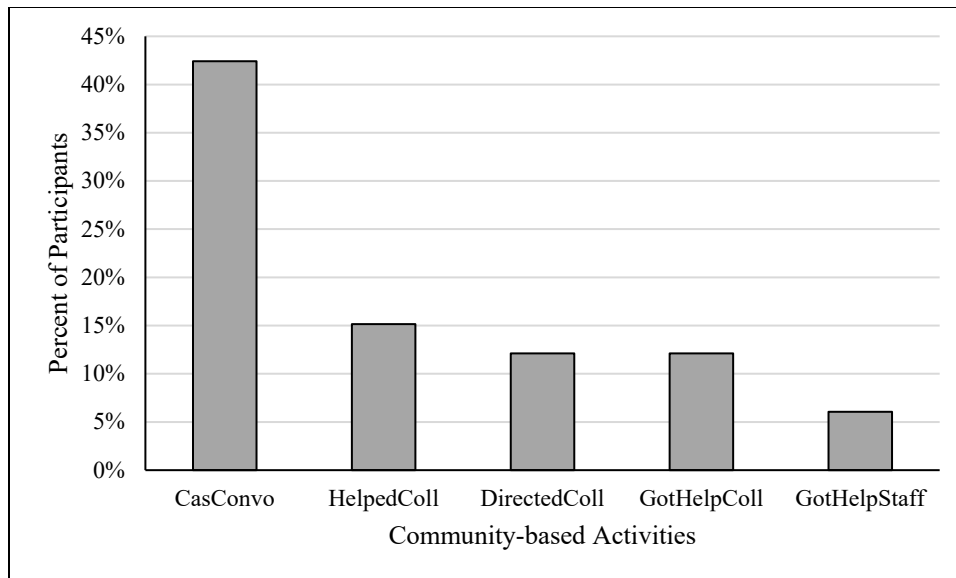
At the end of week 15, nearly a third of the participants indicated that they were engaged in teaching themselves something to support their instructional endeavors (Figure 1). The percent of participants that were supporting their teaching by referencing university or other sources and reading about best practices ranged from approximately 9% to 15%.



**Figure 1. End-of-week 15 instructor reported self-directed activities ( $n=33$ )**

### ***Community-Based Activities***

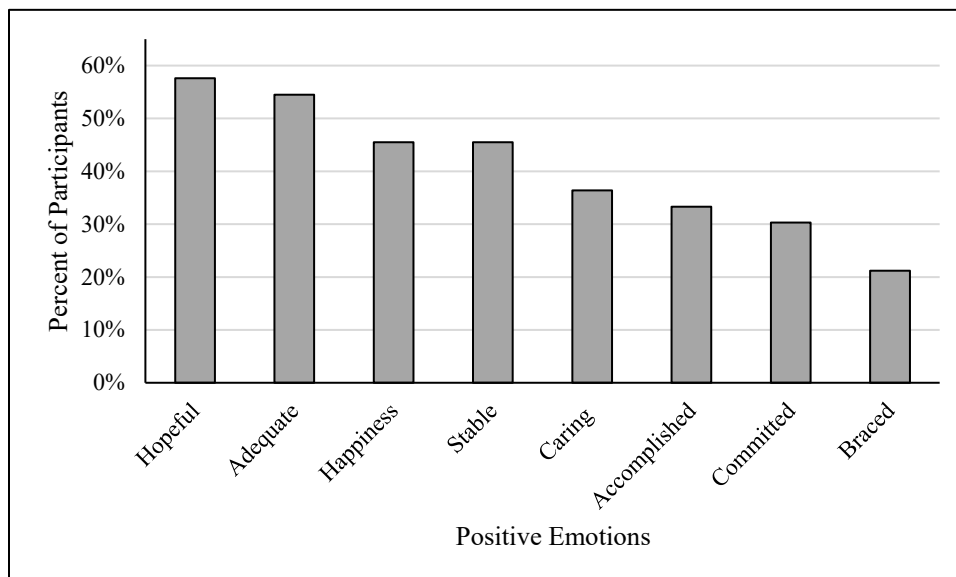
Over 40% of the participants indicated that they engaged in casual conversations with colleagues (Figure 2). Participants provided colleagues with one-on-one help (15.2%) or directed colleagues to teaching resources (12.1%). They also got help from colleagues (12.1%). To a lesser extent, participants got help from staff (6.1%).



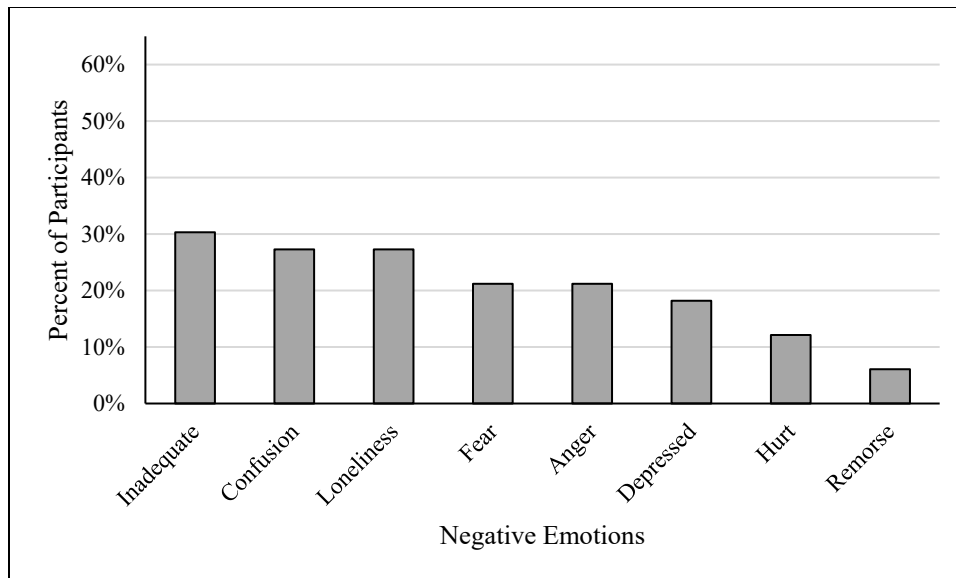
**Figure 2. End-of-week 15 instructor reported community-based activities ( $n=33$ )**

### *Emotions*

Participants selected more positive emotions (Figure 3) than negative emotions (Figure 4). Over 50% of participants selected feelings of hopefulness and adequacy, while 30% selected feelings of inadequacy. Isolation seemed prevalent with close to 30.3% of participants selecting feelings that indicated loneliness, although just the opposite was expressed, with over 20% selecting feelings associated with being supported (braced). It is important to note that an individual could select both positive and negative emotions, meaning an individual could have had instances of feeling isolated and braced in the same week.



**Figure 3. End-of-week 15 instructor reported positive emotions ( $n=33$ )**



**Figure 4. End-of-week 15 instructor reported negative emotions ( $n=33$ )**

### ***Successes & Challenges***

Within the open-ended survey questions about success and challenges, the most frequently cited successes were the instructor completing tasks related to preparing course content, such as recording video lectures. A typical example of completing tasks was “I created another online lecture along with quizzes for the students to take. Everything up on Canvas [the learning management software used at the university].” Responses in this category varied in terms of the specifics the instructor gave - some cited “making online content” while others referred to a specific type of content such as video lectures, homework, or quizzes. Instructors also frequently talked about successes relating to students submitting work, student engagement, and exams and quizzes. Many of the successes around exams and quizzes pertained to design, setup, and administering them to students, oftentimes via Canvas. For example, one participant wrote “I was able to hold an asynchronous quiz using Canvas.” In terms of student engagement, participants wrote about student attendance during office hours, synchronous sessions, and online asynchronous discussions.

The most common themes in the open-ended challenges responses pertained to student engagement and quizzes and exams. In terms of student engagement, instructors wrote about the lack of connection to students including interacting with students, feelings of one-sided communication, and students not submitting work or attending office hours. One example of this is “I am not sure what some students are feeling or thinking. In face-to-face classes, I could understand them more easily.” Participants were also starting to think about how they were going to deliver the final exam for their course in an online environment and challenges associated with this such as being fair. For example, one participant wrote “How to successfully and fairly conduct the final exam for my class.” This was a common theme among the challenges associated with exams and quizzes during week 15 as many instructors were delivering an exam online for the first time.

### ***Instructor Interviews***

Instructor interviews provided more context for the survey findings. For example, Morgan provided insight into the types of things instructors were getting help on and the new things

they were learning to address challenges. Morgan declared their most recent challenge, “The only concern was how do we do the testing. Actually, that was the only concern because everything else seemed to roll out good.” Morgan considered one way to design and administer a short, timed exam, but, with help, went another way.

*And so they actually talked me into, into a version that I didn't anticipate... I actually wanted to do it in like 90 minutes or two hours posted online and then within two hours they have to submit their solutions, but I actually gave them 24 hours so they you know starts with a certain time, they can download it and then they have 24 hours to to to upload it and it worked fine everyone had submitted within that 24 hours and so we created a question set that really required someone to sit down and think a little bit. [I didn't want students to be able to] easily go to the internet and just type [the questions] in and ... find [the solutions]. I really had to work on it. I could tell they did. They did well. So actually, [the] test came out pretty well. I was actually quite impressed. I have to admit that.*

As can be seen in this excerpt, Morgan originally thought they would deliver a timed test in a manner as similar to an in-class situation as possible, but after talking with colleagues, they changed their mind and did a complete overhaul of the test for an online format. Morgan explained in more detail how the nature of their exam questions changed to accommodate the move from a timed-test to a take-home test.

*And I actually created the questions completely from scratch. So those were different questions. I have this large set of questions, where I mix and shuffle and maybe one year, one semester, I add another one. But it's a mixing shuffle from the past. And I also hand out some of them as an example to the class [so] that they have an idea of what it's going to look like. But those were all prepared to be solvable in like 5-10 minutes, you know, you have four or five of them. It's usually five [and] one is optional, meaning they get extra points. And so if you concentrate and you've done your preparation, you can answer them. And so I opened this up a little bit more. So that there was some other twist in it. So they really had to sit down and think for a bit for like two hours or so before they can fix it and really work it out. But you had to sit down and think.*

Morgan not only thought through how to remotely deliver a take-home exam but also dug deeper to think about how the questions on a take-home exam needed to be formulated to ensure students had to sit down and think to demonstrate their understanding and not just use the internet.

### **Next Steps**

The insights presented here, from the end-of-week 15 data collection, are just examples of what will be revealed from the overall data that have been collected since COVID-19 began impacting instructional practices. The Spring 2020 data set will be analyzed holistically to provide insight into instructor adaptability during the initial period of moving to remote instruction.

Survey and interview data collection continued through Fall 2020 and Spring 2021 and will be compared to the initial period of change (Spring 2020) to see what changes were sustained



and/or discontinued in instructors' teaching practices. The work will contribute fundamental knowledge on instructors' teaching-related activities and community engagement in the face of an urgent need to deliver courses differently and could help shape the design of professional development opportunities that promote adoption of research-based pedagogies and instructional technologies.

### **Acknowledgment**

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