Educator Perceptions of Teaching in Undergraduate Equine Programs Before and After the Onset of the COVID-19 Pandemic

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Abstract

In March, 2020, campus restrictions associated with COVID-19 necessitated significant changes to undergraduate instruction at institutions of higher education. Rapid, unplanned transitions to remote learning caused disruptions for all educators, especially those who traditionally facilitate student learning via wet labs or live animal interactions, as is common within equine science and management courses. This study sought to identify teaching challenges and strategies associated with pandemic-era instruction among educators in equine science and management. Educators who taught undergraduate equine science or management courses in the United States before and after the spring of 2020 (n=43 respondents) completed an online survey distributed during Spring 2021. Approximately two-thirds of educators of lecture-based courses, and 40% of educators of laboratory-based courses incorporated an online element into their teaching as a result of COVID-19. Content delivery and assessments were altered to accommodate remote learning, although participants noted lower student engagement and participation. Respondents were generally satisfied with their institutions' ability to provide resources to meet the challenges of teaching during COVID-19 but indicated challenges related to work-life balance and working from home. Results from this study can be used to develop resources to improve instruction during and after the COVID-19 pandemic.

Keywords: Equine education, remote learning, COVID-19

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In the early Spring of 2020, colleges and universities across the United States experienced unprecedented challenges as the spread of COVID-19 forced quarantines, shut-downs, and sudden transitions to remote learning (Johnson et al., 2020). While online learning can offer students advantages in flexibility and self-pacing (Adedoyin & Soykan, 2020) relative to traditional in-classroom instruction, the abrupt mid-semester pivot to emergency remote teaching brought on by the pandemic created difficulties for many students and their educators. Survey-based studies (Villanueva et al., 2020; Ramachandran & Rodriguez, 2020; Barber et al., 2021; Colclasure et al., 2021) have revealed that for many students, the effectiveness of remote learning during the COVID-19 pandemic was hindered by limited access (e.g., poor internet and/or technical barriers to access to digital content), perceptions of higher workloads, lack of sufficient instructor contact, and reduced opportunity for peer-to-peer interactions. Reports of delayed graduation, job/internship loss, reduced motivation, and expected loss of income have also been noted, especially for lower-income, first-generation, and minority students (Barber et al., 2021).

For many faculty members and instructors in higher education, the pandemic redefined how their courses were taught. The need to quickly reimagine and redesign curricula and instruction in the moment posed logistical, technical, and pedagogical challenges which varied depending on institutional, faculty, discipline, and geographic characteristics (Colclasure et al., 2021). This transition was especially challenging for disciplines traditionally centered on applied and experiential learning, such as those in the agricultural sciences (Davis, 2020; Easterly et al., 2021). Equine science and management, a sub-discipline within many undergraduate agricultural programs, is characterized by distinctive laboratory-based learning environments that involve riding, driving, or otherwise handling horses; unique equestrian environments; and/or in-person interactions with industry professionals (Splan & Porr, 2011). Additionally, working conditions with horses are often outdoors or in large, open spaces, where social distancing expectations may be different than more traditional classes on a campus. Some equine-related courses, especially those with a laboratory component, may be less likely to require a transition to remote learning, and as a result, undergraduate equine programs represent a unique lens through which to explore educator perceptions of teaching during the first year of the pandemic. Therefore, the objectives of this study were to characterize shifts in information delivery, student engagement, and learning assessment associated with the first 14 months of the COVID-19 pandemic as perceived by equine science and management educators and identify challenges and best practices can be used to inform future education efforts. It was hypothesized that teaching practices would change as a result of the COVID-19 pandemic, and that educators would perceive a both decrease in student engagement and an increase in challenges or barriers to teaching relative to those faced before COVID-19.

Methods

Data were collected using an online survey targeted at full- and part-time educators who taught undergraduate equine science or management courses at colleges and universities in the United States and Canada before and after the Spring 2020 semester. The period investigated ranged over 14 months, from the time campus mandates were put in place (generally March, 2020), through the end of the Spring semester, 2021. This timeframe was chosen because study investigators felt it was long enough to allow educators to make necessary changes to teaching, with at least two full semesters teaching under COVID-related restrictions, and enough time since the onset of COVID-19 to reflect on the impact to teaching practices.

The 22-question survey instrument (Table 1) was created (Qualtrics, Provo, UT) and designed to answer the following research questions: 1) How did teaching methods and content delivery change among educators of equine-related undergraduate courses in response to the COVID-19 pandemic? 2) What methods were used by equine educators to engage students in remote learning environments, and what changes in student engagement were observed as compared to previous semesters? 3) How well did equine educators feel their institutions supported them through the transition to remote instruction, and what challenges did they face related to work-life balance? The survey was reviewed by members of the governing Board of Directors of the National Association of Equine Affiliated Academics (NAEAA) to assure content validity. Once reviewed by subject experts, the survey was approved by the Delaware Valley University Institutional Review Board.

The survey was distributed through the NAEAA current member email list (n=97 members) with weekly reminders, and shared through both the organization's and members' Facebook pages. As such, the survey was not limited to NAEAA members, but instead was open to all post-secondary equine educators in the United States and Canada. The survey was open from April 5, 2021 through May 4, 2021. A total of 64 responses were received. Some surveys were started but not completed, so only those which were at least 80% complete (n=43) were used for analysis. Count data for categorical variables were analyzed via Fisher's exact test, with significance declared at the $\alpha=0.05$ level. Ordinal (e.g., Likert-type) data were analyzed using Wilcoxon tests for pairwise comparisons, and the Kruskal-Wallis test for variables with more than two groups. Benjamini-Hochberg adjustments were made for multiple comparisons, with a false discovery rate of 0.05.

Results and Discussion

Among 43 survey respondents, the majority (74.4%) identified as full-time faculty with rank of assistant (30.2%), associate (27.9%), or full (16.3%) professor, while fewer were full-time instructors (20.9%) or part-time and/or adjunct instructors (4.7%). For this study, no distinction between 12-month and 9-month full-time instructors was made. Full-time instructors have been reported to comprise nearly half of all full-time personnel teaching equine-related courses

Table 1.

List of survey questions

Questions	Response or response type
General Questions	
1. In which state or province is your institution?	Drop-down list
2. How is your institution classified?	Drop-down list
3. What is your age?	Drop-down list
4. What is your faculty rank?	Drop-down list
5. In a typical academic semester, what is your normal teaching load?	Drop-down list
Teaching Before and After the Onset of COVID-19	
6. Please indicate the percentage of your equine lecture-based and hands-on courses that were delivered in the following formats, both before COVID-19 and after COVID-19. Each column should sum to 100%. If you did not teach one type of class (lecture-based, or hands-on), please leave those columns blank.	Fields to input percentages for different delivery formats
7. For your lecture-based equine courses, or portions of lecture-based equine courses, please indicate if you use the following information delivery methods more often, about the same amount, or less often after COVID-19 than you did before COVID-19. If you did not teach any lecture-based equine courses, or did not have any lecture-based portions to your equine courses, please skip this question. *(Information delivery methods included own lectures, guest lectures, printed materials/readings, online readings/materials, videos, student presentations, interactive web-based applications, and "Other" with write-in response.)*	5-point Likert-type scale for frequency of use
8. For your lecture-based equine courses, or portions of lecture-based equine courses, please indicate if you use the following activities and/or assessments more often, about the same amount, or less often after COVID-19 than you did before COVID-19. If you did not teach any lecture-based equine courses, or did not have any lecture-based portions to your equine courses, please skip this question. *(Activities and/or assessments included peer discussions, case studies, quizzes, group projects, individual student presentations, take-home exams, traditional in-class exams, research papers, student presentations, other written assignments, and "Other" with write-in response.)*	5-point Likert-type scale for frequency of use
9. For your hands-on equine courses, or portions of hands-on equine courses, please indicate if you use the following teaching strategies more often, about the same or less often after COVID-19 than you did before COVID-19. If you did not teach any hands-on equine courses, or did not have any hands-on portions to your equine courses, please skip this question. *(Teaching strategies included in-person instructor-led demonstrations or presentations, remote/video demonstrations or presentations provided by the instructor, remote/video demonstrations or presentations provided by students, in-person hands-on activities with groups of students, in-person hands-on activities with individual students, written assignments or reports, group discussions, skill-based exams, interviews of peers or professionals, and "Other" with write-in response.)*	5-point Likert-type scale for frequency of use
10. Please indicate which technology platforms you utilized regularly before and after COVID-19, and which you will likely use in the future once restrictions are lifted. *(Platforms included recording platforms with examples, learning management platforms with examples, meeting platforms with examples, document sharing platforms with examples, exam proctoring platforms with examples, physical paper handouts, and "Other" with write-in response.)*	Check boxes for each platform and time point
11. What approaches do you find useful to engage students in virtual settings like Zoom? *(Approaches included calling on students by name, points for participation, polls embedded in lectures, iClicker, breakout rooms, discussion platforms, and "Other" with write-in response.)*	Check boxes for each approach
12. What changes have you noticed in student success and engagement after COVID-19? *(Measures of student success and engagement included attendance, number of students enrolled, and participation/ engagement in class.)*	5-point Likert-type scale from much better to much worse
13. Did you find that the distribution of student grades remained essentially the same, was skewed toward higher grades, was skewed toward lower grades, or became bimodal?	Check boxes for each option

Table 1 Cont.

List of survey questions

Questions	Response or response type
14. Did you find that the number of students requesting accommodations has increased starting in Fall 2020?	Yes/No
15. How well do you feel your institution provided you with the following resources to meet the challenges of teaching related to COVID-19? (Resources included adequate PPE for use on campus, adequate physical changes to classrooms and instructional spaces to promote social distancing, adequate IT hardware to work on campus, adequate IT hardware to work at home, adequate IT software needed, adequate training related to distance or virtual teaching, clear protocols and guidance for safe teaching on campus, and clear protocols and communication regarding potential COVID cases on campus.)	6-point Likert-type scale from strongly agree to strongly disagree for each resource
16. How many hours per week do you spend on teaching or teaching-related activities from your home, both before and after COVID-19?	Fields to input hours per week
17. If you significantly increased the hours per week you worked from home after COVID-19, what additional, new challenges did you face? (Options included responsible for setting up and managing own IT needs; had to purchase necessary IT equipment, software, supplies, etc. at own expense; home-based teaching space is not ergonomic; concurrently responsible for childcare or homeschooling of children during the workday due to school/daycare closures, and "Other" with write-in response.)	Check boxes
18. Do you feel your scholarly output after COVID-19 has been less than, the same as, or more than its level before COVID-19? (Measures of scholarship included peer-reviewed publications, fact sheets, meeting abstracts, text books, outreach publications, grants, and "Other" with write-in response.)	Check boxes
Moving Forward – What Worked and What Didn't	
19. What new aspects of your teaching did you adopt as a result of COVID-19, but that you feel are positive changes that you will continue to use in the future?	Open-ended
20. What additional information or tools do you feel would be helpful for your teaching practice moving forward? (Options included access to additional technology platforms, additional or better hardware, dedicated IT support, resources for creating high-quality videos, alternative assessment strategies, ways to engage students remotely, no additional information or tools, and "Other" with write-in response.)	Check boxes
21. Please share your best teaching success story so that others may benefit.	Open-ended
22. Please share your best COVID-related teaching fail so that others may not have to repeat it!	Open-ended

in higher education (Splan & Porr, 2011), so their reduced representation relative to full-time faculty in this survey may be due to sampling bias. Additionally, because the survey was primarily, although not exclusively, distributed through NAEAA resources, it may not have reached some eligible participants. However, it did include participants from a wide range of geographic states, faculty ranks, and teaching loads.

Survey participants were distributed across 22 states. States with more than one respondent were Kentucky (n=6), Texas (n=5), Pennsylvania (n=5), Ohio (n=4), and New Hampshire (n=3). The top four states represented are among the top ten with the largest equine populations and subsequent contributions of the equine industry to their states' economies, (Grice, 2018).

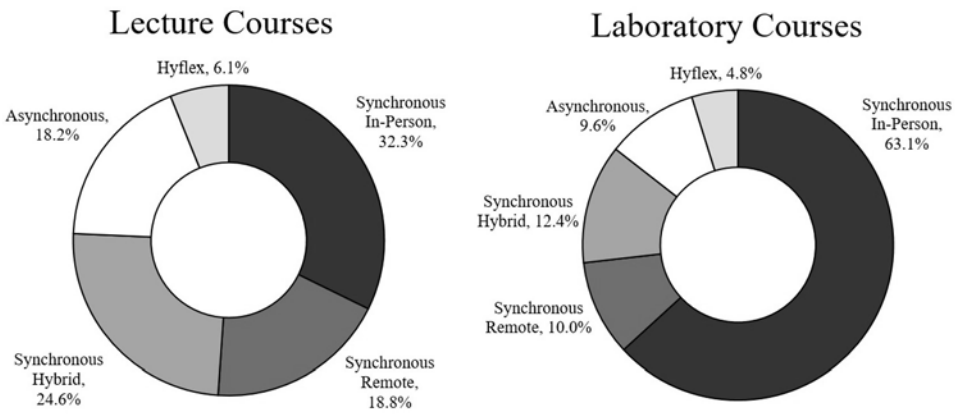
Changes to teaching methods and content delivery

Prior to March 2020, most of the survey participants reported that they had been teaching courses predominantly via an in-person format. Only 6% of respondents had been teaching one or more of their lecture-based classes exclusively online prior to the start of COVID-19, while only 2% had been teaching one or more of their laboratory-based classes entirely online. For the purposes of this study, "lecture-based courses" were defined as those that did not involve live animals or animal facilities or were not wet labs, while "laboratory-based" courses were defined as courses which were predominantly comprised of wet labs, those involving live animals, or those taught in equestrian facilities. These percentages are in line with previous work (Roberts, Moore & Dyer, 2005; Boland, 2017), which indicate relatively slow adoption of remote teaching among educators in the agricultural and life sciences.

After onset of campus restrictions, method of delivery changed for many courses that had been previously taught in person (Figure 1) and differed between lecture- and laboratory-based classes ($p<0.0001$). For lecture-based classes, only about one third (32.3%) of those educators who had been teaching in person continued to do so. However, nearly two-thirds (63.1%) of the participants reported that they continued to teach laboratory courses in person. The discrepancy between the two types of classes may be explained by the hands-on, experiential nature of laboratory-based courses, which often include animal

Figure 1.

Course delivery methods after onset of the COVID-19 pandemic for equine courses which had previously been taught in person.



contact and unique facilities or equipment, making them more difficult to transition to an online platform. Additionally, outdoor activities like those that occur in many equine-related laboratory classes may facilitate social distancing requirements better than the traditional classroom environment (CDC, 2021), especially when individual students are handling, riding, or driving individual horses. Course delivery via asynchronous, remote synchronous, or hybrid synchronous routes, where students participated in person some days, and remotely other days, or a portion attended in person while others attended remotely, was also higher for lecture- vs. laboratory-based courses, while the percentage of educators using a hyflex format, in which learners could participate synchronously (remote or hybrid) or fully asynchronously, was relatively small for both types of courses.

Educators were asked if they utilized various instructional and assessment strategies more or less frequently after the onset of COVID-19, relative to previous semesters. In lecture-based courses, participants reported more frequent use of both online reading materials and videos for information content delivery, as compared to their own lectures ($p<0.01$), guest lectures ($p<0.02$), student presentations ($p<0.01$), and printed reading materials ($p<0.03$; Figure 2). Video use also increased relative to use of web-based applications ($p<0.01$), perhaps due to a higher level of educator familiarity and comfort with the use of video as a teaching tool. Interestingly, use of guest lectures was reported to both increase, and decrease, after the start of the pandemic, resulting in notable variability for this information delivery method. Because of self-imposed or mandated restrictions on travel, it may be that frequency of guest lectures increased when they were available remotely but decreased when speakers were expected to come to campus, or as the result of off-campus field trips. Additionally, in lecture-based equine courses, there was an increase in reported use of assessments such as individual student projects, take home exams, and other written assignments, while group projects, in-class exams, and peer discussions were used less frequently ($p<0.05$; Figure 4). Lastly, in laboratory-based equine courses, the most significant shift was an increase in remote instructor demonstrations or presentations, which participants reported they increased their use of more than any other teaching strategy ($p<0.05$; Figure 5). Due to animal size and the tendency to work with horses in an outdoor or open environment, adequate social distancing may be achieved when horses are handled, ridden, or driven by individual students or educators. However, laboratory settings often involve groups of students working with an individual horse, close interaction between an instructor and students around a horse or within equestrian or classroom facilities, or the shared handling of equipment or materials, which can violate social distancing protocols. As shown previously, although 63.1% of equine educators continued to offer laboratory-based classes in a synchronous, in-person format, 36.9% were forced to incorporate some aspect of remote instruction as a result of the COVID-19 pandemic.

As expected, in both lecture- and laboratory-based equine courses, remote teaching and learning strategies became more prevalent, while in-person group or shared resource activities decreased for laboratory-based courses. In a recent study of animal science faculty, Erickson and Wittaiux (2021) found a heavy reliance on educator-centered teaching strategies after the transition to remote teaching in early 2020. This may partly be due to time limitations as faculty struggled to rapidly redesign classes for remote delivery (Colclasure et al., 2021). However, in the present study, an increase in student-centered teaching and assessment strategies, such as take-home exams, peer assessment, low-stakes pre-class quizzes or surveys, and reflection assignments, were also observed. Shortly after the start of the pandemic, members of NAEAA began compiling a database of online resources which was accessible to members and non-members alike, and contained various online videos containing equine educational content and other resources for teaching (NAEAA, 2021). Materials such as these may be useful as educators continue to transition material to a virtual environment.

Equine educators were queried as to how they used various technologies before and after the onset of COVID-19, and also how they thought they would use these platforms in the future (Figure 5). Nearly all educators reported using recording and meeting platforms (e.g., Zoom, Skype,

Figure 2.

Distribution of Wilcoxon scores indicating educators' perceived shifts in use of content delivery methods in equine lecture-based courses after the onset of the COVID-19 pandemic. Higher scores indicate increased use, and lower scores indicate decreased use, relative to pre-pandemic levels. Different letters under each method indicate significant differences in scores (p<0.05).

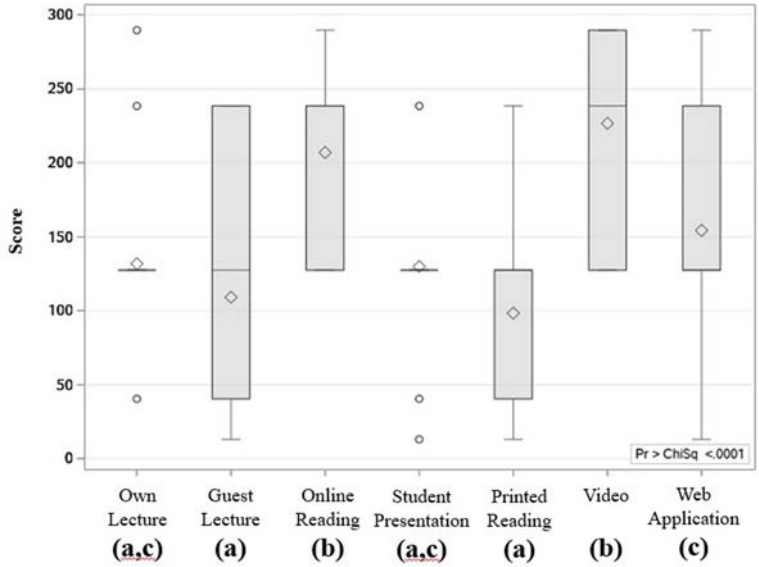
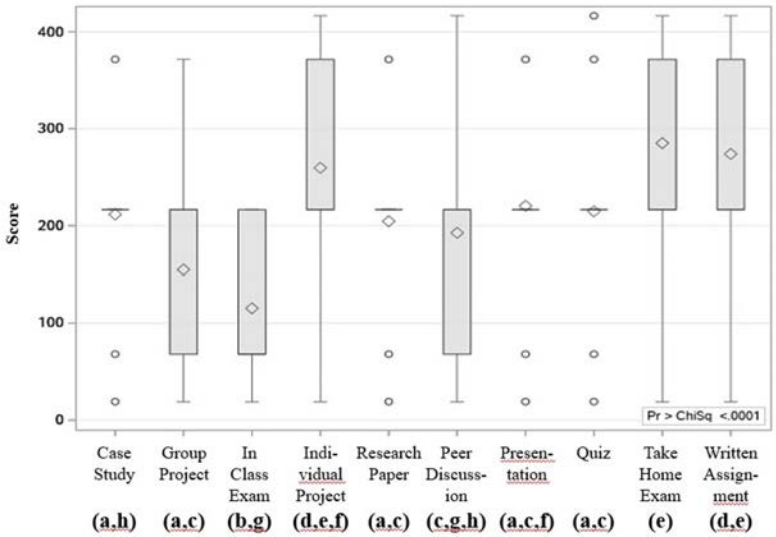


Figure 3.

Distribution of Wilcoxon scores indicating educators' perceived shifts in use of assessments in equine lecture-based courses after the onset of the COVID-19 pandemic. Higher scores indicate increased use, and lower scores indicate decreased use, relative to pre-pandemic levels. Different letters under each assessment type indicate significant differences in scores (p<0.05).



Microsoft Teams) during and after the spring semester of 2020, significantly fewer educators reported using them before COVID-19 (p=0.002 and p=0.01, respectively). Despite reports of initial adoption challenges by faculty and students alike (Sunasee, 2021), Zoom quickly became the most heavily used technology-mediated platform among universities for both synchronous and asynchronous remote courses (Wiederhold, 2020; Joia & Lorenzo, 2021). More than two-thirds of participants in this survey indicated they would continue to use Zoom, or similar recording or meeting technologies, in the future, again a significant increase above pre-pandemic levels (p<0.05). Several noted that using Zoom during the pandemic allowed them to improve course equity and content accessibility through use of real-time captioning, or by recording and posting synchronous lessons for later asynchronous use, or as material that students could review anytime.

Learning management platforms (e.g., Canvas, Blackboard, Moodle) have been widely used in higher education for more than a decade (Walker et al., 2016), so it is no surprise that adoption was high both before and during the COVID-19 pandemic by equine educators, with no significant differences between these two time points (p>0.50). Increases in learning management software

usage has increased during the pandemic among some faculty in the agricultural sciences (Catalan et al., 2021; Tasci et al., 2021). However, it was interesting to note that among equine educators, there was a significant decrease in anticipated use of learning management software in the future, relative to current (p=0.04) and previous (p=0.04) levels.

As anticipated, electronic document sharing platforms (e.g., Google docs, DropBox) saw an increased use after the start of the pandemic (p=0.03), while there was an almost complete reduction in paper use (p=0.006), with an expectation of lower paper use in the future, relative to current (p=0.04) or previous (p=0.02) levels. While this initially may have been an effort to reduce shared objects (CDC, 2021) or a consequence of the transition to remote learning (Aburumann, 2021), a long-term reduction in paper use could make future courses more efficient and sustainable (Khairil & Mokshien, 2018).

It was notable that the use of exam proctoring software amongst equine educators was very limited before COVID-19, yet more respondents were utilizing such measures at the time of the survey (p=0.03), with significant anticipated future use (p=0.03). Both actual and perceived cheating on online exams has increased during the pandemic (Bilen & Matros, 2020; Lancaster & Cotarlan, 2020; Walsh et al., 2021). Access to class notes and

Figure 4.

Distribution of Wilcoxon scores indicating educators' perceived shifts in use of teaching strategies in equine laboratory-based courses after the onset of the COVID-19 pandemic. Higher scores indicate increased use, and lower scores indicate decreased use, relative to pre-pandemic levels. Different letters under each teaching strategy type indicate significant differences in scores (p<0.05).

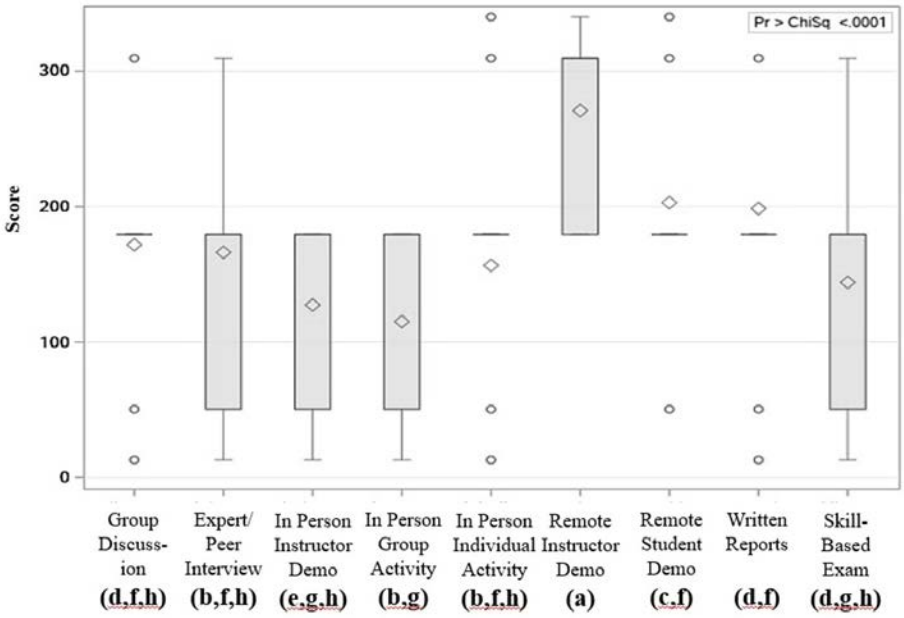
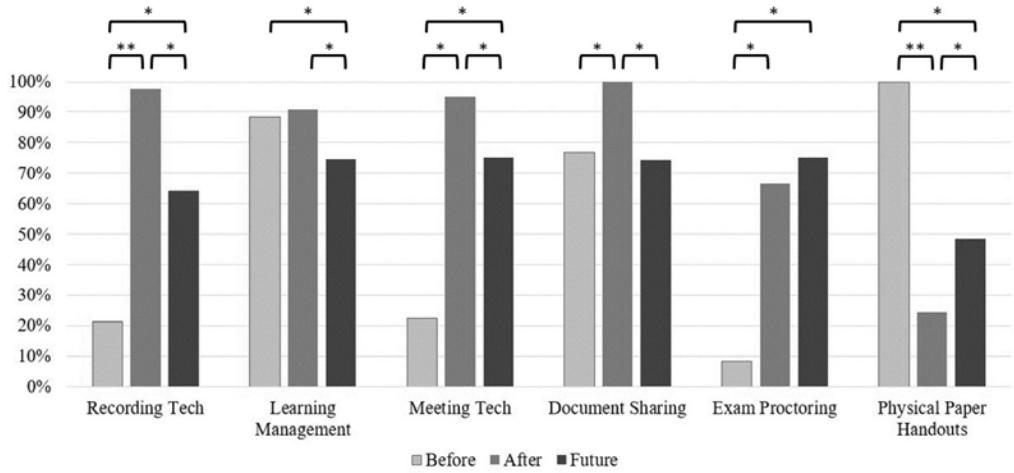


Figure 5.

*Use of technology platforms in equine courses both before and after COVID-19, as well as anticipated future use. Differences between time points are indicated for each technology platform (***p<0.001; **p<0.01; *p<0.05).*



internet resources, coupled with heightened student anxiety and less personal supervision during quizzes and exams make cheating more common (Eaton & Turner, 2020; Walsh et al., 2021). Also, in the rush to transition courses to a remote format, faculty members may have continued to use assessments designed for in-person instruction (Dietrich et al., 2020; Rupnow et al., 2020; Tasci et al., 2021), rather than seek out alternative approaches to assessment. Indeed, when asked what additional support they most desired to help in their teaching efforts, 54.7% of equine educators identified alternative assessment strategies as a major need. Despite high educator interest in their use, online proctoring services that block web applications, collect data, and record or monitor student behavior raise difficult questions regarding student privacy, data collection and storage, and intellectual property rights (Eaton & Turner, 2020). However, individual educators may employ more low-tech and robust solutions to improve remote student assessment, such as open book exams, questions that test higher-order thinking skills that cannot be obtained directly from the notes, oral examinations, or project- or case-based assessments (Walsh et al, 2021).

Student engagement and participation in remote courses

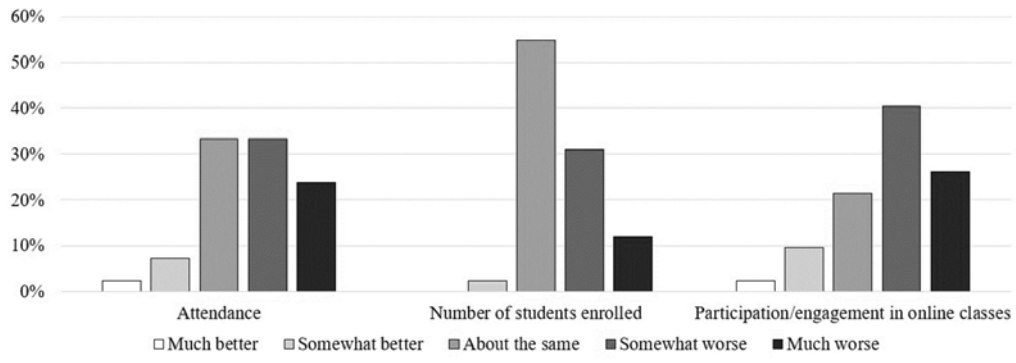
Several measures of student engagement were reported by equine educators to be worse since COVID-19 (Figure 6), indicating worsening attendance, number of students enrolled, and participation in online classes among equine students relative to the time prior to COVID-19. Distributions of all three indicators were similarly skewed, with no significant difference between them in terms of the distribution of Wilcoxon rank sum scores ($p=0.22$). Lower student engagement by post-secondary students during 2020 and 2021 has been reported by several authors, often associated with the transition to digital learning environments (Sunasee, 2020; Supriya, et al., 2021). However, positive measures of engagement and academic outcomes have also been noted for students engaged in online learning, especially when those students are self-motivated, disciplined, have access to adequate technology, and interact regularly and/or synchronously with their instructors (Erickson & Wattiaux, 2021; Walker & Koralesky, 2021).

When asked how they engaged students in virtual classrooms, calling on students by name was mentioned by 80.5% of respondents, a significantly higher percentage than that for any other method ($p<0.04$). Because of their specificity within a program of study, it is expected that equine courses would be populated with students largely familiar to their educators, so calling on individuals may be expected. Addressing students by name is an immediacy behavior that has been shown to increase class participation (Cueso, 2018) and gives the student individual acknowledgement by the educator during a time when opportunities for connections between student and educator have been limited by COVID-related restrictions (Matters et al., 2021). Assigning points for participation was the second most common response, with 56.1% of equine educators polled reporting use of this strategy. Use of in-class engagement tools (e.g., Socrative, Kahoots, embedded polls, clickers), Zoom breakout rooms, and discussion forums were also identified by participants (43.9%, 39.0%, and 19.5%, respectively) as strategies to engage students in remote conversations. Because less than 10% of the participants in the survey had taught courses in an online fashion prior to the pandemic, use of these tools may have been reduced due to lack of educator familiarity with them. Indeed, when asked what tools or resources they would most benefit from in the future, 81.0% of equine educators identified better ways to engage students remotely as a clear need.

The majority (58.1%) of respondents reported that their grade distributions were similar to pre-COVID times, while 18.6% saw lower grades overall. Interestingly, 11.6% of equine educators reported that grades were higher than those given in the same classes in previous years. In an analysis of grade distributions among undergraduates taking biology courses that shifted from in-person to online delivery due to the pandemic, Supirya et al. (2021) reported a slight positive shift in grades, despite the predominant student perception that the transition to remote learning negatively impacted their academic performance. Educators in that study noted that changes in teaching practices, such as increased flexibility in deadlines and altered assessment

Figure 6.

Instructor perceptions of student engagement in equine courses after the onset of the COVID-19 pandemic.



strategies, may have been responsible for grades trending higher. This has also been reported by other authors (Johnson et al., 2020; Villanueva et al., 2020). However, it is unclear whether the increase in grades reflected an actual increase in student understanding of course material or a lowering of educator expectations (Supirya et al., 2021). Lastly, some (11.6%) of survey respondents reported that they felt grades became more bimodal in nature as a result of the transition to emergency remote learning. This divide between students who performed well and those who did not in the same class may reflect some students' difficulty with the increased level of self-regulation, motivation, time management, and resilience required in the face of rapid shift to online learning and changes to class format (Rapanta et al., 2020; Colclasure et al., 2021).

Perceptions of institutional support for remote instruction and challenges to work-life balance

Participants were also asked how well they thought their institutions had prepared and supported them for the changes that occurred since the arrival of COVID-19 to their campus (Figure 7). The quality and fidelity of institutional support for remote teaching has been identified as one of the major factors in faculty adoption of online education before and during the pandemic (Pedro & Kumar, 2020; Lee & Jung, 2021). For all statements related to institutional support, there was at least 50% agreement that colleges and universities had provided adequate resources or communication to meet faculty needs. This was especially true for physical changes to classrooms. The statement with the greatest amount of disagreement from respondents in how institutions dealt with provision of adequate IT support for those teaching from home. When asked what additional support or strategies would improve their ability to teach in remote learning environments, additional or better hardware was the most common response, noted by 66.7% of survey participants. Resources for making high-quality videos (59.5%) and dedicated IT support (26.2%) were also described.

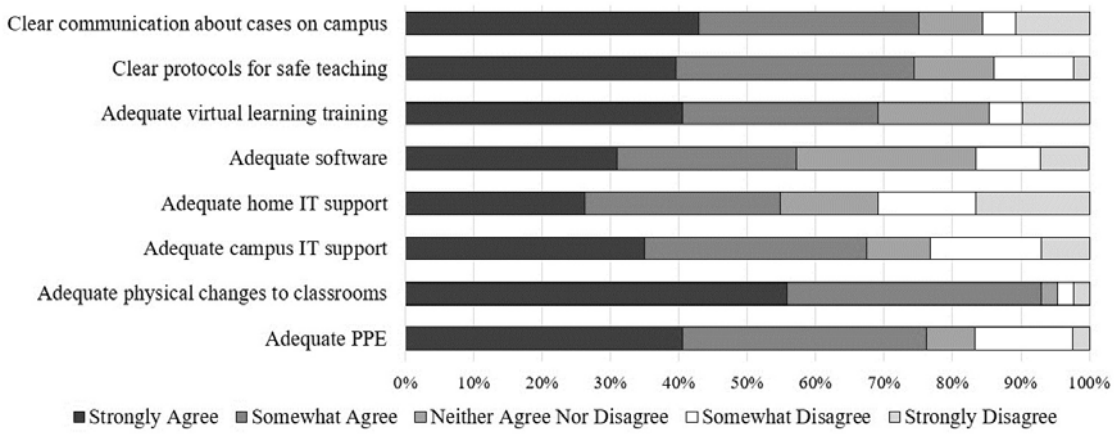
When asked how many hours they worked from home before and after the start of the pandemic, participants reported that mean time spent on teaching or teaching-related activities increased 75% from 17.4 hours per week to over 30 hours per week, and that this was increasingly accompanied by difficulty separating 'work time' from 'home time'. Across disciplines, dissatisfaction with work-life balance, especially for junior faculty, female faculty, or those caring for a child during the pandemic, has been noted (Aubry et al., 2021; Colclasure et al., 2021). Additionally, specific challenges were identified by equine educators when working from home, with responsibility for setting up and maintaining one's own IT needs (65.7%), and teaching in non-ergonomic spaces (65.7%) highlighted as the most prevalent. Purchase of supplies, software, or equipment at personal expense (42.9%), concurrent childcare or homeschooling responsibilities (40%), and concurrent care of other family members (11.4%) were also indicated as major challenges when teaching from home. When asked about scholarly output over the last year, most (72.7%) respondents indicated that their output remained at the same level as it had been pre-COVID, a significantly higher percentage than those who saw a decline (21.9%, $p<0.05$) or increase (6.0%, $p<0.03$) in productivity.

Summary

The COVID-19 pandemic has undoubtedly been one of the most significant disruptions to higher education in recent decades. Like many of their colleagues in the agricultural sub-disciplines, educators of equine-related undergraduate courses have traditionally relied on face-to-face classes with a heavy laboratory element. In this study, we showed that the transition to emergency remote instruction was, and continues to be, challenging in several ways. While some educators continued to teach in-person, approximately two-thirds of educators of lecture-based courses, and approximately 40% of educators of laboratory-based courses reported they incorporated an online element into their teaching as a result of COVID-19. Content delivery and assessments were reimagined to suit this new learning environment, although participants noted lower student engagement and participation than in previous semesters. Respondents were generally satisfied with their institutions'

Figure 7.

Perception of institutional ability to provide resources to meet the challenges of teaching equine courses during the COVID-19 pandemic.



ability to provide resources to meet the challenges of teaching during COVID-19, but indicated challenges related to work-life balance and working from home.

Results from this study can be used to create additional support or resources for those that teach equine-related undergraduate courses, or faculty teaching courses of a similar nature. Specifically, equine educators identified resource needs that assist them as they continue to navigate changes in teaching and academic life as a result of the COVID-19 pandemic, including ways to engage students virtually, alternative assessment strategies, and improved hardware, software, and IT resources.

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