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RESEARCH ARTICLE

EXPERIENCES OF FIRST-YEAR COLLEGE STUDENTS IN AN ONLINE STATISTICS COURSE DURING THE COVID-19 PANDEMIC

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ABSTRACT

The COVID-19 pandemic caused the closing of classrooms all over the world. This paper discusses online learning and learning experiences of first-year students whose first college semester was the Fall of 2020 for the academic year of 2020/2021. The study employed the exploratory case study approach to assess the online pedagogical experiences of first-year students during the COVID-19 pandemic. Furthermore, it examines their engagement and effectiveness of online class tasks. Findings from the case study interviews showed majority of the first-year student were not prepared for online learning in the way as deployed by colleges during the pandemic. Colleges also were caught in the same predicament as they try to support the new students in all ways possible with the limited resources because of the drastic decision of shutdown. The paper may assist parents, educators and students to be prepared and flexible to adapt to different learning situations should there be natural disaster or pandemic affecting traditional learning.

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INTRODUCTION

The COVID-19 pandemic forced 1.5 billion students and 63 million educators worldwide to rapidly modify their face-to-face academic practices (Valverde-Berrococo *et al.*, 2020). By the fall of 2020, many colleges and universities were using both synchronous and asynchronous approaches to online learning. While many incoming freshmen had completed their last few months of high school online, most were unprepared for e-learning at the college level. Gonzalez *et al.* (2020) cite improvement in performance in students learning from home, but more research is needed to determine how online learning has been experienced by students during this time (Aguilera-Hermida, 2020). This qualitative case study investigates how a group of first-year students perceived their online learning experiences in terms of: 1) media familiarity, 2) effectiveness of course materials, and 3) completing class tasks online. It uses the framework of learner-centered principles (LCPs) developed by the American Psychological Association (APA, 1997) that stress new educational approaches focused on the integration of students' needs, skills, interests, and backgrounds into curriculum planning, and looks at how these principles apply to online learning.

LITERATURE REVIEW

As a result of the COVID-19 pandemic, teachers were forced to move from face-to-face classroom instruction to designing and developing virtual learning (Abdelhafez, 2021). Educational institutions adopted and implemented online learning, synchronous and asynchronous communication tools. Synchronous and asynchronous communication as stated by Gunawardena *et al.*, (1997), computer-mediated conferencing is presently being employed with greater and greater frequency as an environment for collaborative learning. For the first time, online platforms such as Google Classroom, Zoom, interactive learning environments, social media, and various community channels such as Telegram, Messenger, WhatsApp, and WeChat are explored and tried for teaching and learning (Das, 2021). Online or remote education implies that students are physically distant from the instructors and require a delivery method. Online education has been studied for decades and effective online teaching is the result of careful instructional design and planning (Hodges *et al.*, 2020). Virtual learning occurs when teachers, leaders, and students can reflect on the best options to engage virtually and then go through a process where they learn what works and what does not. Pandemic learning is when the opportunity for virtual learning is created overnight. The luxury of time to reflect on what works and what doesn't work is nonexistent (DeWitt, 2020).

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The unprecedented global coronavirus pandemic initiated the biggest distance learning experiment in history. Since 2020, online learning is spreading like a brush fire across all types and levels of education (Serdyukov, 2021). However, the utilization of the medium in education has in many respects outstripped the development of the theory on which to base such utilization. One significant question, which has not been adequately answered, is how to assess the quality of interactions and the quality of the learning experience in a computer-mediated conferencing environment (Gunawardena *et al.*, 1997, p. 397-398). They went on to state that computer-mediated conferencing “enables groups that are separated in time and space to engage in the active production of shared knowledge” (Gunawardena *et al.*, 1997, p. 410). Assessment of online learning is not to be conducted as it has been in a traditional face-to-face classroom (Reeves, 2000). Reeves suggested, “Traditional assessment measures are unlikely to reveal the complexities of student-centered online learning environments that are radically different from the dominant teacher-centered instructional paradigm” (p.109). As online and blended learning has become a commonplace educational strategy in higher education, educators need to reconceptualize the fundamental issues of teaching, learning, and assessment in nontraditional spaces. These issues include concepts such as validity and reliability of assessment in online environments serving the intended purposes, as well as understanding how formative assessment functions within online and blended learning (Gikandi *et al.*, 2011). Vonderwell *et al.*, (2007) indicated that assessment (whether formative or summative) in online learning contexts encompassing distinct characteristics compared to face-to-face contexts, particularly due to the asynchronous nature of interactivity among the online participants (teacher and learners). By the very nature in which the medium of learning changed, equally created, this concern, learners’ interaction within the learning space. Formalistic, standardized machine-based education imposes certain norms and routines of learning which can modify consciousness to a predetermined pattern and condition students to certain actions. This creates a rift between a free, active, creative, investigative mind and a passive, dependent, filled one (Serdyukov, 2021).

The Fall of 2020 semester freshmen who completed their last few months of high school with online learning unpreparedly continued their first college semester during the peak of the pandemic with online learning. Online courses can improve access, yet they also are challenging, especially for the least well-prepared students (Bettinger & Loeb, 2017). Bettinger and Loeb (2017) continue that these students consistently perform worse in an online setting than they do in face-to-face classrooms; taking online courses increases their likelihood of dropping out and otherwise impedes progress through college. As this study seek to gain better insight into the experiences of these unprepared online learners, it is pertinent to discuss the learners' interaction within the context of online learning to give perspectives to the educators' efforts to educate more than 1.5 billion students and youth across the globe (UNESCO, January 2021) during this COVID-19 pandemic. Learner-centered computer-mediated interaction involves reciprocal communication among participants in computer-mediated learning environments that emphasizes learner development in cognition, motivation, and social advancement for knowledge construction and community building. The learner must be empowered to profess the necessary skills to use the

communication tools and feel comfortable with the learning environment (Chou, 2001). Moore (1989) contributed to the discussion of learners' interaction by providing three types of interaction, learner-content interaction, learner-instructor interaction, and learner-learner interaction. Moore (1989) distinguishes between the three types of interaction, giving benefits conceptually to overcome the misunderstandings between educators who use different media:

“...*Learner-Content Interaction* is the first type of interaction. It is the interaction between the learner and the content or subject of study. This is a defining characteristic of education. Without it, there cannot be education, since it is the process of intellectually interacting with the content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind...”

“...*Learner-Instructor Interaction* is the second type of interaction regarded as essential by many educators, and as highly desirable by many learners. It is the interaction between the learner and the expert who prepared the subject material, or some other expert acting as an instructor. Furthermore, instructors provide counsel, support, and encouragement to each learner, although the extent and nature of this support vary according to the educational level of the learners, the teacher's personality and philosophy, and other factors...”

“...*Learner-Learner Interaction* is the third form of interaction, a new dimension of distance education, that will be a challenge to our thinking and practice in the 1990s. This is inter-learner interaction between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor...”

Furthermore, learners are active agents who use cognitive, physical, and digital tools to operate on raw information to create products of learning. Learners regulate their learning by continuously evaluating the quality of their products and the effectiveness of the chosen study tools and tactics (Winne and Hadwin, 1998). The learner, being separated from the school and the instructor by space and time, gained the freedom of choosing a more convenient self-study environment, adapting learning to his or her learning style and pace, but lost organized, disciplining and thus obliging regular classroom activities, as well as engaging face-to-face interactions with the instructor and peers, and an opportunity to develop relationships with the peers and the instructor (Serdyukov & Serdyukova, 2012). According to Mirriahi *et al.* (2018), this process, known as metacognitive monitoring, is influenced by internal and external conditions. The former includes a learner's level of motivation, prior knowledge, and affective state. The latter is determined by the elements of the instructional design such as the teacher's role, course requirements, and availability of feedback. Learner's agency is also evident in the decisions the learner makes regarding the study tools and tactics they use to meet the requirements of the learning tasks (p. 58). Insufficient attention to pedagogical questions and concerns arising from the practice of on-line teaching raises questions about the assessment of learners in on-line classrooms (Speck, 2002, p. 5). There is a need to identify effective assessment methods appropriate to online learning and understand how online learning changes the selection, monitoring, and managing of assessment activities

(“Australian National Training Authority,” 2002). Both learners and instructors share ownership and responsibility for assessing their performance and learning outcomes. Additionally, transitioning from face-to-face to 100% online learning is a substantial change to students not only in the medium of delivery but also in the ability to retain learning. Learner-centered assessment can encourage meaningful dialogue, increase collaboration, peer and self-evaluation, and a sense of community for a shared purpose (Morgan & O’Reilly, 2001). Online educators should make all efforts to engage students in communication, interaction, collaboration, and cooperation; integrate inquiry, discovery, and problem-solving approaches and offer meaningful tasks; facilitate their becoming independent, critically minded, creative individuals (Serdyukov, 2021).

Students need to take an active role by planning, monitoring, and then reflecting and evaluating not only the learning tasks but the processes of learning as well (McLoughlin & Luca, 2002). Immediacy behaviors of the instructor and student expectations may influence student learning and metacognitive processes. Instructors should structure a feedback mechanism that will encourage student inquiry, collaboration, metacognitive feedback, and self-assessment strategies (Vonderwell *et al.*, 2007). Online learners need to manage their learning through self-and peer assessment, discovery, learning, reflection, and articulation (“Australian National Training Authority,” 2002). In the context of the COVID-19 pandemic, these processes require a learning environment that supports active student roles and the active involvement of educators saddled with the responsibility of creating balanced learning during unusual times.

MATERIALS AND METHODS

Design/Setting: This study employed an exploratory case study approach to assess the online pedagogical experiences of freshman students during the COVID-19 pandemic. A case study is a “detailed examination of one setting, or a single subject, a single depository of documents, or one particular event” (Bogdan & Biklen, 1998, p. 54). Case study results in a rich and holistic account of a phenomenon anchored in real-life situations and offers insight and illuminates meaning that expands the readers’ experiences (Merriam, 1998).

The research question this case study attempts to answer is: How did first year students at one mid-size state university perceive online learning during the COVID-19 pandemic? This study focused on first year college students who registered for STAT 150 courses during the Fall semester of the 2020/2021 academic year who have not taken any college classes online before and this is their first college semester. This will enable educators, administrators to understand the experiences of first year students with online learning and technology-supported learning through their lenses during the COVID-19 pandemic as e-learning resources were critical in assisting colleges and universities in facilitating student learning during the shutdown of universities and schools (Subedi *et al.*, 2020).

Participants: The sample represented in this study is the freshman class of the Fall 2020 semester enrolled in STAT 150 courses at a mid-sized public university in the Western region of the United States. A purposeful sampling method

was utilized to recruit the participants interviewed for this study. An email was sent to all students soliciting their participation in the study. Their demographic characteristics, including age, gender, ethnicity, home state, and major are provided in Table 1.

Instruments and Procedures: Data were collected through in-depth interviews with each participant. The questions addressed the level of familiarity participants had with online learning before starting college to gauge their level of preparedness. Participants were also asked about how many classes they were currently taking, along with questions about their overall learning experiences during the COVID-19, how engaged they felt with online classes, their experiences using Zoom in classes and how this might compare to a face-to-face situation. A list of interview questions is provided in Table 2. All interviews were conducted through zoom, recorded and transcribed verbatim, and reviewed for accuracy before analysis began.

Data Analysis: All data were analyzed inductively using a standard thematic analysis approach (Patton 2016). The inductive approach of qualitative data coding involves working exclusively from the participant experiences that drive the analysis entirely. According to Thomas (2006), inductive analysis refers to “approaches that primarily use detailed readings of raw data to derive concepts, themes, or model through interpretations made from the raw data by an evaluator or researcher” (p. 238).

In this form of analysis, data are reviewed line by line in detail, and, as a concept becomes apparent, a code is assigned to that segment of the document (Bradley *et al.*, 2007) relevant to the evaluation or research objectives (Thomas, 2006). Similar and co-occurring codes were grouped to generate themes. QSR NVivo 12 Pro, a qualitative research software, was used for data coding. Data analysis was iterative and detailed on emerging codes and themes. The direct quotations used within the results section were selected because they appear representative of each given theme and provide a glimpse into participants’ beliefs and how they assess their online pedagogical experiences and engagements. In total, six overall themes were identified. These themes are: 1) College Experience, 2) Familiarity with Online Learning, 3) Online versus Face-to-Face Tasks, 4) Online Class Engagement, 5) Overall Learning Experiences Without COVID-19, and 6) Course Delivery Preferences.

RESULTS

College Experience: All participants were taking six classes with all classes except labs offered online only as a result of the COVID-19 pandemic. Eight of the ten participants indicated the online classes had been difficult for them while two were happy with their experience and reported it as relatively easy.

One of the participants who had struggled throughout the semester stated “...it is just kind of hard to keep up with the classes because there is a heavier workload, especially with COVID-19 since we’re not in class. It is also hard to understand the different teachers teaching styles”. This express the struggles this participant was experiencing with online learning.

Table 1. Participant Demographic Information

Pseudonym	Age	Gender	Ethnicity	Home State	Major
Apricot	45	Female	Caucasian	Pennsylvania	Dietetics
Carnation	18	Female	Hispanic	Colorado	Nursing
Dandelion	18	Female	Hispanic	Colorado	Nursing
Gray	18	Female	Mixed	Oregon	Business Administration
Green	18	Female	Hispanic	Colorado	Nursing
Indigo	18	Female	Caucasian	Colorado	Nursing
Orange	18	Female	Caucasian	Illinois	Biological Studies
Pink	19	Male	Caucasian	Colorado	Nursing
Scarlet	18	Female	Caucasian	Colorado	Nursing
Violet	18	Female	Caucasian	Colorado	Nursing

Table 2. Interview Questions

1.	Please tell me about your college experiences so far. How many classes are you taking this semester and how many are synchronous or asynchronous?
2.	How familiar are you with online learning? Are you having any unique experiences? If so, what are they?
3.	How would you describe using the online learning materials available for your class?
4.	Are you completing your class tasks online compared to face-to-face courses?
5.	How engaged are you during online classes with your professors? How does the professor best engage you during online classes?
6.	Evaluate and reflect on your overall online experience, how do you think it would have been without the COVID-19 pandemic?
7.	What is your experience being interviewed online through Zoom? What do think are the strengths and weaknesses of a Zoom class or meeting?
8.	Besides Zoom, what other online platforms do think you would be able to use during online classes or meetings?
9.	Which would you have preferred for this interview, online video, face-to-face or voice call and why?
10.	Pseudonym- Any specific name you would like us to use when coding the interview?
Demographics:	
1.	What is your age?
2.	What is your major/career?
3.	Hometown or town of association?
4.	What is your ethnicity?
5.	What is your gender?

Another participant who had enjoyed the semester reported the following “ I’d say it’s been pretty good as I have to keep track of my homework and get it done on time. I haven’t really been on campus much because of the COVID-19 and I live just a couple blocks down from campus”.

Familiarity with Online Learning: Nine out of the ten participants expressed a lack of familiarity with online learning and online study materials, while just one indicated familiarity with online learning as a result of their high school switching to the online mode of class delivery during the last three months of their last semester of high school (Spring 2020) as a result of the COVID-19 pandemic. One of the nine participants stated “...I have never taken an online course. Everything has always been in person for me. Thus, I have not had much experience with online learning.” Participants expressed the COVID-19 suddenly saddled them with great responsibility for their own learning, which would not have been the case in traditional face-to-face learning. The participant who expressed familiarity with online learning started “...I was kind of nervous because I ended high school with online learning. Definitely it was not as much of a study workload like I’m experiencing now in college, but I’m kind of getting on with my studies. Online learning was brand new to the high school as we were about to complete the semester, but I learned a bit which is helpful now.”

Online Versus Face-to-Face Tasks: On this theme, nine out of the participants again stated they think face-to-face will be more efficient and better, while one participant stated online learning is faster. One extract from the nine participants stated “...I’m doing them pretty much on my own time whenever I feel like it, that’s not to say I am procrastinating on it. I like focusing on my in-person classes, which have much more planning and strict timelines, I mean real time requirements to

get schoolwork done, and I prefer learning that way than online”. The participant that indicated online learning is faster stated “...I have set up a pretty good schedule to remind me of all tasks that I need to complete. I think that if I did take in-person classes, my organization would be more”.

Online Class Engagement: On this theme, the participants had some interesting mixed responses depending much on the individual classes. Most of the participants stated that their professor kept them engaged by doing zoom breakout rooms for group discussion, asking questions, and some professors gave clues to be used later during the quizzes. Some participants reported their professors used class activities at intervals to gauge if they were pay attention. These are some statements as expressed by the participants, “... my level of engagement depends on the day. I am not gonna lie, because some days when on zoom sitting in our room, and our bed is right there staring at us, you want to just crawl into bed, not continue with class or engage the online session as you can turn your camera off”. Another participant stated “...I’m somehow engaged always, because the professor at random points throughout the lecture, say the answers to the attendance quiz. Then there is an attendance on canvas and that keeps us involved”. The information from these interviews provided a window to how professors were keeping their students engaged and facilitating learning during the COVID-19 pandemic.

Overall Learning Experiences Without COVID-19: On evaluating and reflecting on this theme, all participants stated their learning experiences in different ways would have been different in different ways. Each student learn differently and moving to online learning can result in cognitive overload, affecting students’ ability to sufficiently learn new information (Bower, 2019). These are some extracts from the interview on

overall learning experiences "...I think it would have been better without the COVID-19 pandemic, because I feel like campus would be more alive and I would instead of trying to do work to get a good grade, I would actually be learning in person and asking questions, if that makes sense". Another participant stated "...So maybe if we hadn't had the COVID-19 pandemic, I would be less independent and less organized, because I would be relying on the teachers a little more and learning faster. I'm sure...". The pandemic, COVID-19, created new stressors on education institution resources as the need to shift to more exclusive forms of distance delivery presented itself. While technology has enabled the provision of education across various virtual platforms, not all school levels or institutions have used them (Robinson-Neal, 2021) in the way during the pandemic.

Course Delivery Preferences: On this theme, nine out of the ten participants indicated they really like zoom because it cut down a lot of effort needed to attend a class, meeting or interview, while one participant out of the ten said face-to-face meeting is preferable and, the human feeling of meeting people in person is a great experience. These are some extracts from the interview, "...I would say it's fun to zoom and you can see each other almost like in person. I think zoom is cool. Again, it is very engaging rather than email because it is easier to portray what you're trying to say when you are talking instead of emailing". Another participant said "...I think so far zoom is excellent, for example, this interview is going nicely, I am able to understand the questions and answer everything. I think the only weakness of it for me is that I like in-person meetings".

DISCUSSION

These participants provided valuable insights into the online learning experiences of first-year students during the upheaval in learning resulting from the COVID-19 pandemic. The majority of students interviewed were not at all prepared for online learning. Some expressed difficulty accessing online learning materials or getting them to work, effectively, emphasizing that seeking technical support was very challenging and made learning more difficult. All participants expressed satisfaction with the support given by the professors, along with their creative efforts to keep them engaged and learning. They especially appreciated zoom sessions that were recorded, allowing them to review the material again outside of class. Some expressed satisfaction and excitement at the flexibility of online assignment deadlines, but noted they often had to pay extra attention to deadlines and due dates in order not to miss submitting their homework.

Conclusion

Online learning is likely to become more prevalent, not only due to disasters such as the COVID-19 pandemic, but in response to the needs of nontraditional students who require greater flexibility in completing their education. In spite of the likelihood that many students may encounter online learning at some point during their higher education experience, whether by choice or necessity, few are prepared for this reality during high school. Some introduction to online learning in the final year of high school to begin to prepare students for college learning would have been a useful addition to the high school curriculum. High schools should consider adequately

preparing students to adjust and effectively learns through a variety of channels. These channels, which may include online, distance, correspondence learning, etc., could be built into regular high school course work as projects or dry-run exercises. These then become part of the expectation for the college experience. It is vital to note that effective training for both students and educators may reduce the negative effects of emergency online learning, as in the case of the COVID-19 pandemic. Better training may reduce financial and human costs resulting from emergency measures. Finally, engaging parents, educators, and students in designing and implementing comprehensive and flexible training programs will be crucial in approaching possible future lockdowns and emergencies.

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