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College students' use and acceptance of emergency online learning due to COVID-19

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ARTICLE INFO

Keywords:

Emergency Online learning
Face-to-face learning
COVID-19
Students' perception
Online learning acceptance
Technology Acceptance Models

ABSTRACT

Due to COVID-19, higher education institutions transitioned to online learning. This study explored college students' perceptions of their adoption, use, and acceptance of emergency online learning. The factors analyzed were attitude, affect, and motivation; perceived behavioral control (ease of use of technology, self-efficacy, and accessibility), and cognitive engagement. Quantitative and qualitative data were collected from 270 students. The findings present how attitude, motivation, self-efficacy, and use of technology play a significant role in the cognitive engagement and academic performance of students. Also, participants preferred face-to-face learning over online learning. This study presents suggestions on how to improve the acceptance of emergency online learning.

1. Introduction

The world is facing a health crisis as COVID-19 has spread globally. As a result of COVID-19, higher education has moved to deliver courses online during Spring 2020 (Ali, 2020; Daniel, 2020; Hodges, Moore, Lockee, Trust, & Bond, 2020; Murphy, 2020). However, students have expressed stress related to online learning and difficulties when completing schoolwork. Understanding students' challenges and preferences, higher education institutions can develop strategies to assist students in case there is a second wave of Coronavirus or any other disaster that requires an emergency transition to remote learning. The current study explored college students' perceptions about their adoption, use, and acceptance of online learning after COVID-19 government measures (stay-at-home orders and/or physical distance).

To reduce transmission of the COVID-19, several countries established measures on infection prevention and control by limiting contact between people (WHO, 2020). Governments suggested or ordered physical distancing and movement restrictions (CDC, 2020). For this study, the term used will be "stay-at-home" order. Higher education communities aimed to slow the spread of the virus by protecting vulnerable students, staff, and faculty and to help ensure a safe and healthy learning environment (Cao et al., 2020; CDC, 2020; Huang et al., 2020). Many college campuses and universities transitioned to remote learning where classes were held online (Ali, 2020; Crawford, Butler-Henderson, Rudolph, & Glowatz, 2020; Huang et al., 2020). Some universities were offering asynchronous classes where instructors prepare assignments or record lectures and students can complete them at their own pace

(Crawford et al., 2020; Hodges et al., 2020). Some institutions used "synchronous" learning that occurs at a specific time via a specific medium.

There is some evidence to suggest that online learning during the pandemic facilitated benefits. Gonzalez et al. (2020) analyzed students' performance during COVID-19 and found that students improved their performance when compared with a cohort from the previous year. Gonzalez et al. (2020) analyzed the results of specific tests designed for both, the online and face-to-face modality (this was part of a larger study analyzing learning strategies). The authors found significant improvement in the scores of both modalities, online and face-to-face, when students were confined due to COVID-19. Although there may be documented and objective improvements in performance, there is not enough information about how COVID-19 measures (stay-at-home) and online learning have affected the learning process from the students' point of view.

1.1. Online learning

Online or remote education implies that students are physically distant from the instructors and require a delivery method (Wang, Shannon, & Ross, 2013; Wilde & Hsu, 2019). The interaction between students and teachers is mediated by technology, and the design of learning environments (e.g., space where learning occurs) can have considerable influence on learning outcomes (Bower, 2019; Gonzalez et al., 2020; Wang et al., 2013). Online education has been studied for decades and effective online teaching is the result of careful instructional design and planning (Hodges et al., 2020). However, due to the COVID-19 pandemic, many students around the world had to transfer from face-

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to-face instruction to an online learning environment in the middle of the semester. People have limited information processing capacity, and there is potential that combinations of learning modalities can result in cognitive overload, impacting the ability to sufficiently learn new information. Moreover, if students lack confidence in the technology they are using or do not feel a sense of cognitive engagement and social connection, the result may affect negatively the students' learning outcomes (Bower, 2019).

Technology, if used effectively, allows students and teachers to mutually engage and collaborate (Bower, 2019; GarcíaBotero, Questier, Cincinnato, He, & Zhu, 2018; Gonzalez et al., 2020). The more successful transitions to online learning are influenced by the user's intention and the usefulness of the technology (Kemp, Palmer, & Strelan, 2019; Yakubu & Dasuki, 2019). Online learning's effectiveness highly depends on the degree of acceptance of the user (Tarhini, Hone, Liu, & Tarhini, 2016). Therefore, it is important to analyze the factors related to the use and acceptance of technology.

1.2. Technology acceptance models

Technology acceptance models explain the determinants of computer acceptance among user populations (Abdullah & Ward, 2016; Chan, 2013; Kemp et al., 2019; Teran-Guerrero, 2019). The first technology acceptance model (TAM) was based on cognitive theories that explain the process of adopting a behavior. Technology acceptance implies the willingness and the continuous use of technology from the user. Researchers use TAM to understand the use and acceptance of mobile learning; however, the first model has limitations and has been redefined many times (GarcíaBotero et al., 2018; Teran-Guerrero, 2019). Kemp et al. (2019) analyzed different technology acceptance models and developed a taxonomy of factors that affect attitudes towards the use of educational technologies by students or educators in higher education institutions. The taxonomy included seven primary categories: a) attitude, affect, and motivation; b) social factors; c) usefulness and visibility; d) instructional attributes; e) perceived behavioral control, f) cognitive engagement, and g) system attributes. Even though all the factors are influential for adopting technology, this research will be focused on the factors that are mainly related to students' behavior or attitude. The factors that will be considered are attitude, affect, and motivation; perceived behavioral control; and cognitive engagement.

Factors that focus on the educator (instructional attributes), the technology design (visibility and system attributes), or social factors will not be analyzed. The abrupt transition to online learning did not allow educators and professionals to plan a properly designed online instruction that eases the transition. Furthermore, social distancing during COVID-19 created a new social reality that is outside of the scope of this study.

1.2.1. Attitudes, affect, and motivation

The first group of factors refers to attitudes, affect, and motivation (Kemp et al., 2019). Attitudes towards a behavior refer to the individual's positive or negative evaluation of the behavior (GarcíaBotero et al., 2018; Kemp et al., 2019). Students' attitudes towards educational technology directly affect their learning process (Ali, 2020). GarciaBotero et al. (2008) studied the factors that affect behavioral intentions and the use of mobile-assisted language learning. The authors found that students' attitude significantly impacts their intention to adopt mobile technology for language learning.

Another consideration is the user's affect toward the learning experience. Affect includes the user enjoyment and satisfaction with the prior use of an information system, the affect toward the use of technology, and the individual's emotional state (Kemp et al., 2019). Findings suggest that there are negative correlations between negative emotions and cognitive processes and learning outcomes (Heckel & Ringeisen, 2019). The quantitative findings related to affect and emotions will be published in a different study.

Motivation alludes to the learner's intrinsic motivation to learn. It includes the satisfaction inherent in the activity and the intention to achieve a goal. Motivation refers to the perceived relevance of an activity that impacts behavioral intention. Students who are motivated will engage in self-regulatory activities that help them to achieve their goals (Kemp et al., 2019). Similarly, Albelbisi and Yasop (2019) explain that learners who are highly self-regulated exhibit effective positive motivation and self-efficacy concerning their learning processes through selecting learning content, identifying learning goals, and organizing and controlling their learning. Research has shown that lack of motivation and self-regulation skills in online learning may result in individuals spending extra time completing assignments, turning in late assignments, or overall poor-quality work (Albelbisi & Yasop, 2019).

1.2.2. Perceived behavioral control

Perceived behavioral control refers to the individual's capability and effort and facilitating conditions that affect the ability to use educational technologies. It includes ease of use, self-efficacy, and accessibility to technology. Ease of use refers to the degree to which a user expects the target system to be free of effort. It implies prior experience and knowledge about educational technology (Kemp et al., 2019).

Regarding self-efficacy, Kemp et al. (2019) included self-efficacy of various forms, focusing on "people's judgments of their capabilities" (p. 2399). It is a targeted concept where a person estimates what one can do with the skills one possesses. Self-efficacy is based primarily on the Social Cognitive Theory developed by Bandura (1977). It states that previous experiences and efficacy expectations contribute to self-efficacy. From this social cognitive theory, "individuals are regarded as proactive agents in the regulation of their cognition, motivation, actions, and emotions" (Myers et al., 2019, p. 2).

Students achieve online learning self-efficacy based on previous experiences with technology and may require training and assistance to use learning tools and platforms before the start of an online course (Heckel & Ringeisen, 2019). Ultimately, if the student believes they have knowledge and resources to support them, it will positively influence their use of the application (Alghamdi, Karpinski, Lepp, & Barkley, 2020; Yakubu & Dasuki, 2019).

The last factor of perceived behavioral control includes accessibility and mobility. Accessibility is the degree that a student can access to reliable internet and use of cloud applications and mobility is defined as the students' ability to use devices without any time or place restriction.

1.2.3. Cognitive engagement

Kemp et al. (2019) describe cognitive engagement as the cognitive processes that allow the user to absorb the knowledge. It includes focusing attention, engaging curiosity, concentration, and flow. Cognitive absorption refers to a state of deep involvement and flow refers to the concentration in one activity without paying attention to anything else (Kemp et al., 2019; Saade & Bahli, 2005).

Online learning material must be provided in ways that enhance the learning experience. This requires a deeper understanding of the factors that influence online learning. As mentioned before, there is extensive literature related to online learning, but not enough about the students' perception of emergency remote teaching and learning. This is particularly important because students had to do it and not because they decided to venture into online learning (Hodges et al., 2020).

This research is part of a larger cross-cultural study on college students' perceptions about how online learning due to COVID-19 has affected their learning process. This research presents only data from the United States of America. The research questions that guided this study are:

What are college students' perceptions about their adoption, use, and acceptance of online learning after COVID-19 government measures (stay-at-home orders and/or physical distance)?

What is the students' perception regarding factors that affect the use and adoption of educational technologies such as attitude, affect, and motivation; perceived behavioral control; and cognitive engagement?

How do attitude, affect and motivation; perceived behavioral control; and cognitive engagement relate to each other?

2. Method

All procedures were approved by the Institutional Review Board. A total of 298 students responded to my anonymous, online questionnaire hosted on the Qualtrics survey platform, and 28 provided no information after login. A total of 270 participants (166 women and 96 men) gave informed consent and completed the questionnaire after the transition to online learning. Participants received no remuneration. Participants' mean age was 21.9 ($SD = 3.9$), and reported ethnicities were: 50% Caucasian, 14.5% Asian, 11.1% Black/African, 10.7% Multiethnic, 8.1% Hispanic/Latinx, 2.2% Other, and 3.7% preferred not to answer. Most students (89%) were from the author's home institution, although some students from other colleges responded via snowball sampling. 86% were undergraduate and 14% graduate students. At the time of questionnaire completion, students were taking a mean of 4.5 ($SD = 4.4$) courses. A few students (4.4%) reported living by themselves, and some students (18.5%) reported living with 5 or more other people, but most reported living with a few other people (1–2 others, 28.9%; 3–4 others, 47.8%).

I administered a 36-item questionnaire geared at gauging students' experiences with activities, attitudes, emotions, and educational experiences after the transition from seated (in-person) courses to online learning.

Quantitative Items. The questionnaire included demographic items, items geared at assessing attitude towards in-person versus online learning, motivation to pursue school, and emotional states, items about previous knowledge, self-efficacy, accessibility, and mobility, and items about cognitive engagement. I created the questionnaire based on the constructs presented in Kemp et al. (2019) taxonomy about factors that affect attitudes towards the use of educational technologies. Questions are presented below in the context of analysis.

Qualitative Items. I also included two additional open-ended questions about the challenges and positive changes in the students' learning experience after the stay-at-home order due to COVID-19. Students responded to two open-ended questions: "Describe other challenges related to the COVID-19 pandemic that affected your learning experience" and "Describe the positive aspects and or changes that you have experienced since the stay-at-home order because of COVID-19." A total of 158 students answered the question reporting challenges and 156 reporting positive aspects related to COVID-19. Data were analyzed using Dedoose, a qualitative software for coding. After that, the categories were grouped into themes.

3. Results

3.1. Attitude, affect, and motivation

Regarding attitude towards the educational delivery method, I asked students their preference and if they struggled with adapting to online learning. Their preference implies a positive attitude towards their selection. Students showed a stronger preference for face-to-face learning than for online learning, $t_{(249)} = 20.18$, $p < .001$ (Table 1). Moreover, students who preferred face-to-face learning struggled with adapting to online learning. Responses showed a moderately significant correlation between preference for face-to-face and struggled to adapt to online learning, $r_{s(249)} = 0.539$, $p < .001$.

For the students' motivation, I listed a series of scholastic factors and asked participants to gauge their perception of how each motivated them to pursue schooling *before* the stay-at-home order was implemented. Factors were talking to classmates, interaction with professors,

Table 1
Descriptive statistics.

| Item | <i>n</i> | <i>M</i> | <i>SD</i> |
|-----------------------------------|----------|----------|-----------|
| Attitude - Prefer Face-to-face | 249 | 4.49 | 0.89 |
| Attitude - Prefer Online Learning | 249 | 1.98 | 1.23 |
| Struggle w/Online Learning | 249 | 3.69 | 1.41 |
| Affect (satisfied w/courses) | 249 | 3.32 | 1.25 |
| Motivation - Before | 247 | 3.19 | 0.62 |
| Motivation - After | 240 | 2.27 | 0.81 |
| Use of Technology - Before | 243 | 3.09 | 0.73 |
| Use of Technology - After | 238 | 4.28 | 0.73 |
| Self-efficacy | 236 | 2.63 | 0.87 |
| Accessibility | 227 | 3.40 | 0.59 |
| Cognitive Engagement | 235 | 2.39 | 0.92 |

hanging out (eating, talking, studying, etc.), school activities, complete schoolwork, interest in-class topics, and finishing my degree/program. Participants rated each on a four-point scale, where 4 = very motivating, 3 = motivating, 2 = slightly motivating, and 1 = not motivating. Responses showed acceptable internal consistency (Cronbach's alpha = 0.83). Participants then rated the same factors in terms of their perception of how each motivated them to pursue schooling *after* the stay-at-home order was implemented. Responses showed good internal consistency (Cronbach's alpha = 0.86). I calculated a mean score for the seven "before" items and a mean score for the seven "after" items. Responses indicated that students were statistically significantly more motivated before the stay-at-home order than after the stay-at-home order, $t_{(239)} = 13.14$, $p < .001$.

3.2. Perceived behavioral control

Perceived behavioral control refers to the ease or difficulty of using the educational technology given one's abilities. It includes the user's perception of ease of use, self-efficacy, and accessibility to technology.

3.2.1. Ease of use of educational technology

The category of ease of use is based on the degree to which the user considers an educational technology to be easy to use and implies prior experience or continued use. I listed five online educational platforms and activities and asked participants to report their frequency of use for each *before* the stay-at-home order was implemented. These were: an online educational platform (Canvas, Blackboard, etc.); communication tools (Zoom, Teams, Google); social media (TikTok, LinkedIn, Twitter, Facebook, etc.); asynchronous videos (assigned or taped by instructors); and synchronous class sessions (live). Participants rated each on a five-point scale, where 5 = very frequently, 4 = frequently (once per week), 3 = occasionally (one to two times per month), 2 = rarely, and 1 = Never.

Participants then reported their frequency of use for each *after* the stay-at-home order was implemented. I calculated a mean score for the five "before" items and a mean score for the five "after" items. Students reported a more frequent use of learning technology after the stay-at-home order compared to before, $t_{(238)} = 19.02$, $p < .001$.

3.2.2. Self-efficacy

Self-efficacy deals with how a person assesses his or her capabilities to successfully engage with educational technology (Bandura, 1977). Students were prompted, "Describe how your skills have changed since the stay-at-home order," and I listed five scholastic abilities. Students responded on a five-point Likert scale, where 5 = much better, 4 = somewhat better, 3 = about the same, 2 = somewhat worse, and 1 = much worse. Using one-sample *t*-tests with a test value of 3 (neutral), analyses showed that students reported a *decrease* in skills in four out of the five items: ability to complete assignments on time; ability to be successful in classes; ability to discuss topics with classmates and/or professors; and time management skills. Only one item, knowledge of new learning

Table 2
Self-efficacy and Cognitive engagement with Neutral (3).

| Self-efficacy compared with neutral Item | <i>n</i> | <i>M</i> | <i>SD</i> | <i>t</i> | |
|---|----------|----------|-----------|----------|----|
| Complete assign on time | 237 | 2.65 | 1.08 | 5.06 | ** |
| Knowledge of new tools | 238 | 3.30 | 1.11 | 4.20 | ** |
| Ability to be successful in class | 239 | 2.62 | 1.01 | 5.87 | ** |
| Ability to discuss topics with professor/classmates | 239 | 2.25 | 1.07 | 10.81 | ** |
| Time management | 238 | 2.40 | 1.19 | 7.82 | ** |
| Cognitive engagement compared with neutral Item | <i>n</i> | <i>M</i> | <i>SD</i> | <i>t</i> | |
| Grades | 236 | 2.91 | 0.99 | 1.44 | |
| Knowledge/learning (school) | 237 | 2.51 | 1.04 | 7.34 | ** |
| Concentration | 239 | 1.97 | 1.16 | 13.63 | ** |
| Level of engagement | 239 | 2.06 | 1.15 | 12.61 | ** |
| Class attendance | 238 | 2.71 | 1.07 | 4.20 | ** |
| Interest and enthusiasm | 239 | 2.15 | 1.13 | 11.58 | ** |

*Significant at the $p < .05$ level, ** Significant at the $p < .001$ level.

tools (analyzing/creating videos, online quizzes, etc.), showed perceived improvement (Table 2).

3.2.3. Accessibility

Accessibility refers to the degree to which a person perceives opportunity and access to educational technology. Hence, students were asked to report the consistency with which they have access to technology. The four categories about which I asked were: a reliable digital device (e.g. computer, tablet, mobile device); a reliable internet service; communication software/tools (e.g. Skype, Zoom, Teams, Classroom); and support for solving technical issues. Available responses were 4 = always, 3 = most of the time, 2 = sometimes, and 1 = never. Another option, "I don't need it for my learning," was selected only by 10 subjects in response to support for solving technical issues, but not for the other three categories. Therefore, these were eliminated, and analyses were conducted on scaled responses. Responses showed acceptable internal consistency (Cronbach's alpha = 0.80). I generated a mean accessibility score. Participants' scores indicated they had access to these technological tools most of the time to always, $t_{(227)} = 10.11$, $p < 0.001$.

3.3. Cognitive engagement

Cognitive engagement refers to the state of deep involvement and absorption of the learner (Kemp et al., 2019). I prompted students, "Compared with how you were before COVID-19 stay-at-home, describe changes in your school performance," and I listed six school-related constructs. Students responded on a five-point Likert scale where 5 = much better, 4 = somewhat better, 3 = about the same, 2 = somewhat worse, and 1 = much worse. Responses showed very good internal consistency (Cronbach's alpha = 0.92). As shown in Table 2, using one-sample *t*-tests, I compared each mean response with a test value of 3 (neutral). Interestingly, students reported that grades did not change. However, they reported a decrement in each of the remaining five constructs: knowledge/learning (related to school); concentration; level of engagement, class attendance, and interest and enthusiasm. Of note, combining these ratings to form a mean changes score, results demonstrated that, overall, students perceived a decrement, $t_{(234)} = 10.23$, $p < 0.001$.

3.4. The role of cognitive engagement

I further examined the data for relations between these variables of interest. I compared students' attitude towards the educational delivery method with cognitive engagement. There was a statistically significant moderate negative correlation between preference for face-to-face learning and cognitive engagement, $r_{s(234)} = -0.390$, $p < .001$, which means the more students preferred the face-to-face learning, the lower was their cognitive engagement during online learning. On the contrary,

when students preferred online learning, their cognitive engagement was higher, $r_{s(234)} = 0.377$, $p < .001$. The attitude of the students and their cognitive engagement were highly related during online learning due to COVID-19.

Likewise, motivation and self-efficacy were related to cognitive engagement. I compared motivation to pursue school after COVID-19 with cognitive engagement and I found a significantly moderate correlation, $r_{(225)} = 0.350$ $p < .001$. The more motivated the students were, the better their cognitive engagement was. Moreover, there is a significantly strong positive relation between self-efficacy and cognitive engagement $r_{(232)} = 0.680$ $p < .001$. The students' expectations and judgment of their own capabilities were strongly associated with their outcomes. The more motivated the students were, the better their cognitive engagement.

3.5. Perception of self-efficacy

Self-efficacy is a strong determinant of a successful online educational experience (Albelbisi & Yusop, 2019). Consequently, I analyzed what factors impacted self-efficacy. I compared previous use and knowledge of technology with self-efficacy because if students have used technology, it is easier to use it again (Kemp et al., 2019). Responses showed a statistically significant weak positive relation between the use of technology before COVID-19 and self-efficacy, $r_{(236)} = 0.153$, $p < .05$. Students who used technology before online learning due to COVID-19 had a better perception of their capacity for academic success.

Likewise, the attitude towards the delivery method was associated with the perception of self-efficacy. The findings showed a statistically significant weak negative correlation between the preference for face-to-face and self-efficacy, $r_{(235)} = -0.314$ $p < .001$. The more students preferred face-to-face educational delivery, the lower their perception of self-efficacy (students may think they will not be successful, and it could be related to their negative attitude towards the delivery method). On the contrary, students who preferred online learning had a statistically significant positive weak relation with self-efficacy $r_{(235)} = 0.334$ $p < .001$.

3.6. Accessibility and student's environment

Accessibility refers to the students' access to the internet, a reliable device, and technical support. Accessibility is highly relevant for online teaching. With COVID-19 and the closing of educational institutions, students had to move to their homes, and access to technological tools and support could have changed. Therefore, I compared the number of people living in the same house with accessibility and I found a statistically significant weak negative correlation, $r_{s(206)} = -0.207$, $p < .001$. The more people were living in the same household, the less accessibility for students. I also compared accessibility with cognitive engagement

Table 3
Qualitative data display.

| | Theme | Category | Students |
|------------------|--|---------------------------------------|----------|
| Challenges | Situational and Environmental Challenges | Concentration Difficulties | 38 |
| | | Living at Home | 23 |
| | | Stress Balancing Life | 17 |
| | | Financial Hardship | 9 |
| | | Lack of Social Interaction | 7 |
| | | Sudden Life Changes | 38 |
| | Online Educational Challenges | Online Learning Was Difficult | 25 |
| | | Lack of Supporting Academic Resources | 11 |
| | | Workload Increased | 10 |
| | | Being Distracted During Class | 3 |
| | Emotional Challenges | Unfamiliar Online Technology | 26 |
| | | Lack of Motivation | 25 |
| Positive Aspects | Increased Family Time Personal Improvement | Negative Emotions | 66 |
| | | More Family Time | 15 |
| | | Self-care and Personal Growth | 9 |
| | | More Sleep | 8 |
| | | Managing Own Time | 7 |
| | New Activities | Financial Benefits | 41 |
| | | Practicing Hobbies | 17 |
| | | Gaining New Skills | 18 |
| | Absence of Positive Aspects | No positive aspects or change | |

and there is a significant weak positive relation $r_{(224)} = 0.236, p < .001$. Not surprisingly, the lack of accessibility (device, support, and internet) is related to students' level of cognitive engagement.

3.7. Qualitative data – challenges and positive changes during COVID-19

The following analysis is supported by one or two representative quotes from the data. Table 3 displays the qualitative data with the themes, categories, and the number of responses for the challenges and positive aspects mentioned by students.

3.7.1. Challenges related to COVID-19

Three themes emerged from challenges: Situational and environmental challenges, online educational challenges, and emotional challenges. Results are presented from more to less-mentioned challenges.

Situational and Environmental Challenges. Students reported their biggest challenge to be concentrating while being at home. There were many distractors such as family members, noise, and housework. Also, students associate home with a space for relaxation, so concentration was difficult. Students wrote, "There was a lot going on in the background of my home. Sometimes I could not focus long enough to listen to professors," and "I work better in a separate environment from home. I associate home with resting, so having to be productive at home has been difficult." The second, more relevant, challenge was difficulty balancing activities between personal life, work, and school. Here is a representative quote: "It was a challenge managing other responsibilities that I had along with my schoolwork."

Financial hardship during the pandemic was mentioned as a challenge too. A participant wrote, "Financially, I was left with barely money to work with." Other challenges that students mentioned were the lack of social interaction and sudden changes in their lives (death of family members, being pregnant).

Online Educational Challenges. The major challenge reported was the online environment. Students reported, "It is just very hard," and "Staring at a screen made me tired." Moreover, students found difficulty understanding the material and some lost their internships or clinical practices. The second challenge mentioned more often was the lack of supporting resources to complete schoolwork. Students mentioned, "Many of the normal tools I would have to learn are unavailable, like peer tutoring, library." They also reported difficulties in communicating with professors. The lack of internet connection was also a problem because many people were using the internet at once.

Moreover, students considered that the quality of the learning process decreased after the transition to online learning. Here are some quotes: "Lack of educational value found in modified assignment structure," and "I felt like I wasn't learning at all." Additionally, some participants reported stress due to an increased workload, "professors added more work," and difficulties because they were not familiar with some online tools. Even though there were not many students who mentioned unfamiliarity, the following quote denotes the difficulty for a student who has never had an online educational experience. The student wrote,

I have never taken an online course so this was beyond stressful and I know that our generation is supposed to be very tech savvy but in my personal experience I am not and this process was a struggle that I hope I never have to go through again.

Emotional Challenges. Participants reported a lack of motivation and negative emotions as the most prevalent emotional challenges. Students mentioned, "The stay at home order has made me lose a lot of motivation," and "finding the motivation to engage when you have not even gotten out of bed." Regarding emotional challenges, students reported stress, anxiety, being worried about getting sick (coronavirus), and changes in their mental health. Students wrote, "I feel like my mental health has taken a toll as well. I feel a bit more sad than I usually am. It just feels weird," and "Worst thing that could've happened to me, grades dropped, my mental health was bad."

3.7.2. Positive aspects/changes related to COVID-19

Three themes emerged related to positive aspects or changes that students experienced after the stay-at-home order: increased family time, personal improvement, and new activities. Many of the responses were shorter statements than those used for describing challenges. Results are presented from more to less mentioned positive aspects. Moreover, some participants expressed no positive aspects or changes.

Increased Family Time. Students reported more time with family. The majority expressed it as something positive, for example, "I am able to spend more time with my family and pets which is a huge benefit." Only 2 (from 66) expressed it as not so positive due to some conflicts.

New Activities. Participants expressed that they had more time to "catch up on emails and responsibilities," and they are doing new activities such as writing poetry or doing exercise. Moreover, students are practicing different hobbies such as hiking, watching TV, and so on. A student wrote, "I have time to pursue some hobbies, and be creative with baking or painting, etc." Another category of this theme was gaining new skills. Students reported learning new technological tools such as Zoom and being more organized and disciplined. Moreover, some stu-

dents became self-directed learners pursuing certifications or trying to learn a new language. A student wrote, "I've been able to focus more on professional development - exploring third party training material, etc."

Absence of Positive Aspects. Some students wrote that they do not perceive any positive changes. This information is important because students did not have to respond, but they chose to add comments like "nothing," "honestly, none" or "not really any." These answers reflect that some students could not see positive aspects.

4. Discussion

Transitioning to online learning due to COVID-19 has been a highly complex undertaking for higher education institutions. This study presents the factors that influence students' use and acceptance of online learning during the stay-at-home orders due to COVID-19. Regarding attitude towards the learning delivery method, the quantitative and qualitative results showed that students prefer face-to-face instruction over online education. One of the strongest categories in the qualitative data showed that after the online learning transition, many students reported that online learning was an unpleasant experience and they expressed a negative attitude towards online learning. They not only considered online learning more difficult but also the lack of supporting resources (access to the learning center, library, interaction with professors, etc.) was an important challenge during the transition to online learning.

Even though this preference is similar to findings in previous literature (Bali & Liu, 2018; Tichavsky, Hunt, Driscoll, & Jicha, 2015), the experience cannot be completely compared due to the current circumstances. Students are having an emergency online delivery method, but not necessarily an appropriately planned online instruction (Daniel, 2020; Murphy, 2020). Students who did not have previous experience with online learning may think that online delivery is not desirable. However, students may not know that they did not have a proper online delivery experience (Hodges et al., 2020; Murphy, 2020). Therefore, for future adoption and use of online learning, it is important to clearly explain to students, faculty members, and staff that the experience during COVID-19 was an emergent response to a global crisis but it does not depict the profoundly studied field of online learning instruction.

Concerning motivation to pursue school during the stay-at-home order, quantitative and qualitative data showed that participants were more motivated before the stay-at-home order than after. Consistent with existing literature (Albelbisi & Yusop, 2019; Chang et al., 2016; Sun, Lin & Chou, 2018), this study confirms that when students are not motivated, their level of cognitive engagement is lower, and vice versa. Motivation influences the students' effort and degree of perseverance invested in certain tasks.

Tichavsky et al. (2015) examined the students' motivations behind their preference for face-to-face or online learning. The authors found that interaction (90%), and specifically interaction with professors (50%), was important for students and was one of the most mentioned explanations to choose face-to-face over online learning. In addition, Tichavsky et al. (2015) found that students view themselves as poor self-motivators, so they rely on others to regulate and direct their learning experience. Verbal reminders and being together with real people are highly valued.

In a similar line, the findings of this study confirm that motivation decreased when students transitioned to online learning, and interaction was a motivating factor for students. In the qualitative data, students reported that the lack of interaction with professors and students was a challenge for them. When there is an emergency and students cannot choose the delivery method of their preference and have to pursue online or hybrid approaches, professors have to consider the students' motivation levels. As Bower (2019) mentioned, "In technology-mediated learning contexts, agentic intentions reside with humans, and not with technology" (p. 1037).

Even though affect and emotions were not reported in the quantitative data, in the open-ended question twenty-five students (8.7%) wrote as a challenge an increase in negative emotions such as anxiety, sadness, and worry. Anxiety that is too high may restrain motivation and negatively impact achievement while pride tends to show a direct positive relation with intrinsic motivation, learning effort, and achievement (Heckel & Ringeisen, 2019).

This study confirms that students used more platforms and online educational tools after the transition to online learning than before. As Murphy (2020) mentioned, the use of emergency eLearning programs increased the students' knowledge of technological tools (Murphy, 2020). The knowledge and experience gained may help students with their future abilities and perception of self-efficacy regarding online educational technologies.

Based on the previous knowledge about online learning, faculty members have been bombarded with information for improving instructional materials and encouraged to use multimedia-enhanced content and educational software (Ali, 2020; Jayaprabha & Jayakumari, 2020). Is it the best strategy to include so many new things in an online environment where neither the professor nor the student are knowledgeable enough? Probably not. The findings from this study demonstrate that students who have not used educational technologies have a lower perception of self-efficacy, and those with a low sense of self-efficacy has a lower cognitive engagement. The use of new technologies can be detrimental if not used properly.

Adopting an online learning environment is not only a technical issue but a pedagogical and instructional challenge (Ali, 2020). Teaching students to be self-directed learners is an ongoing goal for educators, but not all students have the self-regulating skills needed for online education (Tichavsky et al., 2015). During this pandemic, students had to jump into the online system without any preparation, and this study showed that their motivation, self-efficacy, and cognitive engagement decreased. Consequently, it is important to train students in new technologies before they are used.

Another important factor for the successful use and acceptance of online learning (due to an emergency or not) is self-efficacy. The findings from this study confirm previous literature saying that students who are confident in applying a variety of self-regulated strategies are more likely to accomplish their academic tasks (Abdullah & Ward, 2016; Alghamdi et al., 2020). Self-efficacy beliefs affect task choice, effort, persistence, resilience, and achievement and it is directly related to academic expectations and performance (Alghamdi et al., 2020). When offering online teaching, and especially within an emergency, it is very important to foster students' control by encouraging them to recognize their previous abilities and knowledge and help them to trust in their own capacities.

Results regarding students' performance vary depending on the design and objective of the study. For example, Gonzalez et al. (2020) compared students' performance in two academic years and they found that students improved their performance during COVID-19 confinement. Even though I did not analyze students' performance in a specific course, in this study the majority of the participants did not report changes in their grades. Contrary to what Gonzalez et al. (2020) found, in this study, cognitive engagement (knowledge, concentration, engagement, attendance, and interest) among students decreased after the stay-at-home orders due to COVID-19. The studies were very different, but more research is needed to have an accurate sense of the impact of confinement measures over students' performance.

Finally, educational institutions must be aware that accessibility is crucial for a successful online learning experience. As the results from this study showed, accessibility is not only related to access to the internet or a device, but it is also related to the number of people living in the same house. I remember one of my students who was living on campus had to move back with her mom and siblings. Since the moment she moved due to COVID-19 measures, she expressed her difficulty to continue her education. First, her mom did not have internet, so she had

to go to her aunt's house to be connected, but second, she had to help her mom take care of her siblings, so accessibility to the technological educational tools was almost impossible. Obviously, her cognitive engagement declined severely. This study was not able to reach students like her because it was an online survey, but we need to understand that there are students who lack accessibility, and accessibility is directly related to cognitive engagement.

During the COVID-19 pandemic, students had to jump into online systems and reported a decrease in motivation, self-efficacy (the ability to perform scholastic activities), and cognitive engagement. Furthermore, the qualitative data showed that students perceived that the quality of education decreased. This can become a vicious cycle. Students have a negative attitude towards online learning, this attitude impacts negatively their academic performance, the lack of learning or the negative experience diminishes their self-efficacy and motivation, and students confirm that online learning is not good for them, so the cycle starts again. Higher education members must stop this negative cycle, so students can have positive educational outcomes.

4.1. Implications for practice

Based on the findings of this study, some recommendations for better students' adoption, use, and acceptance of educational technology during emergency online learning are as follows:

- Students and professors should promote a positive attitude towards a temporary situation. It may be necessary to explain to students that their attitude may influence (positively or negatively) their educational experience and their cognitive engagement, so they can consciously try to improve their attitude towards the emergency delivery method. Furthermore, it is important to talk about students' fears and transform them into opportunities. Asking questions like, *What do I think of online learning (to analyze students' bias)? What are my fears about online learning? How can I overcome my fears? What skills do I have that will help/have helped me to be successful?* Sometimes just asking these types of questions invites students to reflect on their learning process and take a more positive attitude towards it. As [Bandura \(1977\)](#) mentioned, the expectations are mainly concerned with people's hopes for favorable outcomes.
- It is not only about content. Emergency online learning requires a certain degree of self-regulation skills where students have to manage their learning process (at least more than in face-to-face instruction). Students need to remember or be reminded that they are capable of being successful (self-efficacy). The use of metacognitive conversations will help both professors and students to monitor the learning process and take agency for what is happening (it is not a course evaluation; it is a strategy to promote self-regulation skills). Professors can ask about what is working for students and what students are already doing to become successful. It is not only a reflection about the learning process but also a reaffirmation process that helps students to improve their perception of self-efficacy.
- Students' motivation is a complex factor, but it can be influenced. Professors can ask students to write reasons why school/education is important for them (it could be an assignment or a discussion). They can also use small nudges to encourage students constantly. It does not have to include more work for the professor, but a small announcement showing encouragement can make a difference in a students' motivation.
- Accessibility is not only about having internet or a computer; the family conditions impact the level of concentration and the accessibility to educational tools. Flexibility, tolerance, and communication have to be a common factor during remote classes. Due to the emergency, many professors (including myself) had to use new tools without preparing students for it. Based on the students' responses, the lack of knowledge about technology is associated with their self-efficacy. For future experiences, professors can use new things, they

just have to be sure that students feel confident that they will be able to manage them successfully.

4.2. Limitations

Findings from this study should be interpreted with caution as there are some limitations. This is an exploratory study and I created the questionnaire about the factors that influence the use and adoption of online educational learning, but it is not a standardized questionnaire. Students expressed their perception, which could be influenced by many factors, especially because the study was in the middle of a pandemic (fear, uncertainty, stress, etc.). However, this is a limitation and an opportunity. By being asked exactly during the transition and not after, students could express what they were thinking while they were experiencing it.

Likewise, the generalizability of the findings is limited. The present study recruited students from a public university on the east coast of the United States. Even though the results showed an initial appreciation of students' perception of the emergency online learning experience, future research should include a wider range of colleges and universities. Another limitation is that this study did not reach those students who do not have access to the internet because the survey was online.

5. Conclusion

This study explored the perception of college students about the use, adoption, and acceptance of emergency online learning during the stay-at-home orders due to COVID-19. Students, faculty members, and educational institutions should not be confused thinking that online learning is the same as emergency online learning. Face-to-face education has an overall ecosystem designed to support learners (learning centers, co-curricular activities, libraries, etc.). Similarly, effective online education requires time to identify and build ([Hodges et al., 2020](#)). During emergencies, (second wave of COVID-19, hurricanes, war, and so on) it is important to remember that online or blended instructional delivery has to be a creative and flexible emergent response to the particular crisis, and requires more reflection and communication than any of the previous educational experiences because it is unique to the emergency circumstances.

The findings showed that motivation, self-efficacy, and cognitive engagement decreased after the transition, and only the use of technology increased. The crisis is not over, and we need to adapt to the students' responses and needs if we want them to continue and have a positive higher education experience.

Content is important, but without the proper conditions, students may have a negative experience again and their cognitive engagement can drop. Educators must be mindful of these circumstances and promote a positive attitude, encourage motivation, and invite students to rely on their previous knowledge. The more that members of higher education institutions understand the circumstances students are facing, the better we can respond to them.

Further work is required to explore how inequalities may have impacted students' learning opportunities and outcomes. Some students did not have access to technological tools and/or their family conditions limited their accessibility. More research is needed to reach out to this population and understand the short and long-term effects that the pandemic may have for them (drop-outs, failing classes, or the resources that they developed). This would be the most effective way to create strategies and resources so that all students could continue their education.

Furthermore, it is imperative to understand how COVID-19 affected professors' teaching styles and/or strategies. The professors' experience may also be interconnected with the students' learning experiences. Faculty, administrators, and students faced different challenges during the pandemic that may have had repercussions in the teaching and learning processes.

Another important future direction is to explore how emergency on-line learning may influence the adoption of online learning in the future. On one side, students and professors became more knowledgeable of the tools for remote teaching and learning and, if the learning experience was positive, they may increase the adoption of online learning. Conversely, if the experience was negative, students and/or professors may have a false representation of the online learning environment and avoid it.

In many countries, higher education institutions may not be able to offer in-person classes, and they will rely on the internet for delivering classes. Further research is required to test if a short training about self-efficacy and motivation strategies for students can improve their cognitive engagement during online learning. The intervention can be a short video offered at the beginning of a course explaining the relation between attitude, self-efficacy, and cognitive engagement, and some applicable strategies. Awareness may encourage students to motivate themselves. Another research line is to implement a “nudge” system, where professors can send constant reaffirming messages to students, so they become more confident during class, increase their self-efficacy, and hopefully, cognitive engagement increases too.

The pandemic was transformative for many people. More research is needed to understand how the lack of physical contact, the reduction of social interaction, and the negative emotions that the pandemic created (fear, sadness, uncertainty, etc.) influenced students’ daily habits (sleep, eating, watching TV, etc.) and if changes in their environment and daily lives are related to the students’ learning process.

Finally, it is important to compare the students’ perceptions of the use and acceptance of emergent online learning between different countries. It will help higher education institutions to determine similarities and differences and develop strategies accordingly given that the pandemic affected the majority of countries in the world. This a challenge that we are all facing, and we can help each other to effectively cope with it.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

Thanks to Dr. Marissa Harrison and Dr. Senel Poyrazli for their guidance and support, and to the students who answered the questionnaire.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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