

# Changes in Academic Rigor and Faculty Perception of Student Learning in the Post-Secondary Classroom During Covid-19

*K. D. Tasci<sup>1</sup>, M. L. Drewery<sup>2</sup>, and R. G. Anderson<sup>3</sup>*  
*Texas State University*  
*San Marcos, TX*



## Abstract

The environment created by Covid-19 did not allow for face-to-face instruction, forcing educators to transition courses online. While Covid-19 disrupted the learning experience, it also accelerated the delivery of online courses at the post-secondary level. Thus, we should leverage the widespread adoption of online learning that occurred during the pandemic to document effects on the learning experience and help educators craft their online courses moving forward. Our objectives were to capture: 1) how and why post-secondary agricultural faculty altered academic rigor in courses in response to Covid-19; and 2) faculty perceptions of student learning during Covid-19. Respondents lessened (33%), increased (10%), or did not change (52%) academic rigor from March to October 2020. When asked an open-ended question about why they altered academic rigor, responses emerged into four themes: 1) concerns over academic dishonesty; 2) difficulty converting practical concepts to an online format; 3) student engagement or communication suffered; and 4) lacking resources or time. Faculty felt students learned less (56%), more (4%), or the same amount (33%) in courses during Covid-19 as compared to previous semesters. Using the Academic Communities of Engagement (ACE) model, we interpreted our data and discussed best practices for faculty teaching online.

## Introduction

The Covid-19 pandemic created unprecedented challenges for all sectors of society, especially post-secondary education. School closures occurred across the globe, starting in China in February 2020. By mid-March 2020, 75 countries had announced school closures (UNESCO, 2020), forcing educators to transition courses to

online platforms. To achieve this abrupt transition, faculty and institutions experimented with technology for teaching, including software and social media platforms (Carrasco et al., 2021; Tasci et al., 2021), during the pandemic. The changes faculty made in response to Covid-19 likely impacted student's learning experiences.

Online courses are often offered to relieve "non-traditional" students of the simultaneous burdens of working and raising children; to offer commuter students flexibility in attending classes; or for those who simply want more flexible class times (Dutton et al., 2002). Offering online courses has increasingly become an expectation of post-secondary institutions and faculty as we become a more technologically dependent society. With this expectation, faculty are required to commit more time to their courses (Bolliger and Wasilik, 2009). With more time required to create and maintain online courses, faculty development programs have been identified as a source of support and education for learning how to use online platforms. When development programs were offered for online teaching, faculty had improved perceptions of online classrooms (Walters et al., 2017). Programs such as these were critical during Covid-19 as faculty expressed unease and lack of confidence in teaching online during the pandemic (Benito et al., 2021, Rahim et al., 2020).

A critical factor regarding the success of online learning is the ability to foster student engagement in an online, geographically dispersed classroom. Bernard et al. (2009) reported that consistent and strong interaction in online courses results in more positive perceptions of online learning and improved outcomes of student learning. Previous literature documents mixed student perceptions to online learning. A study conducted by O'Malley and McCraw (1999) indicated that students felt an online environment made contributing to class discussions more difficult and forced behavioral changes, which was not favorably viewed.

<sup>1</sup>Department of Agricultural Sciences, Texas State University; B.S.; kdt91@txstate.edu

<sup>2</sup>Department of Agricultural Sciences, Texas State University; PhD; m\_d553@txstate.edu

<sup>3</sup>Department of Agricultural Sciences, Texas State University; PhD; r\_a461@txstate.edu

These same researchers also reported that students did not want more online courses to be offered at their institution and ultimately suggested that online learning provides no advantage to students (O'Malley and McCraw, 1999). A key factor linked to improved student satisfaction of online learning is the availability of support. Providing students with instructional, peer, and technical support can optimize learning experiences, especially in an online context (Lee et al., 2011). Previous research evaluating student perceptions of support and course satisfaction in an undergraduate online course indicates that student support was significantly related to overall satisfaction of the course (Lee et al., 2011), demonstrating that student support in an online environment is paramount to the overall learning experience. As faculty were forced to rapidly transition their courses to an online format and, for many, navigate online teaching for the first time during Covid-19, it is possible that the additional support students require in an online classroom was not available during the pandemic.

The environment created by Covid-19 affected the academic performance of and learning by students during the pandemic (Adnan and Anwar, 2020; Mahdy, 2020). Student absence (i.e., not attending school and missing class) is directly related to a loss in learning (Kuhfeld et al., 2020). Given the global school closures caused by Covid-19, loss of education may have occurred as, anecdotally, we observed a gap between when some educational institutions closed and when they were able to move online. Students also lacked resources to access online materials from home, undoubtedly impacting their academic performance. Specifically, in K-12 schools, 50% of low-income families and 42% of families of color in the United States did not have adequate devices to continue learning online during Covid-19 (Education Trust, 2020). Finally, the pandemic demanded greater autonomy and attention from students, placing pressure on their physical and mental well-being (Mseleku, 2020). Cumulatively, these factors affected university and college student education during Covid-19.

As we optimistically move towards the end of this pandemic and emerge into a "new normal", it is important to assess the impact Covid-19 had on education and document "lessons learned". Online learning was on the rise before Covid-19 (Quezada et al., 2020) and we anticipate the pandemic accelerated institutional adoption of this such that online courses will be now offered at a higher rate than before. Recent studies have demonstrated that students and faculty are eager to have more online or hybrid courses offered which indicates there is value in online education. A study conducted by Benito et al. (2021) demonstrated that 79% of faculty felt that, given the choice, their students would choose a hybrid model of learning over exclusive face-to-face instruction. Thus, we should leverage the widespread adoption of online learning that occurred during Covid-19 pandemic as a resource to help faculty craft their online or hybrid courses moving forward.

## Theoretical Framework

The theoretical framework supporting our research was the Academic Communities of Engagement (ACE) model (Borup et al., 2020). The ACE model focuses on how educational institutions can provide guidance to faculty on best practices to support students with the ultimate goal of maximizing student's academic success and engagement (Borup et al., 2020). Under the scope of the ACE model, two support communities are necessary for students to fully engage in their courses and maximize academic success: a course and a personal community. The course community includes instructors, peers, and administrators in the course whereas the personal community includes family and friends in the student's social circles. For our study, we focused on the course community.

Student engagement is associated with positive educational outcomes (Shernof et al., 2017). The ACE model specifically focuses on academic engagement at the student level as opposed to the school or institutional level. Borup et al. (2020) defines academic engagement as "the energy exerted towards productive involvement with course learning activities".

The ACE model posits that to maximize student's academic success, their engagement in courses must include three components: affective engagement (associating feelings with executing specific tasks), cognitive engagement (acquiring knowledge and skills), and behavioral engagement (putting forth the effort). In practical context, affective engagement in the classroom can be facilitated by faculty posting motivational videos or personally contacting students. To facilitate cognitive engagement, creative instruction can be integrated into the pedagogy and feedback can be provided to students about their progress in the course. Finally, to ensure behavioral engagement, faculty can provide outreach to students who have low class activity and provide additional resources to students in need, as appropriate. Beyond these three components of support, the student's background, the personal environment the student is in, and the course environment all contribute to the extent of academic success the student achieves. Overall, student's academic engagement and, thus, academic success, will improve when each of the engagement components are supported by the course community.

The ACE framework was especially relevant during Covid-19 as students required multiple levels and forms of support to ensure academic success in courses. In order for students to be engaged in their courses, they need to be supported in both their course and personal communities. By interpreting our data through the ACE model, we provide guidance to faculty and institutions on how to best support students for academic achievement and ensure rigor, or level of course intensity, is not sacrificed in online courses.

## Purpose and Objectives

The overarching purpose of our study was to evaluate how Covid-19 impacted faculty's actions and experiences with online teaching in post-secondary agricultural courses.

To achieve this, our objectives were to:

- 1) Determine how and why faculty altered the level of academic rigor, or the level of intensity, in courses in response to Covid-19.
- 2) Evaluate faculty perception of student learning in courses taught during the Covid-19 pandemic.

The purpose and objectives of this study align with the National Research Agenda of the American Association for Agricultural Education's focus on the use of technology in online learning environments (Roberts et al, 2016). Since adopting online learning was a necessity during Covid-19, it is imperative to understand the changes made to academic rigor, perceived impacts on student learning, and how to maintain continuity in education as we move towards a new era of digital education that emphasizes online learning.

## Methods

For our study, we developed an electronic survey-based questionnaire to assess the impact of Covid-19 on academic rigor in post-secondary agricultural-based disciplines. The Texas State University Institutional Review Board deemed this research as exempt (#7380) and verified that all participants were provided written informed consent before participating. The population of interest was faculty and instructors who held a formal teaching appointment based in agricultural sciences during the early stages of Covid-19 (spring 2020, summer 2020, fall 2020).

Data were collected using a researcher-developed instrument that contained five sections. Section 1 consisted of nine questions including personal and institutional demographics. Section 2 was related to training in teaching online. Section 3 was related to the use of technology, before and as a result of Covid-19. Section 4 consisted of fifteen questions related to teaching experiences during Covid-19, including questions related to course and career impacts. Finally, Section 5 was related to future training and professional development in relation to online teaching. The data presented here are from Sections 1 and 4.

To establish validity, a panel of experts were chosen from outside the research team or participants. This panel of experts included ten Agricultural Education faculty with expertise in survey design and online teaching. The purpose of the panel was to establish face, content, and construct validity. Face validity ensured that the questionnaire appeared effective in achieving our intended purpose and objectives. Given panel feedback, we revised and resubmitted our instrument for review resulting in the final version of the questionnaire was approved. To ensure reliability of the study, the questionnaire was piloted by 14 agriculture faculty from multiple sub-disciplines who were not part of the research team, participant group, or expert panel. These individuals were sent a pre-notice

informing them of the questionnaire followed by a link to the questionnaire three days later. After seven days, six responses were obtained giving a response rate of 43%. An email to non-respondents was sent one week after the initial link was sent. After two weeks, two more faculty members had completed the questionnaire for a final response rate of 57%. Data from the pilot study were coded and entered using the Statistical Package for the Social Sciences (SPSS) 25.0 software. Cronbach's alpha reliability coefficient was calculated ( $\alpha = 0.790$ ). Based on interpretations provided by George and Mallery (2003), this coefficient was acceptable.

The survey was sent to a self-developed database of faculty teaching agricultural sciences ( $n = 1795$ ) at the post-secondary level in the southern United States. Using a total population of 1,795 faculty and instructors, a sample size of 317 with a 95% confidence level and  $\pm 5$  confidence interval was calculated. We developed the database by searching college and departmental websites in the targeted states during summer 2020. A pre-notice was sent to faculty followed by the survey link. Three reminders were sent out (one each week for three weeks) after the first initial link was sent in accordance with the five-point contact data collection model from September to October 2020 (Dillman et al., 2014). Once the survey closed, we exceeded an 85% response rate for a random sample (95%  $\pm 5$  confidence interval) and did not require further outreach for additional responses to account for non-response error following recommendations of Lindner et al. (2001).

Data were analyzed with SPSS 25.0 using descriptive statistics and measures of central tendency to report how faculty changed academic rigor and faculty perceptions of student learning as a result of Covid-19 using SPSS 25.0. Descriptive statistics were also used to calculate the demographic characteristics of the both the participants and their institutions. Qualitative data were coded for themes and sub-themes by two independent judges with a third judge serving as a tiebreaker as needed per the recommendations of Lincoln and Guba (1985).

## Results and Discussion

Most of our respondents identified as male (62.6%), were White or Caucasian (81.9%), and held a Doctoral degree (84.6%) (Table 1). The three age ranges in which most respondents were born were 1981-1996 (23.1%), 1965-1980 (36.9%), or 1946-1964 (38.0%). Slightly more than half of respondents worked at an 1862 Land-Grant institution (52.2%). Most respondents were either Full (34.6%), Associate (25.2%), or Assistant Professors (26.4%). All respondents (100%) taught courses in agricultural sciences. The full characteristics of our respondents' places of employment and professional titles are presented in Tasci et. al (2021).

We asked faculty how they altered academic rigor, or level of intensity, in their course(s) during Covid-19 versus previous semesters during which they taught the same course(s) (Table 2): 33.1% decreased academic rigor, 51.8% did not change academic rigor, 9.6% increased academic rigor, and 5.4% taught the course(s) for the first time. Our data align closely with similar research also conducted

Table 1. Demographics of sample population

	Percent
Gender identity	
Male	62.6
Female	37.4
Date range born	
1981-1996	23.1
1965-1980	36.9
1946-1964	38.0
1928-1945	1.6
Prefer not to disclose	0.4
Ethnic identity	
Asian	4.6
Black or African American	3.5
Hispanic or Latino	4.2
White or Caucasian	81.9
Other	2.3
Prefer not to disclose	1.9
Highest degree	
Doctoral	84.6
Masters	12.7
Bachelors	1.2
Academic title	
Full Professor	34.6
Associate Professor	25.2
Assistant Professor	26.4
Lecturer	3.9
Instructor	7.9
Adjunct	2.0

Table 2. Faculty alterations in the level of academic rigor during Covid-19 as compared to the same course(s) in previous semesters not affected by the pandemic

	Percent
Decreased it	33.1
Did not change it	51.8
Increased it	9.6
First time teaching this/these course(s)	5.4

during the pandemic; Benito et al. (2021) reported that, as compared to assessments in pre-pandemic face-to-face courses, 33% of faculty perceived assessments in online courses during Covid-19 were less rigorous, 61% perceived assessments were as rigorous, and 6% perceived assessments were more rigorous.

To understand why faculty altered academic rigor in their course(s), we asked those who reported decreasing (33.1%) or increasing (9.6%) academic rigor a qualitative question from which four themes emerged (Table 3): 1) concerns over academic dishonesty, 2) difficulty converting practical concepts to an online format, 3) student engagement or communication suffered, and 4) lacking resources or time. A fifth emerging theme was also identified: empathy for students.

The first theme stemming from our data, concerns over academic dishonesty, had two sub-themes: a) cheating and b) inability to proctor. Faculty reported there was “more opportunity for students to cheat online and cheating is more difficult to truly mitigate” and that cheating was abundant “due to my inability to prevent collaboration between students and unwillingness to give proctored exams”. It seems our respondents were concerned about academic dishonesty which, in turn, affected how they altered academic rigor. Previous data indicates that faculty and students perceive cheating to be more rampant in an online setting due to students being technologically savvy (Stuber-McEwen et al., 2009) and the greater physical distance between students and faculty (George and Carlson, 1999). Further, stress and anxiety are often used by students to justify cheating in online courses (Abdelrahim, 2021). A study conducted by Cao et al. (2020) demonstrated that 25% of Chinese college students experienced fear and anxiety due to the Covid-19 pandemic. The heightened emotional state students experienced during Covid-19 likely contributed to academic dishonesty. Institutions can reduce student's stress and anxiety and, thus, academic dishonesty, by ensuring students have a sense of support and encouraging engagement in online courses. This provides students with a strong sense of course community which can incite affective, cognitive, and behavioral engagement – components that maximize student's academic success under the lens of the ACE model. Young and Bruce (2011) demonstrated that student engagement and a strong course community



are critically related to one another, as a strong community fosters a sense of connectedness which promotes student learning. Proctoring exams is also a potential solution to cheating, but is limited because proctoring services present technological difficulties; require a quiet or empty place that is not often available to students; and can create anxiety, negatively impacting test performance (Kharbat and Abu Daabes, 2021). Accordingly, academic dishonesty in online courses can potentially be addressed by using multiple versions of an exam, randomizing question order, and using multiple performance indicators such as having a mix of multiple choice, essay, or short answer exam questions

(Dietz-Uhler and Hurn, 2011).

Within the second theme, difficulty converting practical concepts to an online format, two sub-themes were identified: a) difficulty conducting a laboratory online, and b) difficulty transitioning courses to an online format. Representative quotes from respondents include “Due to the nature of the course, it became harder for students to adjust to an online course that is meant to be FTF” and “Some assignments, I could not do because they did not lend themselves to a format outside[sic] of the classroom”. Online courses deny students critical hands-on experience necessary in certain courses (Gamage et al., 2020); as

**Table 3. Reasons underlying faculty alterations in the level of academic rigor during Covid-19 as compared to the same course(s) taught in previous semesters not affected by the pandemic**

Theme	Sub-theme	Example statement(s)	# statements
#1. Concerns over academic dishonesty	#1A. Cheating	<ul style="list-style-type: none"> <li>“More opportunity for students to cheat online and cheating is more difficult to truly mitigate.”</li> <li>“Because the students are not holding themselves to the honor code and cheating on their exams and quizzes in order to get a ‘good grade’ whereas prior to COVID-19 and going online they had to learn the material in order to take these exams and quizzes in person.”</li> </ul>	7
	#1B. Inability to proctor	<ul style="list-style-type: none"> <li>“Due to my inability to prevent collaboration between students and unwillingness to give proctored exams.”</li> </ul>	5
#2 Difficulty converting practical concepts to an online format	#2A. Difficulty conducting a laboratory online	<ul style="list-style-type: none"> <li>“Not being able to do traditional labs and hands-on training, no field trip are allowed or student travel during Pandemic.”</li> </ul>	6
	#2B. Difficulty transitioning courses to an online format	<ul style="list-style-type: none"> <li>“Due to the nature of the course, it became harder for students to adjust to an online course that is meant to be FTF.”</li> <li>“All assignments had to be accessible for students who were attending remotely, and this was quite a challenge. Some assignments, I could not do because they did not lend themselves to a format outside[sic] of the classroom.”</li> </ul>	8
#3. Student engagement or communication suffered	#3A. Students not engaging or participating	<ul style="list-style-type: none"> <li>“Inability or unwillingness of students to participate in discussion of topics at-a-distance.”</li> <li>“If my rigor did not change I believed that if students were not engaged in their virtual learning then the quality of instruction from the student grades/perspective would have suffered.”</li> </ul>	9
	#3B. Difficulty communicating with students	<ul style="list-style-type: none"> <li>“Less interaction among students with zoom; less ability to “read” student responses with zoom; more time to devote to technical issues.”</li> </ul>	5
#4. Lacking resources or time	#4A. Uncertain of how to teach online	<ul style="list-style-type: none"> <li>“Needed to improve documenting student involvement and outcome.”</li> <li>“Harder to teach and hold a higher standard with a drastic change in delivery method.”</li> </ul>	7
	#4B. Faculty and/or students lacked time	<ul style="list-style-type: none"> <li>“Greater time needed by students and faculty to create the course and participate in the course from a distance.”</li> </ul>	6
Emerging theme. Empathy for students	n/a	<ul style="list-style-type: none"> <li>“I felt students were overwhelmed. Everyone else required synchronous Zoom lectures, papers, and multiple assignments. So I decided to go a little easier on them. They seemed to be struggling with just getting by.”</li> </ul>	5

our respondents teach agricultural sciences courses, a discipline that is characterized by practical and applied concepts, it is not surprising it was difficult for them to transition their lessons to an online format. If online courses prevail in the agricultural sciences discipline in the future, faculty may be able to leverage technology as a solution for delivering practical, applied lessons to students. Zhai et al. (2012) demonstrated the use of simulation tools and virtual reality in online electrical engineering laboratories; the online laboratory allowed students the opportunity to view processes step-by-step in a simulated environment and provided a collaborative learning space that fostered effective interaction. Although perhaps impractical during Covid-19 due to a lack of time and resources (Theme #4), faculty who continue to teach agricultural sciences online after the pandemic could experiment with integrating technology into their online laboratories.

The third theme that emerged from our analysis, student engagement or communication suffered, was further divided into two sub-themes: a) students not engaging or participating, and b) difficulty communicating with students. Faculty reported there was an “Inability or unwillingness of students to participate in discussion of topics at-a-distance” and there was “Less interaction among students with zoom; less ability to ‘read’ student responses with Zoom; more time to devote to technical issues”. Under the ACE model, faculty can ensure student engagement does not suffer in an online classroom through affective engagement. Positive psychology, a form of affective engagement, can maintain relationships that were undoubtedly affected by Covid-19 (Chu, 2020). Faculty can integrate positive psychology into their courses by highlighting class successes, showing gratitude to students, empowering students to apply their strengths to the class, encouraging resilience, and setting goals with an outcome in mind (Chu, 2020). Ultimately, this increases student engagement which is correlated with positive academic emotion (Zhang et al., 2020). Conversely, negative academic emotion (i.e., feelings of nervousness and anxiety) detrimentally affects student engagement and performance (Pekrun and Linnenbrink-Garcia, 2012).

An approach to maintain student engagement is to facilitate communication and interaction within the peer community. Student interaction in course discussions is one of the most influential aspects of online courses (Swan et al., 2000). Picciano (1998) demonstrated that the amount a student learns in an online course is related to how much discussion takes place in the course. Course discussions, specifically in asynchronous courses, allow students to develop their own responses whilst reflecting on their peer's work; this provides students with a sense of mindfulness and community within online courses (Swan, 2002). While online discussion encourages a strong peer community, it will not be effective if there is a lack of instructor structure and support (Ruberg et al., 1996); this underlines the important interplay between peer and course community. Peer-to-peer interaction within the course is one of the fundamental components to developing an online learning community (Rourke et al., 2001). Faculty can facilitate peer-to-peer interaction and discussion in online courses by using group messaging platforms, class discussion boards,

and/or “break-out rooms” offered by some online teaching platforms.

For the fourth theme, lacking resources or time, we identified two sub-themes: a) uncertain of how to teach online and b) faculty and/or students lacked time. Faculty reported it was “harder to teach and hold a higher standard with a drastic change in delivery methods” and that there was “greater time needed by students and faculty to create the course and participate in the course from a distance”. Clearly, our respondents were uncertain about how to navigate online courses during the pandemic. This is understandable as faculty generally perceive the transition of a face-to-face classroom to an online format as daunting under normal circumstances (Gillett-Swan, 2017) and the abrupt and rapid nature of Covid-19 certainly exacerbated this perception. In June 2020, 34% of faculty teaching medical sciences were anxious about teaching online and 33% did not have previous knowledge of online education systems (Rahim et al., 2020). This lack of previous knowledge aligns with our sub-theme, uncertain of how to teach online. These uncertainties likely led to the observation of Gardner (2020), who found that many courses transitioned online during Covid-19 were not sustainable for long-term needs due to the little time given for consideration in course design. The rapid shift from face-to-face to online instruction at the start of the Covid-19 pandemic did not provide extensive time for faculty to transform their courses to an online platform. This aligns with our second sub-theme, lacking resources or time. Indeed, in focus groups conducted in another study, faculty recognized that their experience teaching online courses during Covid-19 was not the same as it could be in an online course that had been planned in advance (Benito et al., 2021). Further, they also recognized that many were teaching during the pandemic without the appropriate training or accumulated knowledge in online technology, tools, and pedagogy (Benito et al., 2021). To combat uncertainties and unease with teaching online, institutions should implement long-term theory-based training on best practices of online learning instead of simply teaching faculty and instructors how to use the necessary hardware and software (Marek et al., 2021). Perhaps if faculty themselves received more institutional support under the ACE model, students would also feel better supported and, thus, maximize their academic engagement and success in online classrooms.

Finally, we identified an emerging theme: empathy for students. Faculty perceived that students were overwhelmed and struggling with learning the course content amidst the uncertainty of the pandemic which, in turn, prompted them to alter academic rigor in their courses. Identifying the need to change course structure in response to the emotional state of students demonstrates that faculty are sensitive to student's needs and committed to adjusting their pedagogy to best suit the circumstances of a given situation. This ultimately creates a sense of course community which is a critical element of student support under the ACE model. Psychological distress is common amongst college students in normal circumstances (American College Health Association, 2019) and additional academic stressors caused by the pandemic undoubtedly affected academic progress and required action by faculty. Further research

should be conducted on the effects of the pandemic on student mental health to prepare faculty to support their students in future pandemics or similar events that disrupt society and education to a profound extent (e.g., school shootings, major climatic events, wildfires).

We also asked faculty how much they felt students learned in course(s) during Covid-19 relative to students in previous semesters not affected by the pandemic (Table 4). The majority (55.5%) of our respondents felt students learned less during Covid-19 and 32.9% felt students learned the same amount. Only 4.3% felt students learned more during Covid-19. This data aligns with another study conducted during the pandemic in which 52% of students and 53% of faculty felt less was learned in online classes as compared to face-to-face (Benito et al., 2021). In that same study, 57% of students reported online courses were less engaging (Benito et al., 2021). In addition to other factors presented throughout this discussion, students may have been less engaged and learned less in online courses during Covid-19 due to lacking resources, such as access to a computer and the internet. Issues with internet connectivity impact a student's level of engagement and can be disruptive when they are attempting to learn new material (Gillis and Krull, 2020). Faculty may also experience technological issues which can further impact the level of student engagement and, thus, learning. Unfortunately, while individual access to necessary resources is an aspect of online learning that is difficult to mitigate, the more prominent offering of online courses – likely a lasting effect of Covid-19 – provides an opportunity to identify a permanent solution.

**Table 4. Faculty perceptions of how much students learned in course(s) during Covid-19 relative to those who took the same course in previous semesters that were not affected by the pandemic**

	Percent
Less	55.5
The same amount	32.9
More	4.3
First-time teaching this/these course(s)	7.3

## Summary

Covid-19 forced post-secondary institutions to shift from the traditional mode of face-to-face learning to an online environment. With consideration to this shift, we evaluated faculty alterations in academic rigor and captured their perceptions of student learning during the pandemic. Overall, our data demonstrate that most faculty either lessened or did not change academic rigor in response to Covid-19. Analysis of responses from an open-ended question identified four themes and one emerging theme explaining why faculty altered academic rigor in

their courses. Further, the majority of faculty felt students learned less in their courses during the pandemic than in courses previously taught in semesters not affected by Covid-19. Our research highlights faculty's response to Covid-19 and raises concerns about how the pandemic impacted the learning experience. Through the ACE model, we make recommendations for faculty and institutions to support the student learning experience and maximize academic success in an online environment. Accordingly, we recommend future research to assess the long-term impacts of Covid-19 on student learning outcomes and to evaluate strategies to maximize student success and satisfaction in online agricultural sciences courses.

## Literature Cited

- Abdelrahim, Y. 2021. How Covid-19 quarantine influenced online exam cheating: A case of Bangladeshi university students. *Jour. of Southwest Jiaotong University* 56(1): 137-146. <https://10.35741/issn.0258-2724.56.1.18>
- Adnan, M. and K. Anwar. 2020. Online learning amid the Covid-19 pandemic: Students' perspectives. *Jour. of Pedagogical Sociology and Psychology* 2(1): 45-51. <http://www.doi.org/10.33902/JPSP.%202020261309>
- American College Health Association. 2019. American College Health Association: National College health assessment II: Reference group executive summary spring 2019. American College Health Association. <https://doi.org/10.1080/24745332.2019.1620558> (accessed May 10, 2021).
- Benito, A., K. D. Yenisey, K. Khanna, M. F. Masis, R. M. Monge, M. A. Tugtan, L. D. V. Araya and R. Vig. 2021. Changes that should remain in higher education post covid-19: A mixed methods analysis of the experiences at three universities. *Higher Learning Research Communications* 11(0): 51-75. <https://doi.org/10.18870/hlrc.v11i0.1195>
- Bernard, R. M., P. C. Abrami, E. Borokhovski, C. A. Wade, R. M. Tamim, M.A. Surkes and E. C. Bethel. 2009. A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research* 79(3): 1243-1289. <https://doi.org/10.3102%2F0034654309333844>
- Bolliger, D. and O. Wasilik. 2009. Factors influencing faculty satisfaction with online teaching and learning in higher education. *Distance Education* 30(1): 103-116.
- Borup, J., M. Jensen, L. Archambault, C. R. Short and C. R. Graham. 2020. Supporting students during covid-19: Developing and leveraging academic communities of engagement in a time of crisis. *Jour. of Technology and Teacher Education* 28(2): 161-169.
- Cao, W., Z. Fang, G. Hou, M. Han, X. Xu, J. Dong and J. Zheng. 2020. The psychological impact of the covid-19

- epidemic on college students in China. *Psychiatry Research* 287: 1-5.
- Carrasco, M., M. L. Drewery, R. G. Anderson and M. Swafford. 2021. Adoption of technology and social media in the post-secondary agricultural classroom as a result of the COVID-19. *NACTA Jour.* 65(1): 56-66.
- Chu, T. L. A. 2020. Applying positive psychology to foster student engagement and classroom community amid the COVID-19 pandemic and beyond. *Scholarship of Teaching and Learning in Psychology* 1-10. <https://doi.org/10.1037/stl0000238>
- Dietz-Uhler, B. and J. Hurn. 2011. Academic dishonesty in online courses. In: *Proc. 44th Annual Conference Association of Small Computer Users in Education, USA*, 12-16 June.
- Dillman, D. A., J. D. Smyth and L. M. Christian. 2014. Internet, phone, mail, and mixed-model surveys: The tailored design method. 4th ed. Hoboken, NJ: John Wiley & Sons, Inc.
- Dutton, J., M. Dutton and J. Perry. 2002. How do online students differ from lecture students? *Jour. of Asynchronous Learning Networks* 6(1): 1-20.
- Education Trust. 2020. Parents overwhelmingly concerned their children are falling behind during school closures. <https://edtrust.org/parents-overwhelmingly-concerned-their-children-are-falling-behind-during-school-closures/#:~:text=Nearly%20%20in%2010%20parents,are%20experiencing%20heightened%20stress%20levels> (accessed May 10, 2021).
- Gamage, K. A. A., D. I. Wijesuriya, S. Y. Ekanayake, A. E. W. Rennie, C. G. Lambert and N. Gunawardhana. 2020. Online delivery of teaching and laboratory practices: Continuity of university programmes during COVID-19 pandemic. *Education Sciences* 10(10): 291. <https://doi.org/10.3390/educsci10100291>
- Gardner, L. 2020. Covid-19 has forced higher ed to pivot to online learning. Here are 7 takeaways so far. <https://www.chronicle.com/article/covid-19-has-forced-higher-ed-to-pivot-to-online-learning-here-are-7-takeaways-so-far/>. *The Chronicle of Higher Education*. (accessed May 10, 2021).
- George, J. and J. Carlson. 1999. Group support systems and deceptive communication. In: *32nd International Conference on Systems Sciences*, Maui, HI, 4-8 January.
- George, D. and P. Mallery. 2003. Cronbach's alpha. In: *SPSS for Windows Step by Step: A Simple Guide and Reference*. 11.0 Update. Boston: Allyn & Bacon. pp. 231. <https://doi.org/10.12691/education-2-8-18>
- Gillett-Swan, J. 2017. The challenges of online learning: Supporting and engaging the isolated learner. *Jour. of Learning Design* 10(1): 20-30.
- Gillis, A. and L. M. Krull. 2020. Covid-19 remote learning transition in spring 2020: Class structures, student perceptions, and inequality in college courses. *Teaching Sociology* 48(4): 283-299. <https://doi.org/10.1177/0092055X20954263>
- Kharbat, F. F. and A. S. Abu Daabes. 2021. E-proctored exams during the COVID-19 pandemic: A close understanding. *Education and Information Technologies* 1-17.
- Kuhfeld, M., J. Soland, B. Tarasawa, A. Johnson, E. Ruzek and J. Liu. 2020. Projecting the potential impact Covid-19 school closures on academic achievement. *Sage Journals* 49(8): 549-565.
- Lee, S. J., S. Srinivasan, T. Trail, D. Lewis and S. Lopez. 2011. Examining the relationship among student perception of support, course satisfaction, and learning outcomes in online learning. *The Internet and Higher Education* 14(3): 158-163. <https://doi.org/10.1016/j.iheduc.2011.04.001>
- Lincoln, Y.S. and E.G. Guba. 1985. *Naturalistic inquiry*. Sage Publication, Thousand Oaks, CA.
- Lindner, J. R., T. H. Murphy and G. E. Briers. 2001. Handling nonresponse in social science research. *Jour. of Agricultural Education* 42(4): 43-54. <https://doi.org/10.5032/jae.2001.04043>
- Mahdy, M. A. A. 2020. The impact of covid-19 pandemic on the academic performance of veterinary medical students. *Frontiers in Veterinary Science* 7: 1-8. <https://doi.org/10.3389/fvets.2020.594261>
- Marek, M. W., C. S. Chew and W. V. Wu. 2021. Teacher experiences in converting classes to distance learning in the Covid-19 pandemic. *International Jour. of Distance Education Technologies* 19(1): 89-109. <https://doi.org/10.4018/ijdet.20210101>
- Mseleku, Z. 2020. A literature review of e-learning and e-teaching in the era of covid-19 pandemic. *International Jour. of Innovative Science and Research Technology* 5(10): 588-597.
- O'Malley, J. and H. McCraw. 1999. Students perceptions of distance learning, online learning and the traditional classroom. *Online Jour. of Distance Learning Administration* 2(4): 11.
- Pekrun R. and L. Linnenbrink-Garcia. 2012. Academic emotions and student engagement. In: Christenson S., Reschly A., Wylie C. (eds). *Handbook of Research on Student Engagement*. Springer, Boston, MA. [https://doi.org/10.1007/978-1-4419-7999-6\\_11](https://doi.org/10.1007/978-1-4419-7999-6_11)



- Picciano, A. 1998. Developing an asynchronous course model at a large, urban university. *Jour. of Asynchronous Learning Networks* 2.
- Quezada, R. L., C. Talbot and K. B. Quezada-Parker. 2020. From bricks and mortar to remote teaching: a teacher education programme's response to COVID-19. *Jour. of Education for Teaching* 46(4): 472-483. <https://doi.org/10.1080/02607476.2020.1801330>
- Rahim, A., S. Ali, S. Ali and H. Fayyaz. 2020. Online education during covid-19 pandemic; An experience of Ripah International University faculty of health and medical sciences. *Experience with Online Education* 2: S506-12.
- Roberts, T. G., A. Harder and M. T. Brashears (eds). 2016. American Association for Agricultural Education national research agenda: 2016-2020. Gainesville, FL: Department of Agricultural Education and Communication.
- Rourke, L., T. Anderson, D. R. Garrison and W. Archer. 2001. Assessing social presence in asynchronous text-based computer conferencing. *Jour. of Distance Education* 14(3): 51-71.
- Ruberg, L. F., D. M. Moore and C. D. Taylor. 1996. Student participation, interaction, and regulation in a computer-mediated communication environment: A qualitative study. *Jour. of Educational Computing Research* 14: 243-268.
- Shernof, D. J., E. A. Ruzek, A. J. Sannella, R. Y. Schorr, L. Sanchez-Wall and D. M. Bressler. 2017. Student engagement as a general factor of classroom experience: Associations with student practices and educational outcomes in a university gateway course. *Frontiers in Psychology* 8: 1-22. <https://doi.org/10.3389/fpsyg.2017.00994>
- Stuber-McEwen, D., P. Wisely and S. Hoggatt. 2009. Point, click, and cheat: Frequency and type of academic dishonesty in the virtual classroom. *Online Jour. of Distance Learning Administration* 12(3).
- Swan, K., P. Shea, E. Fredericksen, A. Pickett, W. Pelz and G. Maher. 2000. Building knowledge building communities: Consistency, contact and communication in the virtual classroom. *Jour. of Educational Computing Research* 23: 389-413.
- Swan, K. 2002. Building learning communities in online courses: The importance of interaction. *Education, Communication and Information* 2(1): 23-49. <https://doi.org/10.1080/1463631022000005016>
- Tasci, K., M. L. Drewery, R. G. Anderson, and M. Swafford. 2021. Adoption of software in the post-secondary agricultural classroom as a result of the COVID-19 pandemic. *NACTA Jour.* 65(1): 44-54.
- UNESCO. 2020. COVID-19 educational disruption and response. <https://en.unesco.org/covid19/educationresponse> (accessed May 10, 2021).
- Walters, S., K. S. Grover, R. C. Turner and C. J. Alexander. 2017. Faculty perceptions related to teaching online: a starting point for designing faculty development initiatives. *Turkish Jour. of Distance Education* 18(4).
- Young, S. and M. A. Bruce. 2011. Classroom community and student engagement in online courses. *Jour. of Online Learning and Teaching* 7(2): 219-230.
- Zhai, G., Y. Wang and L. Liu. 2012. Design of electrical online laboratory and E-learning. *IERI Procedia* 2: 325-330. <https://doi.org/10.1016/j.ieri.2012.06.096>
- Zhang, K., S. Wu, Y. Xu, W. Cao, T. Goetz and E. J. Parks-Stamm. 2020. Adaptability promotes student engagement under covid-19: The multiple mediating effects of academic emotion. *Frontiers in Psychology* 11. <https://doi.org/10.3389/fpsyg.2020.633265>