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## Article

# Drivers and Barriers of Social Sustainable Development and Growth of Online Higher Education: The Roles of Perceived Ease of Use and Perceived Usefulness

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**Abstract:** Online and distance learning classes have been touted for the last several years as an innovation in higher education that should help improve the entrepreneurial growth mindset of students. However, the reported negative online learning experience of many college students worldwide during the COVID-19 epidemic has shown that many opportunities remain to improve the sustainable development and growth of online visual instruction practices. In this study, we outline and investigate a set of hypotheses related to the perceived usefulness and perceived ease of use (from TAM) of online video instruction in higher education courses during the pandemic. We employ grounded theory using autoethnographic case studies as a data source. We found that (a) synchronous broadcast lectures improve participant attitude (H1) and motivation (H2) toward online instruction, (b) prerecorded video instruction increases participant perceived “ease of use” (H3) and perceived behavioral control (H4) of online instruction, but (c) indicators of recorded dates on pre-recorded video instruction decreases participant perceived “usefulness” (H5) and “certainty” (H6) of online instruction. We enrich the insights of popular motivation models for organizations and the higher education industry by outlining a set of emotional elements originating in neuroscience leadership research (SCARF) that might either amplify or diminish the perceived the ease of use and perceived usefulness to technology usage relationships when participations engage in online learning situations.

**Keywords:** sustainable online learning; fairness; autonomy; video-based learning (VLB); perceived usefulness (PU); perceived ease of use (PEU); entrepreneurial growth mindset; technology acceptance model (TAM); higher education sustainability



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## 1. Introduction

The United Nations 2030 Agenda lists “quality education” in its set of Sustainable Development Goals. Quality education is considered an important element of social sustainability [1]. As stated by Aleksejeva [2] (p. 355), “The development of human resources is an important condition for ensuring the sustainability of the society and the development of the national economy. Knowledge is becoming more and more one of the basic factors for society sustainability and development”. Unfortunately, however, “social sustainability is a dimension of sustainability that has received little attention” [3] (p. 1). Furthermore, “universities often fail to perform in a way that complies with the principles

of social sustainability" [4] (p. 235). Yet, as stated by [5] (p. 8025), the COVID-19 pandemic is "an opportunity to foster the sustainable development of teaching in higher education".

The COVID-19 pandemic has considerably impacted higher education institutions, their students, and their employees [6–9]. Most campuses were forced to shut down, and the closures led to the complete cessation of face-to-face instruction and other university services and activities. Research finds that 99% of higher education students were affected due to "lockdown" measures adopted to limit and control the spread of the virus [10]. With declines in international student enrollment [11], students taking classes from home rather than staying on campus resulted in decreases in room and board funding to universities [12], no fans paying to attend sporting events in person [13], and declines in state tax revenue resulting in declines in state institutional funding [14,15]; as a result, the financial sustainability was negatively impacted.

Furthermore, distance education became the only form of education [16]. For some students, the in-person closures resulted in them being sent to their family homes, perhaps leaving them struggling to overcome the difficulties of learning at a distance with varying levels of regional- and country-level digital infrastructure, potentially weaker hardware equipment and technical capacity in those home environments (versus on campus), and more distractions arising from family members in the family homes [17]. For other students, it might have resulted in them being isolated in on-campus housing without the normal levels of social interactions that occur on campus in classrooms, events, and activities. The isolation might result in increased anxiety and apathy about engaging in online classes, negatively impacting higher education sustainability.

Furthermore, nearly all instructors, including many with no experience in teaching online, had to move all in-person classes to online classes. Compounding this challenge, most higher education institutions focused more on the immediate survival-related enrollment and financing strains and less on the longer-term quality of education strains [18]. As a result, it should be no surprise, unfortunately, that recent national studies of college students find that "Nearly 65% of respondents said that the online class experience had been less than positive" [19] and that "about 85 percent of respondents said the pandemic had a negative effect on their performance" [20]. The opportunity exists to identify practices that might help improve the entrepreneurial growth mindset of students in online classes [21,22].

Innovations in information technology platforms such as Canvas, Blackboard, and Moodle should make it easier for all instructors in online classes to include interactive discussions and video-based instruction in addition to simply posting readings and slides in the platforms. As to potential comparable best practices, the aims of using these communication and interaction information technologies is to increase (a) positive attitude, (b) perceived ease of use, or (c) perceived usefulness of the content that prior "technology acceptance model" (TAM)-related research finds can impact the use of technology [23–27]. Indeed, while some research studies have focused on applying the models to the technology adoption by instructors [28–30], other research studies have looked at what influences the extent to which students intend to use the software, tools, and content that instructors have built into the classes [31–34]. However, the benchmark goal of most educators is more than students just adopting the technology, it is students regularly using the technology. Thus, it is worth investigating what might have impacted the student usage experience of it during the pandemic.

Toward this goal, this study adopts a grounded theory autoethnographic approach of educational practices put into place during the pandemic to investigate (a) insights into important TAM-related elements pertaining to video-based instruction being used among instructors during the COVID-19 pandemic and (b) a set of motivation elements from neuroscience management research that we propose instructors should use to improve and enhance student entrepreneurial growth mindset and learning experience. The rest of the article is organized as follows: First, we outline relevant literature. Second, we describe the findings of experimental practice related to video content and learning at three

major universities during the pandemic. Third, we outline motivation model elements that organizations and institutions should focus on in online instructional design.

## 2. Conceptual Background

Many studies have applied the technology acceptance model (TAM) to predict an individual's adoption of variable technologies [35–37]. As indicated in this literature, several different elements might impact how strongly the elements of “perceived ease of use,” “perceived usefulness,” and “attitude” found in TAM each relate to the intention to use the technologies. However, other elements exist that the higher education and motivation model literature has not yet considered. For example, the SCARF framework of Rock [38] in neuroscience research outlines five experiences that activate strong threats and rewards in the human brain: “Status, Certainty, Autonomy, Relatedness, and Fairness”. Combining them results in the acronym SCARF. In this research, we outline how each of the five SCARF emotion experiences could be applied by educators to online classes that utilize instructional technology platforms such as Moodle, Blackboard, and Canvas.

### 2.1. Grounded Theory and Autoethnography

We employed grounded theory using autoethnographic case studies as a data source for investigating the hypotheses related to video-based learning in this research as is commonly used in education studies [39–49]. Subsequent, grounded theory analysis started with thematic coding of observations, departmental meetings, internal communications with the senior leadership management and colleagues, and a series of informal discussions and student feedback in end-of-semester student evaluations to identify patterns. Data collection was supplemented by information gathered from departmental meetings, internal communications circulated by senior management and colleagues during and after the transition from offline to online/blended learning, and from student course review qualitative comments. All three universities are large, research-oriented universities in which English is the primary language of instruction. All three universities provided in-person and online instruction to a diverse student population before the pandemic.

#### 2.1.1. Realizing the Benefits of Prerecorded Videos for Instructional Tutorials

Prior research on online asynchronous learning and information management systems adoption indicates that recorded videos can provide improvements to human learning [6,50]. However, according to the e-learning team at one of the authors' institutions, most academics there preferred not to record lectures even though end-of-term student feedback has repeatedly mentioned the student preference for recorded lectures to supplement lecture slides. Some academics believed that because lecture attendance is not compulsory, students would stop coming to lectures if lecture recordings were made available. Others feared that the intellectual property of the lectures would not be preserved by either the institution or by the students, both of whom might try to reuse or re-post the materials without the instructor's consent.

However, prerecording content permits asynchronous learning. With the increased flexibility regarding when to view the videos (vs. live streaming) and the ability to view them multiple times as needed, the prerecorded materials should increase perceptions about perceived ease of use of the content (flexibility) which could lead to perceptions of a greater chance of success. Rayburn et al. [42] reported on a survey of students regarding positive factors of university actions. The students indicated “(1) proactive response and timely action, (2) continued communication and interaction, (3) student support, and (4) a focus on flexibility and adaptation for continuity of learning” [42] (p. 244). Thus, asynchronous instructional videos should improve participants' attitudes toward using online course technology, which in turn might lead perhaps to improved perceived relatedness to faculty and peers. Thus, we formulated the following hypotheses:

**Hypothesis 1.** *Synchronous broadcast lectures improve participants' attitude toward online instruction.*

**Hypothesis 2.** *Synchronous broadcast lectures improve participants' motivation via improved relatedness to instructors and peer learners.*

#### 2.1.2. The Benefits of Live Video Recording and Archiving

In contrast to prerecorded materials, another option is the live streaming of video. Many instructors used Zoom, Microsoft Teams, and various other platforms to live stream discussions and lectures during the pandemic [51]. Prerecorded lectures should improve point four of Rayburn et al. [42] (p. 244) regarding "a focus on flexibility and adaptation for continuity of learning". Furthermore, increased flexibility might increase perceived autonomy, as the flexibility gives a sense of greater control over the materials and learning.

**Hypothesis 3.** *Prerecorded video instruction increases participants' perceived "ease of use" of online instruction.*

**Hypothesis 4.** *Prerecorded video instruction increases participants' motivation via improved perceived autonomy.*

#### 2.1.3. The Potential Negative Effects of Video Date Information on "Attitude"

Within Canvas (and similarly within Moodle and Blackboard, etc.) instructors can upload videos for students to view. Instructors have the choice of either embedding the videos directly into the course or posting links to videos that are hosted on external locations such as YouTube or Vimeo. The posted links will take the form of video boxes (similar to embedded videos) but provide the opportunity for students to view the videos on the original hosting location in full screen. The usage of open platforms such as YouTube or Vimeo permits students more flexibility in accessing content, the ability to turn on subtitles, and to listen/watch the video at faster speeds (e.g., 1.5× or 2×). The posting of hyperlinks connected to the open platforms is a lot faster than is loading very large files to Canvas, Blackboard, or Moodle. Moreover, the content can be always available to both the instructors and the students past the end-of-course dates when class pages are usually taken down and archived. Some professors prefer to host the videos on external sites to contain greater control over their own content. While there are several benefits to having the videos hosted on external sites, these external video hosting sites often include time stamps of when the video was posted. At the same time, some faculty include cover slides in their lectures that have copyright dates or just the date of the recorded presentation. We argue that students often negatively act on that information. Based on feedback from students, we have determined that many students are more focused on the recency of the media over the quality of the media. On one level, this makes sense, as students do not have prior knowledge to assess the quality of the media. They might assume that recency means that it is more relevant and thus more valuable. Thus, we propose the following:

**Hypothesis 5.** *Indicators of recorded dates on prerecorded video instruction decrease participants' perceived "usefulness" of online instruction.*

**Hypothesis 6.** *Indicators of recorded dates on prerecorded video instruction decrease participants' motivation via diminished perceived certainty.*

### 3. Findings

#### 3.1. Realizing the Benefits of Prerecorded Videos for Instructional Tutorials

The results of the reports and student feedback are consistent with the hypotheses. Synchronous broadcast lectures improve participant attitude (H1) and motivation (H2) toward online instruction. The learner participant feedback and personal observations brought to the surface two important aspects of technology and its users. First, prerecorded

content increases learners' perceptions regarding the overall ease of use and usefulness of the course. Examples of participant feedback include the following:

–I enjoyed the pre-recorded lectures, as I could listen to them when it best suited me. I found this made me more productive when learning the material.

–I enjoyed the pre-recorded lectures, being able to pause and rewind lectures was a great help for me.

–The slides were informational and clear, and a great help for the online sessions. I think the online sessions were good as well in terms of questions asked and discussions.

Second, we found that despite the resistance previously generated by academics' prejudices, attitudes, opinions, and even pedagogical beliefs, the majority of the instructors turned out to be resilient, flexible, and fast learners and were quick to adapt to new technology-led teaching environments during a time of crisis, including the recording and posting of video content. Multiple models of "internet and communication technology" (ICT) adoption and usage support the idea that perceptions that performance may improve lead to adoption/usage of the ICT. For example, "performance expectancy" is defined in the unified theory of acceptance and use of technology (UTAUT) "as the degree to which an individual believes that using the system will help him or her to attain gains in job performance" [52] (p. 447). Performance expectancy is closely related to perceived usefulness from TAM and extrinsic motivation from the motivational model [24]. Thus, the rapid adoption of technology to deliver courses online is enhanced by a change in the perception of academics who now believe that using technological systems can enhance their performance (i.e., enable them to continue to deliver courses and ensure student engagement). Moreover, under circumstances where face-to-face teaching is not possible, technology provides a relative advantage [53].

Further, the above case demonstrates that there were individual differences in choosing technological tools. This can be explained through the constructs "effort expectancy" (UTAUT)/perceived ease of use (TAM). In other words, individual technological choices depend on the extent to which an individual believes that the tool is free of effort [52] (p. 451).

### 3.2. Benefits of Live Video Recording and Archiving

Despite the challenges, some positive outcomes have been noted. Based on experiences shared by academics, it appears that student/teacher engagement in online learning environment (OLE) in some schools is more positive than in others. In some schools, many of the traditional modules were designed for face-to-face teaching, supported by OLE. With the extraordinarily rapid development of COVID-19 to pandemic status, there has been a big "push" to move all modules to online teaching, and naturally, some transformations have been faster and smoother than have others. Many academics from University B have expressed surprise about the array and variety of online technology-driven activities that can be adopted for active learning and student engagement. Their previous preoccupation with face-to-face teaching left them unaware of the scope of the functionality available on OLE and other learning platforms, which they have now been able to utilize for learning and engagement. It also appears that students have generally enjoyed the technology-driven activities more than the traditional face-to-face activities. Similar findings are observed by Rizun and Strzelecki [54] in Polish students for whom "enjoyment" was found to be one of the key predictors of student's acceptance of changing educational instruction to remote learning. The exception to this in University B is the category of modules that were designed for face-to-face delivery and assessment and which have over 500 students. These modules have struggled to swiftly migrate to online teaching due either to the sheer volume of students or the highly traditional form of learning and teaching.

Some academics noted that students required more time to both absorb the information conveyed and transform that knowledge into learning. More time also had to be allocated for feedback and reflection. Moreover, changes had to be made to the assessment profile when the modules moved to a purely online mode. Some of the teaching materials had to be adapted or even recreated to suit online teaching. Support teams that included

teaching assistants, teaching services staff, and class monitors/ reps had to be put in place to communicate with and support students. Traditional face-to-face timetables had to be rescheduled to suit online delivery. Overall, however, it was found that the level of student interaction and engagement in University B did not drop after the sudden move to online teaching.

This case study indicates that the following areas are critical to a successful online learning and teaching (L&T) experience: (a) managing the expectations of students and staff, clearly outlining the parameters of online delivery goals, and communicating these goals and expectations to all the parties involved in online L&T; (b) securing support from other staff members, such as IT support staff, e-learning teams, etc.; and (c) developing support groups, identifying technology champions within the university, sharing experiences, and learning from others. Such a strategy is recognized as one of the “high-impact principles for online education” [55].

Akin to the findings of University A’s case study, it is evident that ease of use and perceived usefulness of technology (TAM) played a role in moving University B’s academics away from their comfort zone, encouraging them to utilize the various technological systems that were already available to them. Further, this case study brings to the surface the importance of the “social element” in influencing people to accept and utilize technology within the lens of the COVID challenges, following up on the research agenda set by Chakraborty et al. [56]. For instance, experience sharing and identifying technology champions relates to the “social influence” construct in UTAUT, which is defined as “the degree to which an individual perceives that important others believe he or she should use the new system” [52] (p. 451). More recent studies suggest effects of interactivity and cooperation as influencing the perceived usefulness, particularly in social applications [57]. In the theory of reasoned action (TRA) and the theory of planned behavior (TPB), this is identified as a “subjective norm,” a determinant of behavioral intention. According to the diffusion of innovation theory, diffusion of innovation is influenced by “adopters”. In the above case, technology champions acted as adopters to influence other academics and encouraged them to use the available technological tools. This can be further supported by the model of personal computing utilization where it is argued that “behavior is determined by what people would like to do (attitudes), what they think they should do (social norms), what they have usually done (habits), and by the expected consequences of their behavior” [58] (pp. 125–126).

In summary, the observations are consistent with the idea that prerecorded video instruction increases participants’ perceived “ease of use” (H3) and perceived behavioral control (H4) of online instruction.

### *3.3. The Potential Negatives Effects of Video Date Information on “Attitude”*

It was discovered from end-of-semester student evaluations that many college students judged the relevance of the video by the newness of the large timestamp of when the video was uploaded to YouTube. For the class in this case study, the instructor used a set of video lectures that the instructor had recorded three to five years prior covering several fundamental principles and techniques that have not changed over the last few decades. While many students indicated the class was excellent, other students appeared to become fixated on the three-year-old to five-year-old time stamps on YouTube, stating the following:

–I was thoroughly disappointed with this course. I was very excited to take it before the semester began, and found myself just wanting it to end so I could be rid of the out of date information.

–I understand why this is no longer required class for majors. I felt that the course could have been much better if it were to be taught by a different professor that had updated course materials.

Instructors who use video hosting Web sites such as YouTube or Vimeo could reupload the videos each year from their computers so that the video posting dates do not become a distraction for learners who confuse newness with relevance or quality. Additionally,

videos can be embedded in the Canvas, Moodle, or Blackboard learning software suite using Kaltura or other similar software that does not timestamp the materials. We advise that instructors should also be careful to not have recording or copyright dates written in the lecture slides used in the recordings. As to the class discussed in this section, the next semester, the same instructor resaved the same YouTube videos using Kaltura and embedded them in Canvas rather than using the YouTube links. No students complained about a need for updated course materials in course evaluations. Instead, the students highly rated the content in course reviews. Thus, it appears that many people struggle to understand that posted time stamps on materials have nothing to do with current applicability. In short, indicators of recorded dates on prerecorded video instruction decrease participants' perceived "usefulness" (H5) and "certainty" (H6) of online instruction.

Reuse is important to sustainable online higher education given that recording content can take longer than teaching it "live" especially considering time spent on microphones, backgrounds, video rendering, uploading, etc. However, in an era focused on newness equating to novelty in TikTok and fast fashion, perceived newness trumps content. We caution that organizations and institutions should pay attention to the dates of the materials (and likewise having copyright dates shown on slides that are used in recordings)—even resaving posted materials if needed—to avoid learners having wrong impressions regarding the value of the content.

#### 4. SCARF Learning Experiences

As mentioned earlier in this article, the SCARF framework of Rock [38] in neuroscience research focuses on status, certainty, autonomy, relatedness, and fairness. In the next subsections, we outline how each of the five experiences could be applied by educators to online classes that utilize instructional technology platforms such as Moodle, Blackboard, and Canvas to achieve greater social sustainability. Research on the adoption of technology has shown that perceptions regarding risk and trust play important roles in the decision regarding the usage of technologies [59]. The switch to virtual instruction during the pandemic has called into question the students' level of risk and trust [60]. We posit that the concerns can be mitigated by focusing on the elements in the SCARF model. The SCARF model has been shown to improve the entrepreneurial growth mindset [61], which can help higher education institution leadership make progress in being more adaptable and innovative.

##### 4.1. Pedagogical Implications Regarding "Status"

Prior research finds "status-confirming information can elicit activation in reward neural circuitry" [62] (p. 4). Thus, one may argue that it is important for educators to use "Comments" and other "virtual learning tools" (VLT) to provide status updates to their students. Students reported to the authors in course evaluation qualitative comments that even simple weekly email updates are appreciated by students in online classes during the COVID pandemic:

–Online courses are definitely more of a challenge than lectures in my opinion because you never meet your professor or any of your peers. Dr. XXXXX did well to stay in contact with us through email though and communicate clearly about the schedule and content of the course!

Status is often typically confirmed through feedback. However, neuroscience research finds that feedback can result in anxiety and stress—both for the recipient and for the giver. The authors propose that educators might be able to surmount this challenge in teaching by communicating the status information in different ways (e.g., Microsoft now uses the word "perspective" instead of "feedback" [63]). In short, the framing of the status can be as important as the status itself.

#### 4.2. Pedagogical Implications Regarding “Certainty”

Based on SCARF, individuals have varying requirements for certainty and differing capacities for handling unclear situations [62]. Nevertheless, uncertainty is deemed more distressing than is a known negative circumstance and is perceived as a source of discomfort in the brain. The balance between certainty and ambiguity may be influenced by the “frequency of communication”. Regarding instructional ramifications, educators need to establish the appropriate frequency of communication that reduces ambiguity and enhances certainty. This may prove to be challenging, as different students may have varying preferences for how often communication happens. One solution might involve adaptive systems that allow students to be in charge of determining, to some extent, how often they receive communications. Instructors could enter in updates and then either manually chunk them out at different intervals to different subsets of the class, or the system could do it automatically. Instructors will want to verify there are updates or new topics to share on a regular schedule for students to digest; prior SCARF research indicates that providing people with information results in the reward process even if the knowledge is less useful. Students reported to the authors in course evaluation qualitative comments that even simple weekly email updates are appreciated by students in online classes during the COVID pandemic:

- I enjoyed the feedback given as well as the quick responses to emails.
- Feedback and weekly emails.

Instructors also have the potential to impact an additional source of ambiguity, which pertains to the perceived obligation of students to fulfill performance expectations during times of economic uncertainty and fluctuation. Importantly, many organizations still appear to process a “blame culture” of “who can we blame for this” instead of “how can we learn from this” [64,65] and encourage a growth mindset. One way of encouraging an entrepreneurial growth mindset is permitting students to make multiple submissions of exercises and assessments. When asked what they especially enjoyed in the course, many students wrote responses similar to the following examples:

- The ability to re-do assignments and to rework them promoted learning and trying things without the fear of punishment when you were wrong. I liked the idea of get as far as you can just trying it on your own, then watch a sample of how to do it.
- I appreciated how he gave multiple chances to do assignments/quizzes to allow us to learn from mistakes.
- We could attempt it once and then find out what was done wrong and find how to fix it then to be able to resubmit it.

#### 4.3. Pedagogical Implications Regarding “Autonomy”

The human inclination to seek control over life events, known as “autonomy,” is a natural aspect of human behavior. Studies suggest that fulfilling this desire can enhance physical, mental, and emotional health [61,66]. In light of this, during times of crisis, educators should provide greater levels of autonomy rather than reducing them, and they should also be more forgiving [67]. One way of giving more autonomy is allowing some flexibility about scheduling question-and-answer review sessions, due dates, and exam dates when possible. Doing this demonstrates trust in the students and also reduces micromanaging. An issue that educators may encounter involves the potential failure to consult with students before scheduling new video conference meeting times that may conflict with their existing commitments to other classes, work, childcare, or other obligations. In this regard, unilaterally scheduling meetings, such as exam review sessions, at arbitrary times without seeking the input of students and respecting their collective preferences, can undermine their autonomy. Once the rescheduled timing is announced, educators must provide explicit details on the purpose of the meeting and the reasons for the schedule change (i.e., outlining new rules for meeting attendance) to avoid further encroachment on student autonomy. These steps may also help to increase the level

of certainty among students. Incorporating these recommendations into instructional practices could enhance the effectiveness of online learning environments.

#### 4.4. Pedagogical Implications Regarding “Relatedness”

SCARF uses the term “relatedness” to refer to an individual’s sense of connection and similarity to those around them, as well as their perception of safe or threatening social interactions. Relatedness is an essential element in higher education classrooms [68–70], where social interaction has long been recognized as a crucial component of relationship building [71]. Research has consistently shown that people tend to exhibit greater trust and empathy toward those whom they perceive as similar to themselves and whom they believe are part of their social circle, as evidenced by the concepts of “in-group preference” and “out-group bias” [62].

Instructors can promote relatedness and reduce the possibility of bias by assigning arbitrary designations, such as “team 2” or “team 3,” to groups. This helps to foster a sense of connection among members of the same group. Additionally, requiring students to turn on their cameras during Zoom meetings is a crucial practice to mitigate unconscious biases such as “distance bias,” which relates to the perception of space and time. By enabling live video, participants are more likely to give the conversation their undivided attention, similar to an in-person conversation. This is particularly important in the context of video calls.

#### 4.5. Pedagogical Implications Regarding “Fairness”

Studies have indicated that fairness perceptions are more often influenced by emotions rather than by rational thinking, and these emotions are shaped by social interactions with other humans over time. [72–76]. A meta-analysis indicates that workplace perceptions of unfairness can negatively impact an individual’s mental and physical well-being [77]. According to Rock and Cox [62] (p. 8) “increasing the perception of fairness and reducing unfairness will promote satisfaction and well-being, especially in social situations in which sensitivity to interpersonal equality and inequality is heightened”.

As to educator implications, the concept of fairness is very important [75]. Therefore, it is crucial that educators consider how they are communicating the changes. For instance, administrators and instructors need to inform students if they are increasing the hours the educators themselves are spending related to the class, as students may not be aware of it otherwise. This can offset student frustration over spending more time on the content, as they feel it is fair if the instructor is also doing the same thing. Moreover, it is essential to help students recognize and label their emotional state, especially if they feel threatened in a social context. Failure to identify this threat state may trigger the fairness concept, and students may perceive it as unfair that they cannot follow the traditional ways of learning. By guiding students to label that they are in a threat state, potential fairness concerns can be eliminated. It might be as simple as stating “Wow. You have spent a lot of time trying to get that dataset to work correctly. That must be very stressful. I am happy to spend some of my time to help you so that you can achieve the benefits of the learning associated with this exercise”.

## 5. Discussion

We have found support for the idea that synchronous broadcast lectures can improve participants’ attitude (H1) and participants’ motivation (H2) toward online courses. Likewise, prerecorded video instruction can improve participants’ perceived ease of use (H3) and perceived behavioral control (H4) when it comes to online classes. However, any indicators of “time stamp” (recorded dates) on prerecorded video instruction decrease participants’ perceived usefulness (H5) and certainty (H6) of online instruction. Improvements in these motivation-related elements can improve the social well-being and quality of life health of college students enrolled in online higher education classes, resulting in improved social sustainability. Social sustainability is one of five types of sustainability

and sustainable development (“technical, environmental, cultural, economic, and social sustainability”) listed in the aims of Sustainability. Thus, this research directly impacts sustainable development. Additionally, improvements in online education experiences not only improve the well-being of the students but also can improve enrollment—which can result in improved financial sustainability of educational institutions. These institutions, in turn, play an important role in scientific research, something that was temporarily negatively impacted by the pandemic [11]. In the rest of this section, we outline several additional challenges and opportunities that higher education instructors might face related to social sustainability.

Organization instructors can create a better educational experience by adopting the recommendations listed in the preceding sections. However, there are additional challenges that face instructors in organizations as a collective. One challenge is the experience of mixed classrooms. Instructors were encouraged to live broadcast (e.g., through Zoom or WebEx) their instruction in live classes to students who were temporarily in quarantine or isolation due to COVID-19. Innovative ICT tools can let students use apps on smartphones to connect to the broadcast so that students watching remotely can hear the entire discussion and not just what the instructor is saying or repeating from their computer at the podium that is hosting the broadcasted session. While these technologies can help remote learners feel more included, they can have a negative effect on students who are attending live in the classroom.

Another challenge is the removal of the “personal touch” in teacher–learner interactions which can occur when technology is excessively used [78] (p. 2). Use of e-learning platforms for lecture recording and online discussion boards can work well in terms of providing students with access to learning and teaching materials and encouraging them to engage with lecturers and other students in the class. However, it has been found that the physical absence of the lecturer and a lack of face-to-face interactions can diminish the quality of the student learning experience and on-campus social interaction [79–82]. It has been further argued that the under-completion of online courses and their low student satisfaction levels can be attributed, *inter alia*, to a lack of personal engagement by the tutor who is guiding the learning. It is also argued that there is a higher attrition rate for online learners compared to on-campus students [83]. Key factors contributing to this include a sense of isolation in online study, technology challenges, high academic expectations, and personal issues in students’ lives. Stone and Springer [83] (p. 146) recommend that “online teacher presence,” combined with an engaging and interactive online study design, could be a solution to this. This view is further supported by findings of an Italian study of the HE sector during COVID-19 in which the authors discovered that social media tools are more effective in engaging with larger audiences (e.g., prospective students) while digital communication channels, such as webinars and video conferencing meetings, can help with engaging with current students [84]. These methods are effective in providing a sense of constant “presence” and engagement between staff, students, and the wider community [85]. Beech [78] also argues that technology use in HE settings can lead to other risks, such as information security issues (related to the collection and storage of data) and the information available on e-learning platforms being used for unethical and unintended purposes (e.g., plagiarism). Moreover, the increasingly rapid pace of technology evolution might alienate some users, such as mature learners who are less comfortable with technology use than are their millennial counterparts.

Some universities have begun investing in learning technologies that they could use as a unique selling point (e.g., University of Deakin’s “study online” pathway marketed as the Deakin “Cloud Campus”). This requires academics to be familiar with and feel comfortable around technology for educational purposes. They should also be willing to integrate technology into their course development. Miller et al. [86] succinctly explain this as follows: “One of the by-products of technology infusion is the decision to ‘re-engineer’ courses causes faculty members to comprehensively re-evaluate the way they teach, from the objectives to the summative evaluation”.

However, many instructors are hesitant or even resistant to transforming their in-person classes to online classes. This pushback has been attributed to deficiencies in training and support [87–90]. Institutional support could be provided in many ways. For example, research finds that “teaching guidelines” and “online training courses” offered to instructors at the start of COVID-19 had a positive effect on students’ satisfaction scores [91]. See also Núñez-Canal et al. [92]. In another recent example from China’s Tsinghua University, positive results were observed after providing online teaching training to the University’s teachers at the beginning of the pandemic [93]. Further, the degree of technology adoption in teaching may be related to the pedagogical beliefs of academics [94]. Research evidence also suggests that faculty regard teaching online as more difficult than teaching traditional courses [95], complaining that online delivery is more labor intensive [96–98].

It might be challenging to secure the full cooperation of teachers in the extensive utilization of technologies introduced for teaching purposes. Technology may get in the way of current teaching practices, with some subjects being more easily taught using traditional methods and some teachers being more comfortable with face-to-face interactions with students. If this is the case, institutions are going to encounter resistance in the form of underutilization of technological resources procured for learning and teaching purposes. At the same time, some institutions expect that with the pandemic ending, things will go back to a prepandemic setting and are requiring faculty to teach a mix of in-person and online classes that matched prepandemic levels. However, students are demanding more online classes, and enrollments in in-person classes are very low.

#### *Limitations and Future Research*

In this article, we have outlined hypotheses on how elements such as perceived usefulness and perceived ease can impact learners’ adoption and usage of video-based learning content in online instruction during environments in which there is more stress, anxiety, and uncertainty. We have described three ethnographic sets of observations at different universities. The results are consistent with the hypotheses. However, observational research has constraints on rigor and external validity. Thus, research is needed that examines comparisons of different gender and ethnic experiences and needs. Additionally, a similar comparison between local and international students at both the undergraduate and postgraduate levels at the same institutions would be helpful. Analysis might be carried out on university investment into learning and teaching technologies, their usage levels, and student satisfaction with technology use. Finally, studies that allow for regional and geographical comparisons of important economic, social, institutional, technological, and cultural factors from multiple countries can contribute to this important debate and assist with the crafting of policy, which is likely to be a top priority for universities, educational practitioners, scholars, and ministers for some considerable time to come.

#### **6. Conclusions**

The COVID-19 pandemic was a situation of external shock to the higher education industry. Administrators and educators need to put into practice elements that might help them cope with the ongoing student mental well-being crisis, adjust their management, and also be entrepreneurial for online education to remain sustainable in the coming years. In conclusion, this research has outlined how particular SCARF elements might be helpful for decision-makers to use as an additional lens of magnification of TAM elements in evaluating and comparing their online video training content, as well as all other course content and communication plans for the current pandemic environment and beyond. The development, integration, and use of technology may not be enough for sustainable online education to improve the entrepreneurial growth mindset of students if decision-makers do not track or measure teacher and learner experiences of these motivation element dimensions.

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