

# Research Report

Introduction to Elementary Statistics

Fully Online

Faculty Perspectives

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## Introduction

This report presents findings from research conducted to document instructor perspectives and lessons learned from teaching elementary statistics fully online. The research was implemented with support from the National Science Foundation (NSF) as part of a larger study of online instruction in introductory and remedial courses. A total of seven interviews were conducted, including four with two members of the instructional design team.

The research spanned several years and during that period the elementary statistics course was transformed from a Massive Open Online Course (MOOC) that was designed by San Jose State University (SJSU) in collaboration with for-profit MOOC provider Udacity to a course offered specifically to California State University students enrolled at SJSU.

The research presented here will be supplemented by an analysis of surveys and interviews conducted with students enrolled in the last three iterations of the elementary statistics fully online course (referred to in this report as “Stat 95 fully online”). This part of the investigation is not covered by the NSF grant, but will be shared with the NSF grant office in late Spring 2017.

The report that follows includes three sections. Section I introduces the research questions. Section II presents key findings from the instructor interviews. A brief conclusion and recommendations follow in Section III. The research methodology can be found in Appendix A.

## Section I: Research Questions

The research was designed to investigate the following questions:

- I. What was required and learned by the instructors who designed and piloted Stat 95 fully online?
- II. How was Stat 95 fully online passed on to other instructors and what did they learn from the experience of teaching the course?
- III. What advice did the interviewees have for colleagues who teach Stat 95 fully online in the future?
- IV. What advice did the interviewees have for students who are considering taking elementary statistics fully online?

The first interviews, conducted in Spring and Summer 2013, was an exploration of what the two instructors who co-designed and jointly delivered Stat 95 fully online learned from the experience. This investigation also attempted to explore what it was like to teach the course in collaboration with Udacity.

Two sets of research questions guided the follow-up investigation conducted in Fall 2016. The instructors who taught the first Stat 95 fully online courses—referred to in this report as “the instructional design team”—were asked to think back and reflect on what had been most

challenging and rewarding about designing the course and what they learned from co-teaching the course when it was first introduced. They were also asked a series of questions about how they passed the class on to other instructors and what guidelines and advice they gave to them.

For the three instructors who subsequently taught Stat 95 fully online the interviewees were asked to reflect back on how they prepared to teach the course and what advice they now have for other instructors who are interested in teaching Stat 95 fully online.

All interviewees were also asked to share their insights on what students should know, consider and do before they sign up for a fully online course in Elementary Statistics.

## Section II: Instructor Interviews

This section begins with a summary of key findings from interviews conducted in 2013 with the Stat 95 fully online instructional design team. This is followed by research findings from Fall 2016 interviews that included both the instructional design team and three instructors who used the instructional design team's fully online curriculum to teach Stat 95. The section concludes with a summary of findings from all the interviews in response to research questions III and IV (see p. 3): What advice did the interviewees have for those considering teaching and enrolling in elementary statistics taught all online?

### A) Key findings from 2013 interviews with the instructional design team

**Design, Delivery and Collaboration with Udacity:** In 2013, SJSU entered into an agreement with the then newly formed for-profit educational organization, Udacity, to jointly deliver a series of introductory courses, including Elementary Statistics or Stat 95 fully online.

The Stat 95 fully online course content was developed by two instructors in collaboration with professional education designers from Udacity who translated the course content into video format.

Students in the first iteration of Stat 95 fully online included SJSU students and high school students attending an academy in the San Francisco Bay Area serving mostly under-represented students. These participants were offered a range of supports provided by Udacity, including access to 24-7 online tutoring. Udacity also provided the instructors with weekly reports detailing the percent of each lesson and problem sets individual students had completed and their last log in. In this way, the instructors and the Udacity support team could identify students falling behind and reach out to them with offers of help.

The course was also open to anybody else who wanted to enroll although these individuals did not have access to the Udacity supports.

**Findings:** In interviews members of the instructional design team provided the following insights and shared lessons learned:

- During the first iteration of Stat 95 fully online, the SJSU instructional design team and Udacity realized that other than “a nicely crafted email,” they did not have mechanisms in place to help students become oriented to the course and get off to a strong start. Most students, they found, needed much more guidance and support to understand what was required in order for them to become a successful online student.
- In response, and in the second iteration of the course, an introductory module was added to the course. Comprised of several engagement activities and refined over time, the module: challenged students to complete a readiness-for-online-education survey; study the course syllabus and take a test on this; create a 10-week class calendar that identified key deadlines and set aside time to study for the course; and write a reflective essay on the subject: “Am I ready for online education?”
- The instructional team explained that they were taken aback by how many students did not read or understand instructions easily available to them that explained both the technical and instructional components of the course. Still, as one instructor noted “Last week [more than half way through the Spring 2013 semester], I got an email from a student asking how to log in to check his grade.” The instructor also commented that “the students, especially high school participants, have no time management skills.” He added: “It blew my mind how students are not checking their email.”
- When a survey conducted as part of the NSF-funded evaluation discovered that many students did not know about supports available to them such as the 24/7 online tutoring and online and FTF office hours, SJSU and Udacity emailed students to raise their awareness of these resources. “For example,” one of the instructors noted, “I was surprised that students never seemed to use office hours.” The other instructor explained that: “We started sending out weekly emails to let students know what is happening. We learned to write engaging emails.”
- Stat 95 fully online included weekly problem sets students had to do and this structure helped participants stay on track and avoid the quintessential online challenge of falling more and more behind.
- The team continued to make adjustments with every iteration of the course. “We got better over time,” one of the instructors noted. As an example, in later iterations, the team sent out targeted emails to students who had fallen behind or who otherwise were at risk of failing the class. The emails would ask the students to let the instructor know if they could help out. “There was much more emailing than in a regular class,” one of the instructors recalled, “and much less teaching.”
- Yet, at least during the first iteration of Stat 95 fully online the vast majority of emails from students were technical in nature meaning that instead of asking questions about the course content and the subject they were studying, students inquired about how to manage the course technology. One of the instructors noted that: “The first semester, I had one

question about content. Everything else was technical and a lot of the questions could have been answered if the students had referred to instructions readily available to them.”

- At the conclusion of the second iteration of the course, the two instructors agreed that they had benefited tremendously from working as a team on the course design and delivery. The team approach, they explained, had allowed one of them to focus on completing the course design with Udacity while the other member of the team delivered the course and engaged with students. This division of labor was especially important because the course was still being designed during the first semester of implementation.
- In the exit interview, conducted with one of the two instructors, the interviewee reflected on how “distance affects our ability to engage with students.” He noted that “When you meet [a student] in person you can joke with the student and remove some of the fear factor. You can’t do that in an online course and part of the challenge is how to have casual interactions with your online students.”
- At the conclusion of the pilot phase, one of the instructors also reflected on his longer term vision for the course where he hoped to have access to just-in-time information about student engagement and quiz performance. This would in turn allow him to identify and focus attention on students at risk of failing before they actually failed. At the time this interview was conducted, Udacity was providing data to the instructional team on student engagement and quiz performance, although there were challenges to getting this information to the instructors in a timely manner. There were also discussions about how Udacity might be able to use a predictive model to identify students at high risk of failing at the outset of the course so that preventive support could be offered to these students before they started to run into trouble.

## B) Key findings from 2016 interviews

### B.1. 2016 interviews with the instructional design team

The SJSU-Udacity collaboration ended in Spring 2014 (Elaine???) . After this, SJSU continued to offer the course online, using the course content that the former partners had jointly designed and developed.

In Fall 2016, the instructional design team was interviewed again.<sup>1</sup> The following summarizes the input and insights they provided as they looked back at their experience designing, developing, modifying and teaching Stat 95 fully online:

- One of the instructors described the course design phase as “a great experience.” He recalled that “I had never worked before with professional instructional designers to develop a course. I really enjoyed working with others on this and think it is a very strong course.” In the past, this instructor had created and delivered his own psychology biology

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<sup>1</sup> One of the two instructors on the instructional design team submitted written responses to the interview questions, while the other instructor participated in a phone interview.

class and taught it for two semesters. Describing the process of developing the course with Udacity design experts he noted that “we created the content from the ground up. We could not use anything others had developed.” The instructor said he had been “blown away by the effort and time required to develop the 225 online content,” comparing the experience to that of writing an entire text book.

- Looking back, the two SJSU instructors recalled how the experience of collaborating on the new course had engaged them and enriched the experience. One of them added that the team-teaching approach may be a good model for online courses with large enrollment.
- However, as one of the instructors pointed out, his original assumption: “If I create engaging online material, students will do well,” had not fully played out. “Students need to be comfortable with technology,” the instructor pointed out. “And they need to have achieved a sufficiently high level of educational maturity and self-motivation. The instructor added that “The lack of face-to-face interaction doesn’t work for some students. The regularity of face-to-face courses provides needed structure for students who are not skilled in time management. The lack of regular attendance requirements makes it too easy for them to let time slip away.”
- Before the original course content was passed on to additional instructors, one member of the instructional design team “received a grant from the CSU Chancellor’s Office to migrate the videos from the Udacity platform into Canvas, the SJSU management platform.” In doing so, he made one adjustment to the course, substituting the use of “canned data” in the quantitative projects for data the students themselves had to collect “on the amount of study time they spent working on the course.” The instructor explained that he had made this change hoping that “it would improve [student] engagement and make data analysis more personal.”
- In recalling the contact he had with the instructors who taught subsequent iterations of Stat 95 fully online, the instructor recalled that he had “extensive contact with them to go over the course, its structure, and suggestions for teaching the course.” In response to a question about whether the incoming Stat 95 fully online instructors had completed training in how to deliver online instruction, the other member of the instructional design team explained that requirements vary by department. In psychology, for example, faculty members can develop online courses and submit them to the curriculum committee for a review that will consider only the content – not the experience and skills required to teach the course online. The instructor added that he felt it would be a good idea to require that CSU online instructors are certified for online instruction. This would require that it became mandatory for CSU online instructors to enroll in an available program that offers such a certificate.
- In reflecting on what he has learned about what makes a strong online course, one member of the design team underscored that you need to “build the course from the students’ perspective.” He also advised that online course designers “not be seduced by the latest application or technology.” He added that “You can integrate FaceBook, but don’t add technologies that drive students crazy. Simplification is important.”
- Responding to a follow-up question about what makes a strong online instructor, one member of the instructional design team said that the experience teaching online is very different. “You are more like the course manager.” He cautioned that: “If you like to be

with students, you won't get this [interaction] in online courses. You can try to find ways to engage directly, but it is never going to be like you are there in the classroom with them on a regular basis."

- One of the interviewees noted that the Stat 95 fully online content could be used in a flipped course environment, adding that "it is a strong curriculum."

## **B.2. 2016 interviews with instructors who taught Stat 95 fully online between Spring 2013 and Fall 2016**

The Stat 95 fully online instructional design team first passed on the Stat 95 fully online course to another instructor in XX. This instructor taught the course once. Another instructor to inherit the course also only taught it one time while the third instructor interviewed for this paper completed his third time teaching the course in Fall 2016 when interviews for this paper were conducted. The findings that follow include insights and input provided by each of these three instructors.

### ***Lessons Learned: Instructor Preparation to Teach Online Statistics***

One interviewee explained he had taught Elementary Statistics and many other statistics courses in the past in the traditional face-to-face (FTF) format. He had also taught Elementary Statistics in a flipped format and had used some of the Stat 95 fully online videos in a FTF course.

To prepare to teach the course online, the instructor spent considerable time with the two faculty members who designed, developed and originally taught the course, including the instructor who delivered the course four times. In these conversations, the instructional design team reviewed and discussed "the course content and the general philosophy of the course itself—the big picture of what are we are trying to teach majors and non-majors."

The instructor explained he had two exams in the course and that this is fewer than what he would offer in a FTF course. The reason for not having more exams was the instructor's concern about the proctoring required for each exam and students difficulty with this process. Having only a few exams "made it hard to see if [students] were on track to pass the course or not," the instructor noted." He added that if he had to do it over he would "add open-ended questions to the weekly quizzes as the multiple choice questions did not reveal much about what students know and could do." He also thought the feedback loop between the student and himself would be improved if he had students anonymously rate how well they understood key concepts.

This instructor said that he had not passed these or other reflections and lessons learned on to the next instructor. He had concluded after teaching the online course once that he wanted more training before teaching online again. He noted that he had learned several months after the course ended that his student feedback and ratings were less favorable than what he is

used to receiving. He concluded that “the online format is uniquely challenging in terms of student engagement.” The instructor also commented that he has “temporarily backed away from teaching flipped courses,” and is instead integrating lecture with in-class problem-solving and other hands-on activities.

One of the other three instructors interviewed for the study also taught the course one time only, in Spring 2015. He had previous experience teaching the course FTF and had done so many times before. However, the instructor had not taught a course online before. “I Googled how to teach online,” he noted, explaining that he looked up articles on effective practices. The instructor added that he had received a lot of help from another instructor who had just taught the course online and from the instructional design team. He said he spent about 30 hours preparing for the course, reviewing all the videos and quizzes. He agreed with other instructors that the Stat 95 fully online videos “are great and that their design gave him a big advantage.” The instructor also pointed out that preparing to teach the course required more time than he was used to from FTF courses: “Even though I had the course material, I had to learn all the technology and learn about Piazza (the course forum) and different Canvas features.”

Among lessons learned, this instructor noted that he should have posted a photo of himself so that students had a better sense of connection with him. He added that in an online course he was taking, the instructor was posting videos of himself. By contrast, the instructor noted, in his own online class students had commented: “We didn’t even see the guy [the instructor].”

The third instructor had taught Stat 95 fully online three times (Fall 2015 and Fall 2016 and Summer 2016) when he participated in interviews conducted for this study. Prior to teaching the course, which was his first fully online course, the instructor had taught flipped courses in social psychology. He had also taught statistics FTF before and noted that teaching online created for him “a sense of dislocation,” that resulted from not knowing the students. “If they come to office hours, I will not know them,” he commented.

To prepare himself to teach the course he spoke with faculty members who had taught online courses before and met with the instructional design team. He also watched all the videos to familiarize himself with the course structure and “tested everything to make sure he understood how the grading worked and that there were no mistakes in the quizzes.” He concluded that the preparatory work was “not like creating your own course,” also noting that the structure was “very well thought out.” To further prepare, the instructor used Google to identify effective online instructional strategies.

The first time the instructor taught the course online, he did not change much, but only made minor modifications to the syllabus, including additional quizzes. “Statistics is skills based,” the instructor pointed out, noting that he would not use the online delivery mode for courses such as social psychology. The instructor also distinguished the role that the instructor plays in online

versus traditional classroom delivery agreeing with a description used by another interviewee that: “[in the online environment] you are more like a manager than an instructor.”

The instructor said that he had created in SJSU’s Canvas platform an instructors’ note page where those who teach Stat 95 fully online can record what they are learning and advice to those who will follow in their footsteps. The instructor noted that “If this [page] is used to accumulate what we are learning and experiencing as we teach this course, the instructors’ note page could become “a running teaching tool.”

### ***Lessons Learned: Student Engagement***

None of the three interviewees had any FTF contact with students and even online interaction was extremely limited. One of the instructors commented: “During office hours, I’d be available on Piazza (the course forum where students could post and respond to questions and leave comments), but nobody ever came.”

The student-to-student interaction was also extremely limited with only very few students participating in the Piazza forum. One instructor recalled that he had tried to host weekly discussion section. To encourage participation, he had posted announcements about this activity and encouraged students to come and ask questions. He also provided students who did not want to post their question publicly with the opportunity to submit their questions directly to him. Still, the instructor noted there was “nowhere near the participation I am used to seeing [in FTF courses]. The same instructor had taught the online course when there was funding available for a student tutor who was available by appointment and through email. The instructor said that a small number of students submitted questions to the tutor.

Another instructor had required that students post questions on the Piazza forum before contacting him directly by email. This helped avoid a situation where he would have to answer the same question multiple times, the instructor said. He recalled that: “A group of students participated actively and he could see from the logs that others were monitoring the forum site.” This instructor also shared that he had asked students to answer questions submitted by their classmates. By helping others, the instructor had told the students, they may earn additional credit. Still, very few students participated in this activity

One member of the instructional design team had enjoyed more success with the forum discussions noting that he thought they were helpful, although he added that: “in the future [if I teach another online stat course] I would also hold in-person office hours and arrange other types of face-to-face meetings (e.g., in-person study sessions).”

Another instructor explained that it had been difficult initially to determine what students were talking about and how to interpret their questions when these were submitted to him through email. “In FTF courses, it is second nature,” he noted, referring to how he is used to being able to see the student asking the question and to respond with follow-up request for clarification to

determine what the student needs help understanding. In the online environment, the instructor struggled to interpret what the students were asking until he developed a strategy to help diagnose where the breakdown of understanding occurred. "I asked them to include in their question a reference to where in the video recording they began to get lost," he explained. This approach, the instructor noted, had proven much more efficient than having students explain in an email what they did not understand. "I wish I had done this from day one," he added

All the interviewees said they had emailed students who were at risk of failing following tests, encouraging them to come and see them—online or FTF. In many cases, nothing would happen, although one instructor said that some of the students did respond while others did not follow through and stopped communicating. One of the interviewees posed the question: "How do you reach out to failing students without making them feel they are failing?" Another instructor said that if he could do it over, he would include in the course an activity where students individually or those available to assemble as a group would walk down to the SJSU Tutoring Center to see how they could get FTF help with their coursework assignments. While the tutoring center was identified as a student resource by all the instructors, it is not clear and no information was collected to reveal if any of the students used this resource.

The interviewees' understanding of available student data varied widely. One instructor explained he could track when students logged in to the course, how long they stayed, and which pages they opened. In addition, he could monitor which submissions they made in terms of assignments and their grades. Another instructor noted that he could review the course data overall and by individual students. Additionally, instructors could track communication they had with students, including email exchanges. One instructor noted that the volume of emails he received varied depending on the assignments. "Some weeks I get nothing," he said, "after exams, there are more. It tends to be the same students." Consulting with the data at the end of the semester, the instructor said he had received an average of 7 emails during the past 10 weeks of instruction. Enrollment in the course around 35.

Further, in addition to the data that instructors could access through the college platform, Canvas, they were able to retrieve information from the Piazza forum on how many posts had been submitted and answered. As an illustration, one of the instructors counted 24 Piazza posts during a semester with 17 instructor entries and only three student postings.

As had been the case from the very beginning of the course, many of the students emailed or otherwise reached out to the instructors did so with questions about technology and, as one instructor noted: "in particular the online test proctoring." One of his colleagues observed that "students become frustrated when technology does not work...when they have to struggle to figure out how to set up the proctor so they can take exam."

C) Findings from all interviews: What should instructors teaching online elementary statistics know and consider?

***What is required for instructors to teach online effectively?***

Not all instructors are suited to teach online. As several interviewees pointed out, the online instructor can be like a course manager rather than like a teacher. “It is a very different teaching experience,” as one of the interviewees noted. Some instructors will not enjoy serving in this capacity.

However, there are opportunities to engage with students in the online environment, including through video-supported discussion boards and office hours. To date these opportunities have not yet been pursued by the Stat 95 fully online instructors. As one of the interviewees observed: “If I had to teach online again, I would investigate and learn more about how to teach online. I would develop a tool box of instructional strategies to draw from.”

In summarizing what is required for an instructor to teach online effectively, one member of the Stat 95 fully online instructional design team who himself taught the course four times noted that:

- They [instructors] should have taught several in-person statistics courses before, so they know the typical challenges that students face in these courses.
- They must have good communication skills and be relatable.
- They need to “stay on top” of the course by regularly checking in to respond to students’ questions and concerns.
- They must be able to explain complicated concepts in a straightforward

One of the subsequent Stat 95 fully online instructors added to this list that candidates should be very comfortable with the learning management system (Canvas).

Interviewees drew from lessons they have learned teaching the course by providing the following advice to those who will be teaching Stat 95 fully online in the future:

- Complete SJSU’s training/certification in online instruction
- Talk to the person who taught the course before and prepare as far in advance as possible. It takes longer than you think to review all the material and study all the video.
- Consult and contribute to develop and improve as a teaching tool a Stat 95 fully online instructors’ log that captures lessons learned and best practices and that is passed down from one Stat 95 fully online instructor to the next.
- Design and develop the course from the students’ perspective by thinking of ways to make the course “higher touch” for students. For example:
  - Show who you are with video to build better connections with students.

- Provide multiple venues for students to engage with you [the instructor] both synchronous and asynchronous; have in place active ways in which you can identify struggling students who would benefit from interacting with you in some way and passive ways that allow students to come to you.
- [Host] in-person office hours or some other method of face-to-face meetings (e.g., Skype, Google Hangouts). The purpose is to engage students and make them feel connected to the course, its instructor, and other students.
- Do not be seduced by the latest app. Students are not interested in learning new technologies. You can integrate FaceBook but don't add technologies that drive students crazy. Develop a welcome video where you introduce yourself and the course.
- After the first exam, invite those who did not do well to meet with you (FTF or online). Walk or direct these students over to the SJSU statistics tutors and follow up to see if they are using this resource
- Expand weekly quizzes to include more open-ended questions that reveal better what students know or do not know and understand. With multiple choice questions, you have limited data and it is hard to determine where the understanding breaks down. Find ways to enable students to rate anonymously how well they understand different key concepts.

***What information can help online instructors support online students?***

Below is a list of information that the interviewees said they would like to have available on student engagement and outcomes. Some of this information can be accessed, but there was uncertainty among some of the instructors both about what data is available and where to find this information.

- Time spent on tasks such as watching videos and completing learning exercises
- Frequency of log ins
- Quiz and test completion and scores
- Postings placed on the Piazza (the course forum)
- Emails sent to instructor
- Participation in office hours
- Indication of where students' understanding breaks down (e.g. through anonymous surveys or clicking)

Overall, the instructors would like to have access to multiple points of assessment that would allow them to determine if a student is learning and progressing at a pace that will make them successful. The instructors interviewed all used student grades on the two-three course exams to identify students who were at risk of failing and reached out to these students with emails encouraging them to take action, including scheduling a meeting with the instructor. However, most such efforts to reach this target group of students had limited impact, including students failing to respond to the instructor's email.

When SJSU was collaborating with Udacity on the course, Udacity offered 24/7 chat support, sent out weekly reminders, and tracked individual students' log-ins, time-on-task and other variables likely to affect persistence and completion with a passing grade. At that time, one of the founding instructors explained: "I could pick any student in the course and get a profile of what they had done in terms of watching videos. I was provided with a weekly log and used it to identify students who were not engaging." In addition, Udacity assigned several individuals to reach out to students at risk of failing using a combination of emails and multiple phone calls if necessary.

This kind of intense outreach is not possible for the individual instructors teaching the course, but the interviewees all wanted to do more to identify and effectively reach out to students who were showing signs of under-performing before the student reached a point where it was too late to help them recover.

#### D) Findings from all interviews: What information should students consider before taking elementary statistics online?

As the interviews with Stat 95 fully online instructors illustrated, not all instructors are suited to teach online. Similarly, not all students are good candidates for online instruction. To address this challenge the instructional design team developed and integrated into the course an introductory module that asked students to assess their own online preparedness by completing a series of activities (see p. 5). One of the instructors who recently taught the course praised the introductory module saying he thinks it contributed to high persistence.

Nevertheless, while all instructors agreed that the introductory module was very effective, several of them also questioned whether the content would effectively deter students not suited for online instruction from staying enrolled. A main reason for this is that many, if not most Stat 95 fully online students took the course online for one reason only: they could not get a space in the FTF Elementary Statistics course. Further, as one instructor noted, if a student takes the quiz about suitability for online instruction and finds it is not a good match with their situation or learning style, the semester is already in progress and it is too late to look for an alternative course.

One member of the instructional design team provided the following advice to students considering taking the course online, summarizing points made in the introductory module:

- Make sure that you have good time-management skills
- Make sure that you have a dedicated quiet place to study, watch content videos, etc.
- Make sure that you have sufficient computer technology (e.g., processor, software) and skills (e.g., how to upload and download files) to succeed in the course.
- Make sure you have sufficient mathematical skills (e.g., basic algebra) to succeed in the course.
- Make sure you can learn on your own from watching videos and reading texts

- Don't be afraid to ask questions and make use of the course discussion boards. Let the instructor know if you're struggling in the course sooner rather than later.

What is really required, an interviewee noted is that students fully understand the expectations in this course. "The curriculum is strong and students who engage with the material and are motivated to succeed are likely to do well. But they have to be able to work independently and be committed."

## Section III: Conclusion and Recommendations

### Conclusion

Several interviewees pointed out that many students who take Stat 95 fully online do so because the FTF Stat 95 course is over-subscribed. While there is not yet evidence of how these students perform compared to those who take the course FTF, some of the interviewees indicated that the pass rates for the Stat 95 fully online and Stat 95 FTF courses are similar. Subsequent analysis will compare the online to the FTF persistence and pass rates.

There was general agreement that the course content and design is very strong, reflecting that the instructional design team brought to the table tremendous experience and expertise and to the fact that they created the course in collaboration with a professional instructional design team.

Instructors underscored the difference they themselves experienced teaching online and FTF. Several interviewees felt their role in the online environment was that of a manager rather than an instructor.

Most of the instructors that followed in the footsteps of the instructional design team had no prior experience teaching online. Several of them did not know that SJSU offers training to new online instructors.

None of the three instructors who followed in the footsteps of the instructional design team and were interviewed for this research had actual or virtual face-to-face contact with their students.

While there was considerable information available to the instructors that could be used to track student engagement and performance, the interviewees were not able to fully take advantage of this capacity. First, the use of this technology did not seem to have been part of the training or introduction they received to the course. Second, there was no process in place and no training that helped the instructors contact students and follow up if and when students responded to their emails. This seemed to be the case especially when instructors had reached out to students at risk of failing, encouraging them to seek help and/or to meet the instructor

online or in person. In most instances, the communication seems to have ended after the instructor sent out the initial note to the failing student.

## Recommendations

### **Instructor Preparation and Support**

Before they teach their first online course, require or strongly encourage Stat 95 fully online instructors with no prior online teaching experience to participate in SJSU's training for new online instructors. In addition, encourage instructors who have not yet taken an online course to review a sample of online offerings in their own or in a related discipline. For this purpose, SJSU could develop a list of online offerings that have received favorable ratings from students. To allow for this kind of preparation to take place, SJSU would need to identify Stat 95 fully online instructors several semesters (ideally) before they teach their first online course so they can find time to complete the training. This recommendation would apply to all incoming online instructors at the institution and not only to those preparing to teach Stat 95 fully online.

Provide Stat 95 fully online instructors with support and training to develop, test and refine strategies they can use to engage directly with their students, including how to host office hours and problem-solving sessions in Google Hangout and how to effectively reach out to students who are behind or under-performing. For example, provide new instructors with sample emails they can send to students who are falling behind as well as follow-up emails to students who do not respond. In preparing faculty members to engage online with students it is important that the training they receive address both the challenge of effective communication online with individual students as well as groups of students and management of the technology that is required to host these interactions.

Have as standard practice the inclusion of a photo of the instructor with a personal statement as well as a recorded video welcoming students to the class. Encourage Stat 95 fully online teachers to record and publish additional video statements throughout the semester.

### **Student Preparation and Support**

Encourage and provide incentives for past students to record short videos explaining to students who are considering taking the course what is required to be successful in an online environment.

Continue the online readiness module. Consider sharing this resource with other departments that offer online instruction. Update the module regularly to reflect changes in technology.

Make sure that the course maintain the highly structured format that has been at its core from the outset. As the NSF-supported research showed in the past<sup>2</sup>, it was the structure and enforced pacing that most accounted for student persistence and success in this course.

### **Teaching Effectively Online – Not for Everybody**

Make sure that instructors understand that the teaching experience in online courses is very different and that those who teach because they love to engage with students are less likely to find this mode of instruction to be stimulating and fulfilling.

Student-centered instructors with extensive online experience have developed strategies to inject personal interaction with online students into these courses. It may be worthwhile for SJSU to identify and contact some of these experts, including Dr. Amelito Enriquez, an instructor at Canada College who is the recipient of numerous NSF-grants, including several that fund a summer institute for faculty members who want to teach online or improve their knowledge of technology in teaching.

### **Developing a Process to Support Continuous Improvement**

While some of the interviewees spoke of a log that instructors can use to record lessons learned and suggested improvements, this “hand-off” is not a standard practice. SJSU may consider formalizing the log to include lessons learned on key issues such as student-instructor and student-student interaction.

In the past, the introduction and preparation provided to those who were about to teach their first Stat 95 fully online course was presented at the beginning of the semester when the course was offered. It may be useful for the instructors to have the opportunity for a follow-up meeting several weeks into the semester when they have experienced first-hand the particular challenge of teaching online.

One of the instructors also noted that the results from the student satisfaction survey did not reach him until late the semester after he taught the course. It was only then that he realized that his student ratings were lower than they usually are in his FTF courses. While the delay in processing the student surveys may be an institutional challenge, it would be useful for new instructors to have access to past surveys with student feedback on this particular course.

### **Question Raised**

Finally, two interesting questions were raised in the interviews:

Udacity injected into the collaboration with SJSU resources and design expertise that enabled the Udacity-SJSU team to translate the SJSU faculty members’ subject knowledge and instructional expertise into a contextualized, highly polished and professional online content.

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<sup>2</sup> Firmin, R., Schiorring, E., Whitmer, J., Willett, T., Collins, E. D., & Sujitparapitaya, S. (2014). Case study: using MOOCs for conventional college coursework. *Distance Education, 35*(2), 178-201

The SJSU instructors invested a large amount of time in this process. In the words of one of the SJSU instructors: “ ...[it was as much work as] writing an entire text book.” Three years later, the faculty members looked back and felt very satisfied that the online course was “strong” and of very high quality. This raises a question – what is the added value that Udacity’s professional education design team injected into the online course – what can instructional teams that do not have access to professional education design experts learn from the 225 videos? What is the value of engaging in online course development professional design experts?

One of the aspirations expressed by one member of the instructional design team was to develop content and a delivery format which would enable him to dedicate more time than is possible in a FTF environment to “getting in touch with students who are struggling and lift them up.” The vision was that the instructor would “spend the time normally dedicated to lecturing focusing on supporting these students.” The quotes are from interviews conducted when Udacity delivered extensive supports to Stat 95 fully online students and at a time when there were plans to develop new ways to identify and quickly reach out to struggling students. The current version of Stat 95 fully online has not included efforts to reach potentially failing students early other than through emails sent to students who scored low on exams. However, the question about how online instructors can dedicate attention and time to focus on early interventions targeting at-risk students remains as relevant as before and merits conversation among those who will teach the course—and other online courses—in the future.

## Appendix A: Methodology

Two semi-structured interviews were conducted in 2013 with the instructional design team. The first interview, conducted mid-semester, included both instructors. One instructor participated in a second interview conducted after the semester had ended.

Four semi-structured interviews were conducted in December 2016 with one member of the instructional design team and with three instructors who taught the course between Fall 2013 and Fall 2016. In addition, the other member of the instructional design team, submitted written responses to the questions posed in the interview protocol.

The interviews were conducted by phone and were between 45 and 60 minutes long. The interview protocols are presented in Attachments I and II.