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Craig Van Slyke
Computer Information Systems Information Systems, Louisiana Tech University, vanslyke@latech.edu

Grant Clary
Computer Information Systems Information Systems, Louisiana Tech University

Mohamed Tazkarji
Computer Information Systems Information Systems, Louisiana Tech University

Selwyn Ellis
Computer Information Systems Information Systems, Louisiana Tech University

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(EXTENDED ABSTRACT)

Craig Van Slyke
Computer Information Systems Information Systems
Louisiana Tech University
vanslyke@latech.edu

Grant Clary
Computer Information Systems Information Systems
Louisiana Tech University

Mohamed Tazkarji
Computer Information Systems Information Systems
Louisiana Tech University

Selwyn Ellis
Computer Information Systems Information Systems
Louisiana Tech University

Abstract:

COVID-19 brought significant, rapid changed to education, including information systems education. One of the most significant of these changes was the abrupt transition from face-to-face instruction to distance learning. As is often the case with abrupt transitions, this shift was stress inducing for many affected, including students. In this extended abstract we describe an empirical study of two types of distance learning stress, distress [stress that is detrimental to well-being] and eustress [stress that enhances well-being] in the context of distance learning. Using data from a survey of higher education students in the United States, we demonstrate that the perceived abruptness of the transition to distance learning had a positive impact on distress, and a negative impact on eustress. Further, distress and eustress impacted intentions to continue with distance learning, but these impacts were fully mediated by distance learning satisfaction.

Keywords: COVID-19, distance learning, stress, distress, eustress

I. INTRODUCTION

Recent events have made distance learning continuance intentions of considerable interest to higher education faculty and administrators. During the COVID-19 pandemic, most universities made rapid shifts from face-to-face to online classes. These changes affected millions of students. Although the long-term impacts of these changes will not be known for some time, the shifts have brought renewed attention to distance learning. Distance learning may provide numerous benefits to universities, such as increased market reach [Appana, 2008] and reduced space requirements. As seen during the pandemic, distance learning also provides a means for responding to disasters and other emergencies. For students, distance learning may allow them to access previously unavailable courses and may also allow for increased schedule flexibility, among other benefits [Appana, 2008]. These potential benefits make it important to understand factors that affect students' intentions to continue distance learning.

Despite the considerable attention on distance learning, one issue that merits additional research is how stress affects students' continuance intentions. Although there has been research into how stress affects students engaged in distance learning [e.g., Cragg et al., 2005; Molinari et al., 2005],

these studies tend to focus on only one type of stress – distress, or "bad" stress that has a negative impact on well-being. More formally, we can define distance learning distress as a negative psychological response to distance learning stressors. In the context of distance learning, stressors are stimuli in an environment that are perceived as influencing a student's routine, psychological or physical health [adapted from Van Dijkhuizen, 1980; Winnubst et al. 1982]. Stressors can also produce a positive psychological response known as eustress, or "good" stress. Distress and eustress are distinct constructs, not opposite ends of a continuum, as evidenced by the fact that they can both result from the same stressor [Edwards and Cooper, 1988; Simmons and Nelson 2007]. When an individual anticipates that a stressor represents a threat, a negative appraisal of the stressor occurs, resulting in distress. Positive appraisals occur when one anticipates a benefit occurring due to the stressor. Positive appraisals result in eustress. Interestingly, the same stressor can be appraised as both positive and negative. Consider a student who is newly admitted to an online graduate information systems program. This student may perceive the program as having career benefits, a positive appraisal that brings about eustress. However, the student may also believe that the program will take time away from family and friends, a negative appraisal that results in distress. So, admittance into the program brings about both eustress and distress.

This more nuanced view of stress is of growing interest in several research domains. For example, recent work on technostress has included eustress [Tarafdar et al. 2017; Califf et al. 2020]. Eustress has also been included in studies of work stress [Le Fevre et al., 2003; Le Fevre et al., 2006; Simmons and Nelson, 2007; Kozusznik and Rodriguez, 2015], nursing [Simmons and Nelson, 2001; Gibbons and Dempster, 2008], among others. The role of eustress in higher education has also been an area of interest [O'Sullivan, 2011; Mesurado et al., 2016].

Stress, whether distress or eustress, can lead to both positive and negative outcomes [Podsakoff et al. 2007; Hargrove et al., 2016]. This stressor -> stress response –> outcome framework is a common perspective from which to study stress [Simmons and Nelson, 2001]. In the context of distance learning, one important outcome is satisfaction with distance learning [Sahin and Shelly, 2008; Daghan and Akkoyunlu, 2016; Richardson et al., 2017]. One reason for the interest in satisfaction is its impact on continuance intentions [Daghan and Akkoyunlu, 2016], which is another important outcome of stress in the distance learning context.

We are specifically interested in these questions in the context of rapid shifts from face-to-face to online courses. COVID-19 led to very abrupt shifts to distance learning – in some cases; these transitions were made in less than a week. Such abrupt changes are likely to be stress-inducing. Students who are especially subject to distress may choose not to continue with online courses. However, the challenges associated with the transition to online courses may be stimulating for some students, as reflected by distance learning eustress. So, it may be that the abrupt transition to online courses may result in both distress and eustress. These different kinds of responses to stressors may have differential effects on distance learning satisfaction and continuance intentions. Since it is possible that COVID-19 restrictions will carry over to future academic terms, it is important to understand the impact of distance learning associated distress and eustress on distance learning satisfaction and continuance intentions. These intentions are of critical importance for universities that are struggling with student retention. Poor retention may lead to budget challenges, which often result in significant negative impacts on students, faculty, and staff. Even when the pandemic has passed, universities and academic programs interested in distance learning will benefit from a better understanding of the effects of distress and eustress on satisfaction and continuance intentions.

Satisfaction has been demonstrated to have a strong positive relationship with distance learning continuance intentions [Limayen and Cheung, 2008; Daghan and Akkoyunlu, 2016]. Stress has been linked to satisfaction [Simmons and Nelson, 2007]. So, we believe that the impact of distance learning eustress and distress on continuance intentions may be mediated, partially or fully, by their impact on satisfaction.

Based on the above, we investigated the following research questions.

What are the impacts of distance learning distress and eustress on distance learning continuance intentions?

Are the impacts of distance learning distress and eustress on distance learning continuance intention mediated by their impact on distance learning satisfaction?

Does the perceived abruptness of the transition to distance learning affect distress and eustress?

The research model guiding our investigation of these research questions is shown in Figure 1. As the figure shows, we expect abruptness to have a positive relationship with distress and a negative relationship with eustress. Distress is expected to negatively impact satisfaction, while eustress is expected to positively impact satisfaction. We expect satisfaction to have a positive relationship with continuance intentions.

Information (IS) faculty and students face additional stressors when shifting rapidly from face-to-face to online courses. Many IS courses involve the use of specialty software such as software development environments, database management systems, and enterprise systems. In some cases, these systems may require resources beyond those available to students at home. In addition, some systems are platform dependent and may not work with certain computers or operating systems. Typically, students in traditional settings have been able to rely on university computer labs when their personal systems are incompatible with required software. However, many universities closed their computer labs during the COVID-19 lockdowns. For IS students with inadequate resources, the lack of access to required software was likely a source of significant distress. Under normal conditions, students who are interested in taking courses online have ample opportunity to learn about resource requirements and have time to acquire necessary systems [or to choose not to take online courses]. However, the abrupt transition to online courses caused by the pandemic meant that students who reasonably relied on labs could no longer do so – they had to gain access to these systems or suffer significant negative consequences. Students who had the necessary hardware may have been subject to stressors related to acquiring the necessary software.

Even cloud-based software can be problematic for some students. Despite the seeming ubiquity of high-quality, high-speed Internet access, the reality is that many students, including IS students, live in rural areas that lack reliable, high-speed Internet access. While this may affect students of any discipline, it may be especially problematic for IS students due to the prevalence of hands-on courses that require specific software resources. Virtual labs, which work well for many students, may be unavailable or unusable for students who lack quality Internet access.

Many IS students, presumably, are studying IS because they derive a certain level of enjoyment or satisfaction from interacting with information technology, and [hopefully] find solving technology-related puzzles satisfying. As a result, IS students may find the abrupt transition to online learning to carry with it interesting technology-related problems to solve. When this occurs, students may find the abrupt transition to be a stimulating stressor, which leads to eustress. Of course, this will not be true of all IS students, but it is likely true for many.
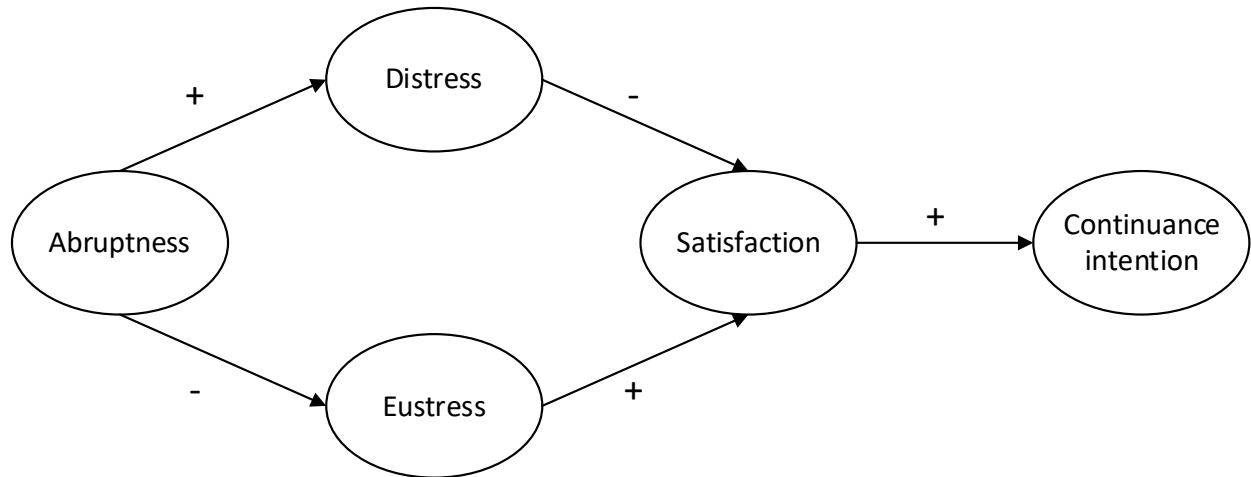
Figure 1: Research Model

II. METHOD AND RESULTS

We collected data through a survey of college students in the United States who were currently enrolled in online courses. We commissioned a survey panel company [Qualtrics] to solicit participants for us. After removing responses that either did not pass our attention check items or that had data quality issues, and filtering for swift transitions to online courses [defined as a notice of less than one month], we had a final sample size of 462 responses. We used SmartPLS 3.0 [Ringle et al., 2015] for all data analysis.

The sample was comprised of 61% female and 38% male respondents. Two respondents reported being of non-binary gender. 86% of the respondents were undergraduate students. 418 (90%) of the respondents were full-time students. The mean age of the respondents was 22 years.

Previously validated scales were adapted for the distance learning context, except for scales related to perceived abruptness, which were newly created. Note that we measured the actual [self-reported] notice that students received prior to transitioning to online courses. This measure was used to screen our sample for abrupt transitions [a notice of less than one month.] We also measured perceived abruptness using a multi-item scale. An example scale item is "I had to start taking online classes suddenly." Scales for distance learning distress and eustress were adapted from O'Sullivan [2011]. Distance learning continuance intentions were measured using a scale provided in Van Slyke et al. [2010]. Our scale for distance learning satisfaction was derived from Dick et al., [2020] . All scales exhibited acceptable reliability and validity. All scale items loaded as expected and significantly. The minimum composite reliability was 0.839 for distance learning eustress. Further, the square root of the average variance explained for each scale was substantially larger than the associated inter-scale correlations, indicating convergent validity. None of the confidence intervals for the heterotrait-monotrait ratios included one, indicating discriminant validity [Henseler et al., 2015].

Results for the structural model are shown in Table 1. The results indicate that the effects of distance learning distress and eustress were fully mediated by distance learning satisfaction. As expected, distress had a negative impact on satisfaction, while eustress had a positive impact on satisfaction. Abruptness had a positive relationship with distress and a negative association with eustress. Satisfaction had a strong positive impact on continuance intentions. R^2 values were 0.256 and 0.483 for satisfaction and continuance intentions, respectively.

Table 1: Results

Path	Path coefficient	p-value
Abruptness -> Distress	0.161	< 0.001
Abruptness -> Eustress	-0.131	0.003
Distress -> Continuance intentions	0.029	0.444
Distress -> Satisfaction	-0.454	< 0.001
Eustress -> Continuance intentions	0.027	0.371
Eustress -> Satisfaction	0.170	< 0.001
Satisfaction -> Continuance intentions	0.702	< 0.001

III. DISCUSSION

The results of our study indicate that stress is an important determinant of distance learning continuance intentions. Both distance learning distress and eustress had significant impacts on continuance intentions, but these effects were mediated by distance learning satisfaction. The abruptness of the transition to distance learning had significant impacts on both distress and eustress. Our results confirm that distress and eustress are conceptually distinct constructs, as indicated by both the different effects of a common antecedent and the different relationships distress and eustress had with satisfaction, an important distance learning outcome.

The results related to abruptness were interesting. Few universities had the luxury of providing ample notice to students [and faculty] regarding the COVID-19 caused shift from face-to-face to online courses. It is clear, however, that the jarring transition had detrimental impacts on distress and eustress, which in turn, reduced satisfaction and continuance intentions. This is not surprising. Students likely felt overwhelmed by the rapid shift, which induced distress.

These results have implications for research and practice. With respect to research, our study is among the first to differentiate between distress and eustress. This is an important distinction. Future research should investigate factors that affect distress and eustress in the context of distance learning. In addition, it is likely that different methods of coping may mediate the effects of distress and eustress on satisfaction and continuance intentions. These coping strategies might include experimentation, assistance seeking, and emotional responses [Taradfar et al., 2017].

With respect to practice, these results indicate that universities that want to promote distance learning should take steps to reduce distress and increase eustress among their students. For example, providing adequate social and technical support for students may help reduce distress. Individual faculty may also be able to take steps to reduce distress and increase eustress. For example, well-organized courses and frequent communication may help reduce distress, while engaging activities that facilitate exploration and discovery may increase eustress.

IV. CONCLUSION

The study described in this extended abstract is among the first to consider distance learning eustress and distress as distinct constructs. The conceptual distinction is confirmed by our empirical results, which show different associations with a single antecedent [abruptness], and outcome [satisfaction]. Our results also show that the impact of distance learning distress and eustress on continuance intentions are fully mediated by their influence on satisfaction. We believe that the distress-eustress conceptualization holds great promise for improving our understanding of distance learning outcomes.

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