Equine Laboratory Performance Measures: Does Self-Reporting Assessments Reflect Student Skill Development?

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Funding Source: No funding associated with this study.

Acknowledgements: Authors would like to acknowledge the assistance from the staff of Dogwood Equine Connection and the Mississippi State University Horse Unit.

Conflict of Interest: Authors declare no conflicts of interest associated with this project.

Abstract

In the hiring process, employers look for confidence within potential employees. This confidence is important in the equine industry as a lack of confidence in one's abilities can create safety issues for both handler and horse. While instructor course assessments for determining student learning and abilities often defer to student self-assessments, exposure to the horse may only develop a perceived confidence and not an actual skill set. Therefore, the objective of the study was to evaluate performance measures within an equine laboratory setting comparing students' perceived confidence in equine handling to actual skill development as assessed by the instructor. Participants were enrolled in a university equine laboratory course (n=83) covering 30 contact hours of basic equine handling activities during the semester. Students completed a self-reporting survey instrument focused on student's confidence of equine handling skills at the beginning (pre-) and end (post-) of the semester. Instructors completed a pre- and post- skill assessment at the same time. By the semester end, students improved both in their self-assessed confidence and in instructor-assessed skill level with a positive correlation seen between the two assessment methods. These results suggest self-reporting assessments can be a reliable approach for instructors to assess handling skills associated with an equine laboratory course.

Keywords: equine handling, skill development, student performance measures, self-reporting assessments, instructor-based assessments

Confidence in ability is a vital aspect for employees, and this is especially true within the equine industry (Mastellar et al., 2022). Whether it's the horse or equipment utilized within the equine environment, injury and even death can result from employees unfamiliar with working within the elements associated with the equine industry (Chapman and Thompson, 2016). According to Mastellar et al. (2022), "Livestock and equipment cause most reported injuries in agricultural industries" (p. 25). Horse-related work environments in particular are categorized as high-risk workplaces, and while significant reductions in work-related injuries have been reported within industrial-based work environments such as construction, the same cannot be said concerning the injury data for those working with horses (Chapman and Thompson, 2016).

The lack of skills specifically within the equine environment can lead to safety issues for both the horse and its handler, and thus, prior experience is crucial for potential employees within the equine industry (Chapman and Thompson, 2016). Previous equine exposure has been shown to give students an advantage in their perception of equine behavior, assisting in developing effective equine handling skills (Guinnefollau et al. 2019). Specifically, students with a rural background, previous livestock or horse ownership, and/or experience competing in equine sports were found to have a better understanding of basic equine behavior. This, in turn, led to these students having

an easier time perceiving and interpreting behaviors shown simply through pictures. This understanding of behaviors is vital in risk assessment within the horse-related workplace (Chapman and Thompson, 2016). Nevertheless, as student demographics have evolved in the last decade to a more urban background (Anderson, 2015), educators are having to find ways to make up for this inadequate previous equine background through not only traditional laboratory settings, but also through internship experiences (Layton et al., 2022) and community-engaged learning (Evans et al., 2022). Although these educational opportunities are becoming more available for the equine student, understanding of the effectiveness of these learning experiences is necessary for educators in evaluating the current curriculum for usefulness in the equine industry.

Self-reporting survey instruments can be useful in measuring respondent feelings and/or knowledge towards a topic area being assessed (Benton et al., 2013; Bundy et al., 2019). In a collegiate setting, instructors will often administer pre-and post-course survey instruments to measure the knowledge and skills the student gains through the participation within a course (Evans et al., 2009). A study conducted at Iowa State University with an introductory animal science course utilized self-assessments to help determine if course participation improved the students' comfort in livestock handling (Bundy et al., 2019). Most students within the course indicated that their hands-on experience reinforced material learned during lecture. Self-reporting inventory of skills learned and knowledge obtained, however, may have limitations due to survey bias. Social desirability bias has been documented in previous studies as a potential issue for self-reporting student surveys within the collegiate setting (Miller et al., 2010). Social desirability bias is common in adolescents and young adults as this population is prone to giving answers that make them more appealing to others. Further, as commonly seen with health-related self-assessments used in econometric health models, questions of reliability are often weak since most participants are more apt to change their answers (Chen, 2021). Due to the potential safety risks when working with horses (Chapman and Thompson, 2016), social desirability bias may be a potential issue if the equine instructor is unaware of the student's true ability and knowledge due to this type of bias. In order to offset this potential bias, instructors often implement instructor-based assessments or assessments done by outside individuals to determine student's unbiased skill mastery. Instructor-based assessments are beneficial in today's academic model to help provide feedback to students concerning their progression within the course (Planar & Moya, 2015). The informative feedback given to the students from these performance measures can highly influence their learning process, however, a downfall of this assessment approach within academia is the time commitment required for those having to assess a large number of students enrolled within a course (Strobel Education, 2023).

Due to the potential limitations associated with these various forms of assessments used within the academic setting, it's important for educators to validate if the method of performance measures utilized within a course effectively reflects the skills and abilities of the student as they progress through a course, and this becomes particularly critical for the student heading into the equine workplace. Therefore, the aim of this study was to determine if student's perceived confidence with equine handling skills reflects that of instructor-based skills assessments. This study will assist instructors in determining the value of self-reporting student surveys in assessing handling skills associated with the horse.

Methods

Student Participants

The survey participants consisted of students enrolled in an equine laboratory-based course at Mississippi State University with the survey data collection taking place in both the fall semesters of 2018 and 2019. The timeframe selected was that prior to the COVID-19 pandemic as in-person laboratory activities were halted during the 2020-2021 school year at Mississippi State University with further adaptations to laboratory activities taking place in the following school years, which resulted in limited hands-on activities and more virtual-based curriculum. As for the course utilized for this study, it was offered by the Department of Animal & Dairy Sciences at Mississippi State University and was open to all majors with all levels of equine experience. The laboratory course was fifteen weeks in length and met once each week. Course activities ranged between grooming, tacking, wound care, leg wrapping, vital sign measurements, lunging, and basic training and handling of the horse. The course activities were primarily ground-based activities, although students were given opportunities in the laboratories covering tack to mount their horses during demonstrations. The course was taught at an introductory level, however, students documenting multiple years working with horses and professionals within the horse industry were assigned more challenging horses for conducting laboratory-related activities. Each laboratory was two hours in length, with the entire laboratory taking place within an equine environment. The beginning of each laboratory consisted of around thirty minutes of instructor demonstration and guidance focused on the hands-on activities for that day. After the instructor's introduction, students were assigned to a horse and worked with a classmate on completing the activities demonstrated by the instructor with their assigned horse and partner. Horses and laboratory partners were assigned at each laboratory and rotated throughout the semester. All horses used in the laboratory were university horses with Institutional Animal Care and Use Committee (IACUC) protocol approval for activities associated with the laboratory given prior to the onset of the course.

Assessment Protocol

The performance measures utilized for the study consisted of a two-part assessment protocol that included a self-reporting survey instrument filled in by the students enrolled in the laboratory and an instructor-based multi-question assessment filled in by the instructors of the

laboratory course. All assessments were evaluated by the Mississippi State University Institutional Review Board (IRB) with protocol associated with this study following the IRB policy and procedures for course assessments.

The survey instrument utilized within this study was modified from previously reported questions given in Evans et al. (2018). Instructor-based assessment questions were modified from previously reported questions documented by Cagle-Holtcamp et al. (2018). As for instrument validity, final determination of the questions utilized was done through a panel of experts that included a team of equine instructors from multiple universities along with representatives from the equine industry. All assessments, both the self-reporting survey instrument and the instructor-based assessment, were completed at the first day of class (pre-) and the last day that the class met prior to finals week (post-) for each semester for the laboratory course. Participation in assessments associated with this study was voluntary, and thus, student grades were not impacted by assessment participation and laboratory activities were not restricted if a student did not participate in the assessments. Both assessments were given out in paper format so they could be completed in person during the laboratory.

The self-assessment completed by the students was an 18-question survey instrument that focused on the self-perceived confidence of personal equine handling skills. (Table 1). For each question, students were given a description of an equine-based activity with them ranking their confidence concerning their ability to complete the described task. Students were asked to rate their confidence on a five-point Likert type scale, with one indicating no confidence and five indicating the highest level of confidence in completing the equine activity described within the question. A member of the research team was present while the students completed the assessment to provide clarification concerning any of the questions. Maximum total score for the entire survey was 90.

Laboratory instructors completed a skill assessment during the same laboratory meeting as that of the self-assessment. Only the two instructors that had participated in the teaching of the laboratory were responsible for these assessments. The instructors filled in the assessment together for each student at the time of the laboratory. During the assessment, instructors asked the students to perform various laboratory activities to demonstrate their equine-related skills. The skill assessment was comprised of 10 questions with a description of activities that the students would perform within the laboratory setting. Instructors ranked the skills of each student from 1-4. A score of 1 reflected a poor demonstration of horsemanship skills and/or an inability to complete any aspect of the described skills. A member of the research team was present during the skill assessment to assist with clarification needed by the instructors concerning aspects of the assessment. Maximum total score for the instructor-based assessment was a score of 40.

The total scores for each student for each of the assessments were determined pre- and post- course. Means and standard deviations for each question and for each assessment were determined. Paired t-tests were performed to compare the pre- and post- course means. Spearman correlation method was applied to determine a correlation coefficient between the two assessments. Statistical analyses were completed using SAS version 9.4 with a p-value set at 0.05.

Results

A total of six students within the two semesters that these assessments were completed withdrew from the course, and thus, their pre-assessments were removed from the following results. The remaining students (n=83) enrolled in the course completed the required coursework participating in the 30 laboratory hours either during the scheduled weekly laboratory time or during make-up laboratory times set-up for student absences.

Overall Scores

After completion of the 30 laboratory hours, students showed a statistically significant higher score on the post self-assessment for personal confidence ($P < 0.05$) and on the instructor-based assessment ($P < 0.05$; Figure 1).

Mean increase from pre- to post-assessment for the overall score for the self-assessment was 7.0, while the mean increase in the overall score for the instructor-based assessment was 5.7. A positive moderate correlation ($r = 0.58$; $P = 0.04$) was seen between the two assessment methods.

Scores Per Question

Self-Assessments. Question 1 for the self-assessment had the highest score for both the pre- and post-assessment (Table 3). This question focused on confidence associated with basic ground handling of an adult trained horse. Question 8 had the lowest score for the pre-assessment and this question focused on basic riding of an untrained horse. Question 10 had the lowest score for the post-assessment and this question focused on advanced riding on a green broke horse. When reviewing each question for the self-assessments, the scores for all questions increased except for Question 17. This question focused on handling of riding and training equipment from multiple riding disciplines. Using a paired samples t-test a statistically significant difference between pre- and post- assessments ($P < 0.05$) was determined in all questions with the exception of Questions 8, 10, and 17.

Instructor-Based Assessments. Question 10 in the instructor-based assessments had the highest score for both the pre- and post-assessments (Table 4). This question focused on student engagement within the laboratory setting. Question 9 had the lowest score for both the pre- and post-assessments and this question focused on riding skills. Using a paired samples t-test a statistically significant difference between pre- and post-assessments ($P < 0.05$) was determined in all questions.

Table 1

Questions for the self-reporting survey instrument that students answered pre- and post-course participation. Adapted from Evans et al. (2018).

Question Number	Question
1.	Basic ground handling of adult, trained horses using the student's preferred horse breed.
2.	Basic ground handling of young, untrained horses using the student's preferred horse breed.
3.	Advanced ground handling of adult, trained horses using the student's preferred horse breed.
4.	Advanced ground handling of young, untrained horses using the student's preferred horse breed.
5.	Basic riding activities in the student's preferred discipline on an adult, well-trained horse using the student's preferred horse breed.
6.	Basic riding activities in the student's preferred discipline on an adult, trained horse with behavioral problems using the student's preferred horse breed.
7.	Basic riding activities in the student's preferred discipline on a young, green broke horse using the student's preferred horse breed.
8.	Basic riding activities in the student's preferred discipline on an untrained horse that has never been ridden before.
9.	Advanced riding activities in multiple riding disciplines on an adult, well-trained horse using the student's horse breed.
10.	Advanced riding activities in multiple riding disciplines on a young, green broke horse using the student's preferred horse breed.
11.	Basic ground handling activities using society-type horse breeds of various levels of training.
12.	Basic ground handling activities using European horse breeds of various levels of training.
13.	Basic riding activities using society-type horse breeds of various levels of training.
14.	Basic riding activities using European horse breeds of various levels of training.
15.	Advanced riding activities using society-type horse breeds of various levels of training.
16.	Advanced riding activities using European horse breeds of various levels of training.
17.	Ability to handle and utilize correctly riding and training equipment from multiple riding disciplines.
18.	Ability to care for and manage any horse breed performing basic management activities.

Table 2

Questions for the instructor-based skills assessment that laboratory instructors answered concerning students' equine handling skills pre- and post-course activities. Adapted from Cagle-Holtcamp (2018).

Question Number	Question
1.	Confident when entering horse stall, paddock, and/or pasture and while approaching the horse.
2.	Able to properly and thoroughly pick stall and/or clean around horse area including the grooming/tacking area.
3.	Able to carry and handle properly horse equipment and/or items including water buckets, tack, etc.
4.	Works diligently to complete intensive barn duties including cleaning facility and equipment thoroughly, putting attention on the details, and working until job is complete.
5.	Able to follow directions and complete horse-related care and management tasks to the desired and recommended standard.
6.	Confident when leading a horse.
7.	Confident when grooming a horse.
8.	Confident when tacking a horse.
9.	Confident in riding-based activities.
10.	Engaged in hands on activities interacting with others during activity and responding appropriately and correctly during the discussion with the instructor and classmates.

Table 3

Mean (SD) scores and p-value for the paired t-tests of the self-reporting survey for each question. Possible scores ranged from 1 to 5.

Question	Pre-Confidence	Post-Confidence	P-Value
1.	4.11 (1.36)	4.36 (1.15)	0.003
2.	3.43 (1.54)	3.81 (1.41)	0.007
3.	2.84 (1.60)	3.24 (1.54)	0.001
4.	2.49 (1.54)	2.77 (1.54)	0.021
5.	3.78 (1.51)	4.19 (1.21)	0.001
6.	3.03 (1.60)	3.5 (1.51)	0.002
7.	2.72 (1.60)	3.0 (1.52)	0.013
8.	2.28 (1.53)	2.45 (1.67)	0.133
9.	2.77 (1.58)	3.07 (1.64)	0.002
10.	2.34 (1.49)	2.41 (1.53)	0.283
11.	2.91 (1.51)	3.48 (1.50)	0.001
12.	2.89 (1.58)	3.37 (1.47)	0.001
13.	2.76 (1.50)	3.62 (1.45)	0.001
14.	2.66 (1.47)	3.28 (1.48)	0.001
15.	2.37 (1.48)	3.09 (1.41)	0.001
16.	2.43 (1.50)	2.78 (1.47)	0.005
17.	3.55 (1.47)	3.3 (1.48)	0.733
18.	3.69 (1.48)	4.02 (1.31)	0.003

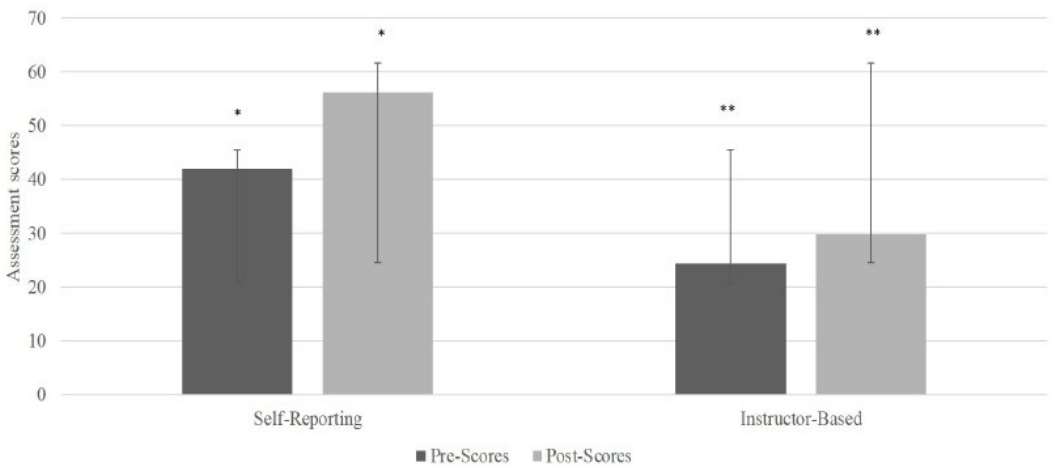
Table 4

Mean (SD) scores and p-value for the paired t-tests of the self-reporting survey for each question. Possible scores ranged from 1 to 4.

Question	Pre-Skills	Post-Skills	P-Value
1.	3.06 (0.67)	3.29 (0.70)	0.017
2.	2.91 (0.65)	3.15 (0.68)	0.008
3.	2.72 (0.70)	3.12 (0.69)	0.001
4.	2.58 (0.74)	3.49 (0.60)	0.0001
5.	2.54 (0.77)	3.53 (0.61)	0.0003
6.	2.42 (0.73)	3.12 (0.71)	0.001
7.	2.13 (0.74)	2.88 (0.72)	0.001
8.	1.92 (0.68)	2.68 (0.74)	0.0002
9.	1.61 (0.74)	2.14 (0.86)	0.003
10.	3.09 (0.70)	3.38 (0.66)	0.004

Figure 1

Overall scores of pre- and post- assessments, both student self-reporting (maximum score of 90) and instructor-based (maximum score of 40), of equine students participating in a university equine laboratory course.



Discussion

Performance measures are essential in academia as they help determine the impact of courses and what is being learned within those courses (Strobel Education, 2023). While grades can reflect improvement in comprehension and understanding of topics being covered within each course, true development and retention of skills may not be fully reflected by grades (Knesek, 2022; Schinske & Tanner, 2014). Nevertheless, poor methodology for measuring performance can give inaccurate assessment of a course and lead to a lack of improvement within curriculum. As such, this study evaluated two performance measures utilized in academia to determine whether self-reporting measures reflected that of instructor-based assessments.

While self-assessments are convenient to the educator in determining the impact of the course for the student, this type of assessment has been documented as lacking the correlation with competence within the student (Yates et al., 2022). A correlation between the two types of performance measures, nevertheless, was determined within this study, with overall perceived skill development increasing in both assessment types by the end of the semester. This demonstrates that the self-perceived skill development reported by the students was also observed by the instructors. The ability for students to accurately self-assess is beneficial for the learning process as it focuses on teaching self-calibration instead of evidence-based methods of advancing learning (Kennedy et al., 2019). Confidence level, as seen through most of the questions within the self-assessment utilized in this study, improved and this reflection of perceived skills was validated by the improvement seen in all of the questions within the instructor-based assessment. Nonetheless, self-assessments may be limited by response bias, which can come from multiple factors such as social desirability and selective recall, and thus, limiting accurate reflection of the learner (Brenner & DeLamater, 2016). This response bias may be evident within this study as improvements seen within questions pertaining to more advanced riding activities (Questions 9, 15, and 16) did not reflect the actual activities covered within the course as mounted activities were limited to basic horsemanship activities. Thus, improvements observed within questions pertaining to these more advanced riding activities are reflective of either confidence gained through what mounted activities were accomplished during the course or potential response bias. This is where the instructor-based assessment is of value in supporting student assessments.

Self-assessments can be regarded as a major component of the learning process due to the student gathering information, and then, reflecting on their own learning (Sharma, 2016). In this study students were able to reflect on what they learned within their equine laboratory course through the self-assessment finding score improvement by the end of the semester in all questions except for the one centered around equipment utilized for training (Question 17). The instructor-based assessment did evaluate perceived skills associated with equipment and tack, but these questions, unlike that reported by the students, did observe a significant improvement by the end of the semester. Further, improvements within questions where significant differences were not seen in the self-assessments included those focused on young, untrained horses (Questions 8 and 10). These areas were not targeted within the questions in the instructor-based assessments, and thus, could be missed when assessing areas where course development is warranted. Along with differences in the questions utilized between the two assessments, the scales utilized for the two assessments were different with the self-assessment using a 5-point scale for responses and the instructor-based assessment using a 4-point scale. The larger scale for the self-assessment could have contributed to the larger pre-post differences in the overall scores between the student (7.0) and the instructor (5.7) assessments. Further, questions were shortened for the instructor assessments due to the time commitment associated with assessing a course with large enrollment numbers (Strobel Education, 2023), thus, comparisons of specific questions between the two assessments were limited. Future studies may want to utilize similar assessments both in the questions and in the scale for the responses between the instructors and the students so that further comparisons can be made. In addition, use of other question formats such as essay and short answer questions like those used by Sharma (2016) may prevent the instructor from overlooking critical topics within their assessments and can be similarly applied to student-based assessments. However, despite the assessment limitations, instructors can utilize the feedback from the student-based assessments to pinpoint areas such as that found concerning training equipment and young horse training to target areas for course development where the instructor-based assessment failed to catch.

Educators may have many reasons for using self-assessments within their classroom, and these reasons will drive the development including the type of assessment utilized and how the questions are formatted. For this study, the use of the self-assessments was to identify specifics concerning horse, training, and equipment types where the students felt the course needed to expand. While the course is more based on ground-activities, there's been a push from students for expanding mounted activities according to the students' interactions with the instructors. However, in the process of incorporating these activities, as seen from the self-assessments, certain types of horses and equipment including working with younger, untrained horses and with training equipment, respectively, have been neglected. This, nonetheless, was not observed by the instructors in the instructor-based assessments. It is important to note that bias can be introduced not only by the student, but also by the instructor within instructor-based assessments. According to Steinke and Fitch (2017), "We argue that the potential for bias is a concern when assessing student work and that when it does occur scorers are often not aware that the bias is operating" (p. 88). Sadly, instructor implicit bias can be observed within the classroom with instructors unconsciously being persuaded by preconceived notions

of a student and this has been documented to hinder fair assessment of students, but sound measures for objectively tracking such bias is limited at this time (DeCuir-Gunby & Bindra, 2022). As such, course assessment should be a multi-level approach before making substantial changes. Therefore, with the varying types of performance measures for educators to utilize, it is important to determine which approach will best achieve the reasons for conducting the assessment for the instructor. This will assist in the finetuning of what assessment is implemented within a course.

Summary

Performance measures are a critical part of academia as these tools for the educator can develop a course and expand positively a curriculum suited for a student's career goal, and this can be especially useful for the equine student in developing the handling skills needed for safely working within the equine environment. Self-assessments by students within an equine laboratory course were determined within the study to be a reflection of skills observed by the instructor. Self-assessments assisted in determining shortcomings within the laboratory course that were not identified by the instructor. The value of this form of assessment allowing the student to reflect on their confidence and abilities holds promise for the equine educator when developing a laboratory course that can create equine handling skills for success within the equine industry.

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