

To: Provost Rick Holtz, John Bradford and Sam Spiegel

From: Faculty Senate

Date: 5/2/2022

Faculty Senate approved the resolution on Mines Online on 4/26/2022 to be brought to your attention. Faculty Senate recognizes the value of shared governance and wills to contribute and engage all efforts related to the scope of this resolution.

Yours Sincerely,

### **FACULTY SENATE RESOLUTION**

In a joint effort with the Assistant Vice President for Online Education at the Colorado School of Mines and Trefny I2 Center, the Mines Faculty Senate facilitated an independent survey by Zappe and Cutler Educational Consulting, LLC. The survey aimed to understand perceptions relating to online courses in general, gather information on successes, challenges, and other experiences relating to teaching online, and collect information on respondents' misconceptions/preconceptions about Mines Online. The survey was administered between December 2021 and January of 2022. A total of 197 participants completed at least a portion of the survey. A detailed analysis of the survey results can be found in Appendix A. It is to be noted that some of the faculty responses reflect remote teaching experiences rather than online teaching. Although this may provide skewed results in the quantitative evaluation of the answers, the responses to the open-ended questions provide clarification and an in-depth understanding of faculty experiences.

Faculty Senate acknowledges Mines Online as one of the critical components of Mines Education and hence provides this resolution for improving Mines Online. Considering that Mines has been experiencing various changes and recovering from COVID-19 impacts, the implementation of the recommendations in this resolution plays a crucial role in sustaining and enhancing Mines Online.

The faculty responses to the survey yielded several positive experiences and perceptions about Mines Online. The positive experiences are:

**Flexibility:** Mines Online provides flexibility for the instructor, where courses can be taught in any location. It also gives flexibility to the students, who can have scheduling flexibility and the opportunity to balancing external jobs.

**Diversity:** Mines Online allows the enrollment of a broader and more diverse population of students. The broader population also provides opportunities for students from various locations worldwide.

**Enhanced pedagogical course structure:** The development of Mines Online courses allowed faculty to enhance their course's pedagogical structure via designing, reviewing, and updating learning objectives/outcomes and specific activities and mapping the course accordingly. Several faculty noted the benefits of the Engineering for Online Learning (EFOL) short course and the support of the online course development facilitators (OLEDs).

**Specific activities and technologies:** Videos, discussion forums, topic-specific discussions, and canvas are found to be enhance online learning.

However, there are a significant number of challenges and barriers that are revealed in the faculty responses to the survey:

**Lack of interaction:** Many faculty had difficulties in engaging students in discussions of readings/assignments. This becomes elevated if students take a mix of online and in-person classes. Moreover, faculty have hardships in getting to know their students. Faculty also have concerns about understanding students' personal problems like identifying mental health or other issues in the online environment.

**Workload:** The required time and workload to develop and teach an online course is a significant challenge. Faculty finds the time commitment and compensation for the online course development and delivery significantly underestimated/undervalued. Moreover, the required time commitment for online course development and delivery is considered a great addition to the faculty's already busy schedules and existing commitments.

**STEM-related course transformation:** Teaching STEM topics in the context of online courses has limitations. For example, transforming existing technical content into an online course format cannot be fully achieved; e.g., challenges in teaching hands-on labs or works in an online environment, limitations of the online environment in teaching technical material.

**Academic rigor:** There is a significant concern about a lower-level of academic rigor in online courses due to challenges emerging from STEM-related course transformation. Faculty are also concerned about students' struggle to achieve the same level of learning.

**Academic integrity:** Faculty find upholding academic integrity difficult and state problems of plagiarism and cheating in many online courses.

**EFOL training:** The time needed to be committed to complete the training is indicated as a barrier. Moreover, a considerable number of the faculty completing the survey indicated a lack of focus on STEM online education and specific aspects of online course development.

**Awareness of Mines Online policies:** Faculty at large are partially unaware of Mines Online policies. It was found that tenure track/tenured faculty are significantly more likely to state that they are fully aware of the 8-week policy for online programs. Other faculty and teaching faculty are less aware. Additionally, faculty who taught at least one Mines Online course are more likely to be somewhat or fully aware of the 8-week course policy and the Faculty Senate's online standards committee. Discussions amongst the faculty senate indicate that there is significant confusion about the specifics of the Mines Online policies and where to find the information on the policies.

**Working with OLEDS:** Some faculty listed several challenges while working with the OLEDS. They are mainly related to unmet expectations of faculty (Details can be found in Appendix A). It is also noted that other faculty indicated positive experiences while working with the OLEDS.

### **Recommendations:**

1. Faculty Senate recommends consideration of faculty concerns via establishing an Online Council run by the Senate, similar to the Graduate and Undergraduate Councils, which will develop recommendations, suggest enhancements, and oversee the implementation of Mines Online.

Developing and overseeing Mines curricula is properly the role of the Faculty Senate and the Faculty Senate needs to take a leadership role in this area.

2. In order for the Online Council to establish solid strategies for enhancement, it is equally important to incorporate current online students' and online alumni's perspectives. The Faculty Senate recommends a holistic evolution of online student exit surveys as well as collecting input from alumni of the Mines Online programs.
3. Although it is not indicated in the survey results, there are still unsolved problems occurring during the registration of non-degree online students. Faculty Senate recommends that the Online Council follow the progress made towards solutions and make further recommendations if needed.
4. Faculty Senate recommends more engagement of faculty in the ongoing revision process of the EFOL training to address faculty concerns.
5. Faculty senate recommends that the Trefny Center handle OLED-related concerns and provide feedback to the Faculty Senate about enhancements.

**APPENDIX**

**Mines Online Faculty Survey Report**

**Zappe and Cutler Educational Consulting, LLC**

Prepared February 2022

## Executive Summary

This report provides an overview of a survey administered to faculty at Colorado School of Mines regarding their perceptions of online teaching and learning. The focus of this survey was to 1) understand perceptions relating to online courses in general, 2) gather information on respondents' and what respondents' colleagues have told them of prior successes, challenges, and other experiences relating to teaching online as well as at Mines, and 3) gather information on respondents' misconceptions/preconceptions about Mines Online. A total of 197 participants completed some or all of the survey.

*Prior Experiences with Online Teaching and Development:* Approximately half of the respondents completed the Engineering and Facilitating Online Learning (EFOL) training. More than half (60%) had taught at least one course online. The majority of these individuals taught the same course both online and face to face. In addition, about 67% of the respondents had helped to develop an online course.

*Perceptions of online learning in general:* Faculty had mixed feelings about online courses in general. Items with average ratings that suggested more positive perceptions of online courses included beliefs that students can “speak their mind” in online courses and that sensitive topics can be taught in an online environment. Negative perceptions included fewer opportunities for students to interact with one another, less effective student and faculty interactions, and more problems in general in online courses. Regarding position type, individuals who were on the teaching track, as compared to tenured/tenure-track and other faculty, were more likely to feel that students take online courses because they think they will be easier than face-to-face sections. In addition, teaching track faculty were more likely to feel that students communicate more in an online course as compared to a face-to-face course; however, the average rating for this item was still quite low.

*Awareness of Mines Online policies:* Most faculty were unaware of the 8-week policy for online programs and of the committee that established the Standards for Online Course Development and Facilitation. However, awareness was higher for faculty who had taken the EFOL and for those who had taught online previously. In addition, tenure track/tenured faculty were more likely to be aware of the 8-week policy as compared to teaching and other faculty.

*Positive experiences of participant with Mines Online:* Positive experiences of respondents (or a colleague of a respondent) included flexibility for students and faculty, allowing a broader population of students to take courses, the pedagogical structure of online courses, and working with the OLEDS/Trefny. Relating to teaching, participants noted that successes related to student interaction, positive student feedback and ability to engage students online. While a lot of positive experiences were shared, a large number of participants said that they did not have any positive experiences with Mines Online or had not heard colleagues discussing successes with Mines Online.

*Challenging and barriers with Mines Online:* Major challenges or barriers shared by participants included negative student perceptions and lack of interaction, time commitment and workload, context-specific course challenges, lack of quality/rigor in online courses, the EFOL training, and certain experiences with OLEDS. Other challenges mentioned include the administrative oversight, the prescribed structure of

online courses, and the 8-week course structure. It is worth noting that this item was framed as asking faculty to identify their own challenges or barriers as well as challenges that they may have heard from colleagues. The purpose of this framing is that we wanted to get an idea of what the overall “chatter” on campus is relating to online learning and to allow all participants to respond, even if they have not taught for Mines Online. It is possible that this framing may have led to an overrepresentation of negative perceptions of Mines Online as colleagues likely tend to discuss challenges more frequently than successes. Additionally, with the 2020 transition to emergency remote teaching and the following semesters of remote instruction, there were some instructors who may have conflated remote instruction with online learning – even though the directions tried to clarify that the faculty should only focus on online teaching, not remote instruction.

*Additional Perceptions of Mines Online:* Based on several rating scale items, faculty tend to perceive that 1) students need to have good time management skills to be successful in a Mines Online course and 2) academic integrity violations are more likely in Mines online courses. Teaching faculty are more likely to feel that academic integrity violations are more likely in Mines Online courses. In addition, those that have taken the EFOL were more likely to believe that students need to be proficient with time management to be successful in Mines Online courses and that students in Mines Online courses are prepared to take courses. As compared to those who had not yet taught online, faculty who had taught at least one course for Mines Online were less likely to agree with the item, “Mines Online courses are less rigorous than Mines residential course.”

*Level of Satisfaction with Online:* On average, faculty responses to items asking about their satisfaction with different aspects of online courses were quite negative. All of these items indicated that the majority of faculty were not satisfied or only somewhat satisfied with different aspects of online. The most positive aspect of online that faculty were satisfied with was the quality of students in the courses. All other items were quite negative. Faculty who were on the teaching track were less satisfied with the academic integrity rates in online courses as compared to tenure-track/tenured and other faculty. Individuals who took the EFOL were more satisfied with the quality of students, the resources provided to support faculty, and the preparation time needed to teach an online course. Those who had taught at least one Mines course online rated the quality of students in online courses higher than those who had not yet taught for Mines online.

*Overall Summary:* In general, many of the faculty members at Mines who completed the survey seem to have some significant concerns about online teaching and learning and Mines Online. Throughout the survey, there seemed to be a negative undertone to items, with many survey items having low ratings. In addition, comments from faculty focused more on barriers and challenges over successes, although it is important to note that many positive successful experiences were also shared. The differences between groups of faculty, based on position type, EFOL participation, and online teaching experience, are not major. There are only a few items where there are significant differences among the groups.

## **Overview**

The Colorado School of Mines (Mines) has launched into online teaching and learning. As with any new initiative, monitoring and addressing faculty perceptions related to successes and challenges associated with the initiative is vital to the overall success of the effort. Mines' Faculty Senate and Mines Online want to assess faculty and administrative perspectives to support and guide the initiative.

The focus of this survey was to 1) understand perceptions relating to online courses in general, 2) gather information on respondents' (or colleagues of respondents') prior successes, challenges, and other experiences relating to teaching online at Mines, and 3) gather information on respondents' misconceptions/preconceptions about Mines Online.

## **Survey Development**

The evaluation team created an online survey tool measuring faculty and administrators' perceptions of online courses/teaching and learning. To find and evaluate existing measures of faculty or instructor perceptions of online learning, a literature search was conducted using the search term "instrument to measure faculty perceptions of online learning." Instruments only measuring student perceptions were not considered (such as Nassoura, 2020; Rodriguez, Ooms, & Montanez, 2008). To fit within the overall survey instrument for this project, articles that did not include their survey items were also not considered (such as Fish & Gill, 2009) or qualitative, solely open-response instruments (such as Shreaves, et al, 2020). Additionally, surveys developed for specific courses (to measure perceptions of instructors teaching a specific online course) or within a specific curriculum (not generalizable across multiple disciplines at Mines – such as Willett, Brown & Danzy-Bussell, 2019) were also not included.

One instrument that was considered was from a dissertation (Kinney, 2015), due to its specific focus on engineering education as compared to other disciplines. The survey instrument used here included multiple sections such as: Demographics, Experience (teaching in different modalities), Online Education – General (perceptions), Importance in Teaching Courses, Effectiveness of Online Delivery, and Online Courses – supports and barriers. The goals for the existing survey were limited to only part of this survey (Online Education – General) which was adapted from an existing instrument in Osborne et al. (2009). The scale developed by Osborne and colleagues (2009) was then explored. The goal of this study was to compare faculty and student perceptions of online learning. The 12-item scale was general enough to apply to the various departments while targeting common perceptions of online learning that may be held by faculty (or students). This scale was selected as the most appropriate for the goals of this survey – items targeted towards faculty, across multiple disciplines, with survey items included and targeting general faculty perceptions of online learning. The scale was lightly adapted to use the term "online" instead of "internet" as that is more updated language round the topic. A draft survey was provided to the Mines team for editing, which resulted in several changes to items. After several iterations, a final survey was developed.

The final version of the survey, available in the Appendix, included multiple sections:

- 1) General perceptions of online learning/teaching

- 2) Prior experiences with online teaching and course development
- 3) Positive experiences and perceptions of Mines Online
- 4) Challenges relating to Mines Online
- 5) Awareness of Mines Online policies
- 6) Perceptions of and Satisfaction with Mines Online
- 7) Demographics

## **Methods**

The survey was administered online using the Qualtrics software program. The project team at Mines sent the initial survey invitation in December of 2021. Additional survey reminders were sent to individuals in January of 2022. The survey was closed at the end of January. The survey link was anonymous with no identifying information collected from respondents.

A total of 197 participants completed at least a portion of the survey. There is some evidence that participants exited the survey early, as later questions in the survey had between 166 and 174 responses. Data summarized in this report includes the maximum sample size available for each question. The total number of responses for that question is provided; percentages are based on the total number of respondents for that specific question.

## **Demographics**

Of the individuals who completed the gender question (n=166), 86 (51.8%) identified as male, 53 (31.9%) identified as female, 1 (0.6%) as non-binary/third gender and 26 (15.7%) preferred not to disclose.

Figure 1 displays the length of time that respondents reported teaching. The majority (n=109, 65.3%) reported teaching for more than 10 years. The remaining participants taught less than 2 years (n=13, 7.8%), 2-5 years (n=18, 10.8%), and 6-10 years (n=27, 16.2%). Figure 2 displays the position type of respondents. Of the 166 participants who completed this item, a total of 56 (33.7%) are on the teaching track and 74 (44.6%) are on the tenure track. The other categories of position types were less represented. In the “other” category, listed positions included adjunct, affiliate professor, adjunct professor, post-doctoral scholar, and research associate.

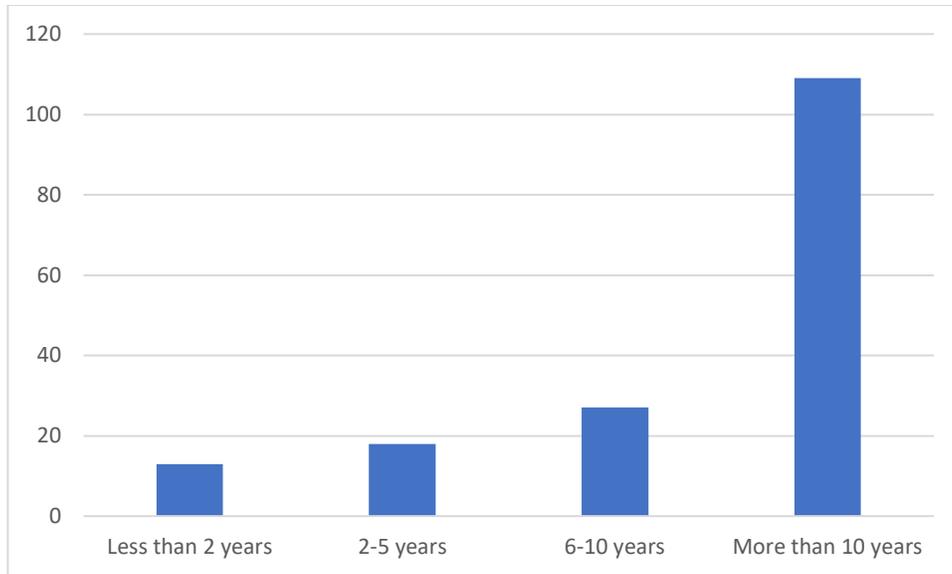


Figure 1: Length of time teaching (n=167)

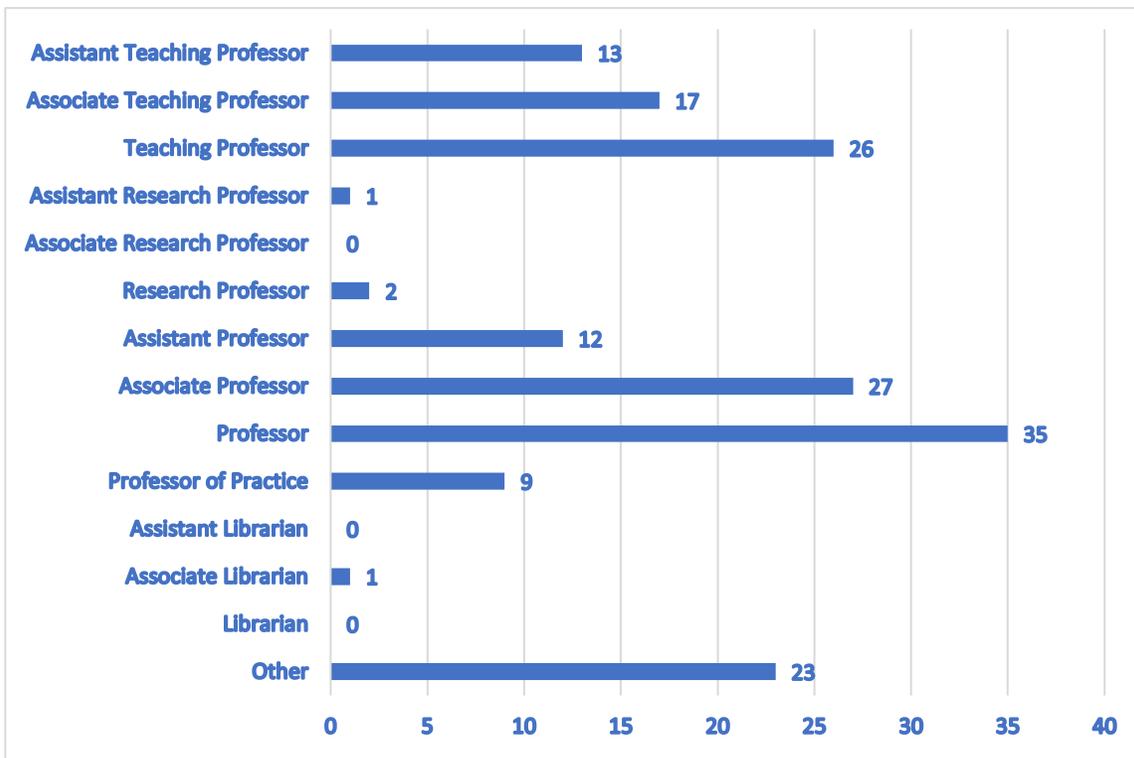


Figure 2: Position type

Figure 3 displays the primary department of the respondents sorted by total number. All departments have at least 2 respondents. The largest sample size came from Chemical and Biological Engineering, Civil and Environmental Engineering, and Mechanical Engineering, each of which had 12 respondents.

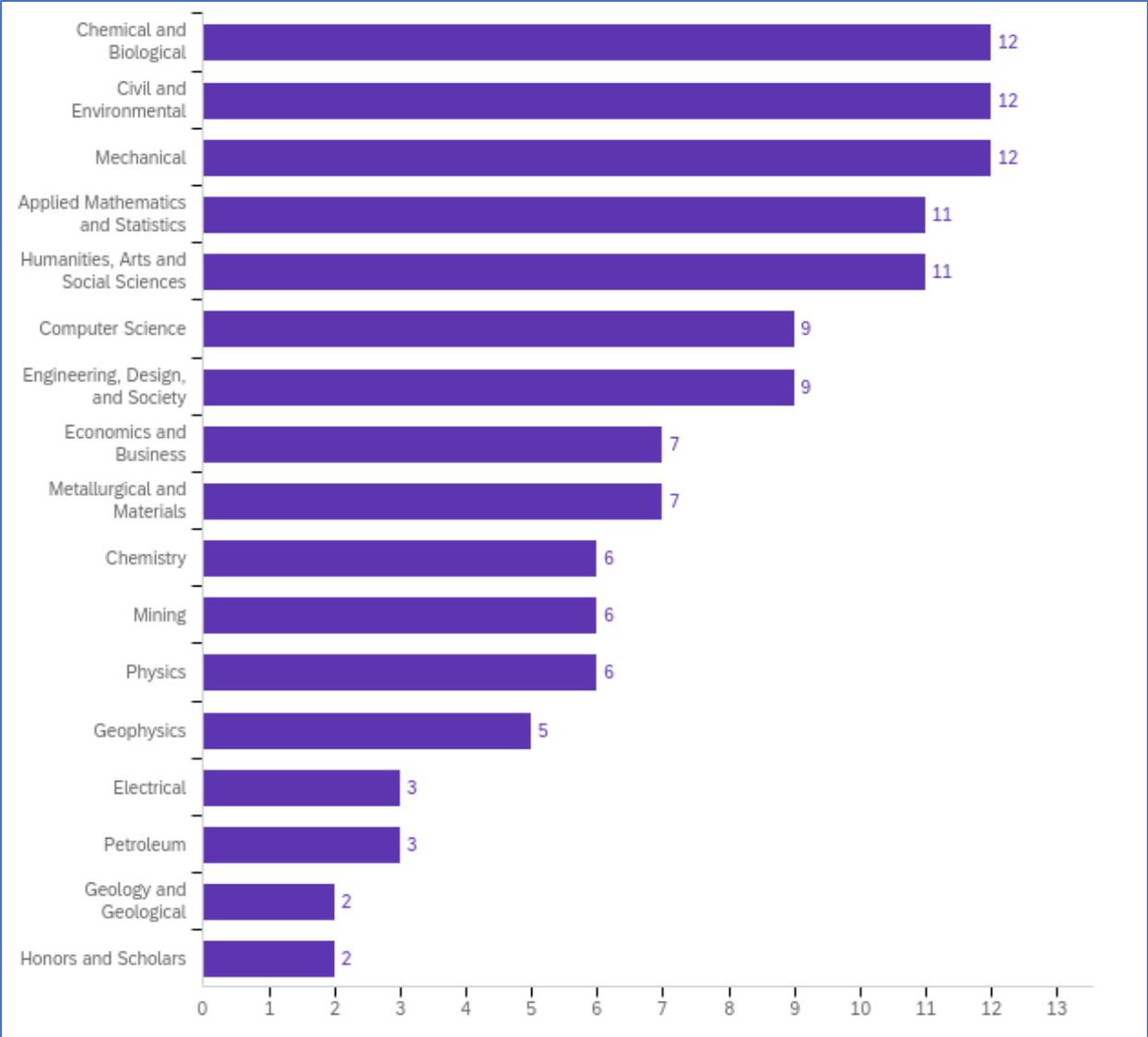


Figure 3: Respondents by department

## Prior Experiences with Online Course Teaching and Development

A total of 100 of the respondents (51.8%) reported having completed the Engineering and Facilitating Online Learning (EFOL) training. A total of 56 respondents also reported having other types of training for online teaching. These included trainings at other institutions, professional short courses or workshops, online tutorials, Quality Matters training, reading books and online materials, and courses during their graduate school training.

Most respondents had taught at least one course online (n=118; 60.2%). Figure 4 displays the reported number of Mines Online courses that were taught. Approximately 52% (n=49) of the respondents to this question had taught one course. Twenty-six (27.7%) of the respondents taught two different courses.

Of the individuals who had taught for Mines Online, 56.4% (n=66) taught undergraduate courses online; 43.6% (n=51) reported teaching graduate courses online. A large majority of individuals who taught for Mines Online taught the same course both online and face-to-face (n=98; 83.8%)

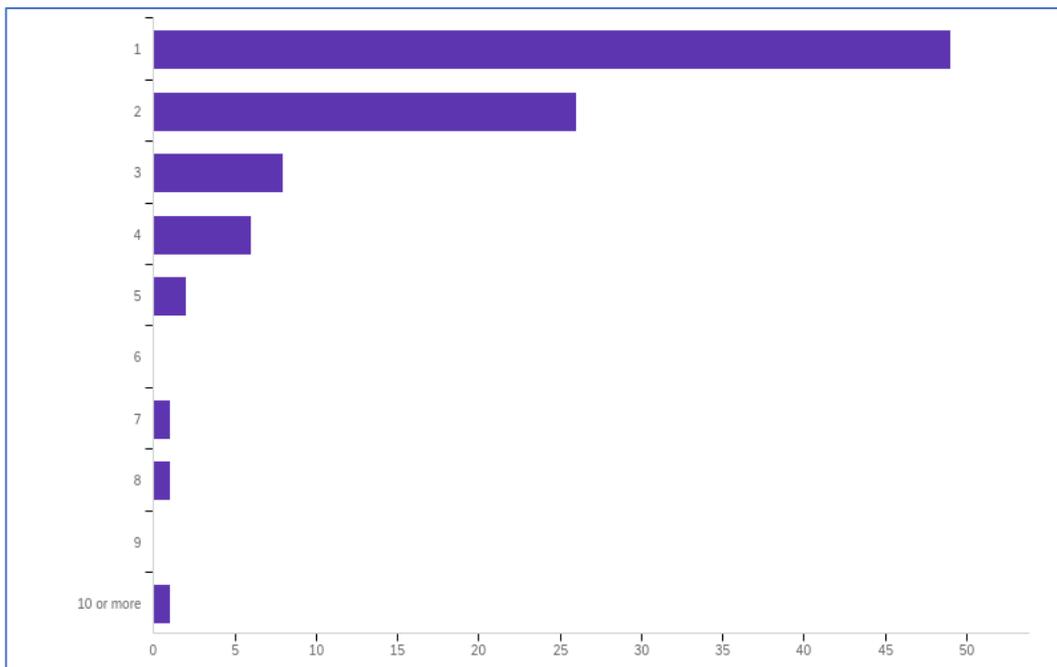


Figure 4: Number of different Mines Online courses taught

A total of 129 (66.9%) individuals stated that they had helped to develop an online course. Of these, the majority (n=68, 55.3%) reported developing just one online course. Another 27 (22.0%) reported developing two online courses. Respondents were specifically asked if the courses they helped to develop were through Mines Online. A total of 84 (65.1%) respondents stated that the course they developed was through Mines Online, with the majority (60; 71.4%) having developed just one course through Mines Online. A total of 71 respondents developed undergraduate courses with Mines Online while 53 respondents developed graduate courses.

*Perceptions of online learning in general*

Faculty were asked to rate a set of 12 items on a scale of 1 to 5 with 1 meaning strongly disagree and 5 meaning strongly agree. The average ratings of the items are in Figure 5. A lower average rating on the item means that faculty were more likely to disagree with the item; a higher average rating on the item means that faculty were more likely to agree with the item. Comparisons for these items were made by position type, which is shown in Table 1. For these comparisons, three groups of faculty were identified: teaching track faculty, tenure track faculty, and other. The average score and standard deviation are provided for each category. The independent samples Kruskal-Wallis test was conducted to determine if there were significant differences based on position type. The starred and bolded items indicate where there are significant differences.

Table 1: Item averages and standard deviations (in parentheses) for items by position type (\* indicates significant differences among the groups)

	<b>Teaching Track</b>	<b>Tenure Track/ Tenured</b>	<b>Other</b>	<b>All</b>
Students who procrastinate should not take an online course.	3.86 (1.05)	3.72 (1.03)	3.64 (0.87)	3.75 (1.00)
<b>Students take online courses because they think they will be easier than face-to-face sections of the same course.*</b>	3.62 (1.12)	3.15 (1.04)	3.31 (1.01)	3.35 (1.08)
Students are less willing to “speak” their mind in an online class than they would be in a face-to-face class.	2.98 (1.12)	3.10 (1.18)	3.28 (1.11)	3.10 (1.14)
Online courses require more time for students to complete successfully than face-to-face courses.	3.04 (1.13)	2.81 (1.03)	2.86 (1.20)	2.90 (1.10)
More students withdraw from face-to-face courses than online courses.	2.45 (0.93)	2.59 (0.80)	2.75 (0.69)	2.58 (0.83)
Sensitive topics (such as racism) should NOT be taught in online courses.	2.48 (1.06)	2.57 (1.06)	3.03 (1.21)	2.64 (1.11)
Online courses are easier for students as compared to face-to-face courses.	2.34 (1.05)	2.57 (1.10)	2.50 (1.08)	2.48 (1.08)
<b>Students communicate more in an online course than they do in a face-to-face course.*</b>	2.54 (0.95)	2.06 (0.98)	2.44 (1.21)	2.30 (1.04)
Fewer problems occur in online courses than in face-to-face courses.	1.95 (0.80)	2.22 (1.12)	2.28 (0.82)	2.14 (0.96)
Students learn more in online classes than in face-to-face classes.	1.71 (0.78)	1.81 (0.91)	2.06 (0.96)	1.83 (0.88)
Face-to-face classes provide fewer opportunities for students to interact with each other than online courses.	1.98 (1.07)	1.86 (1.10)	2.00 (1.27)	1.93 (1.13)
Students and faculty interactions are more effective in online classes than they are in face-to-face classes.	1.50 (0.69)	1.58 (0.90)	1.75 (0.73)	1.59 (0.80)

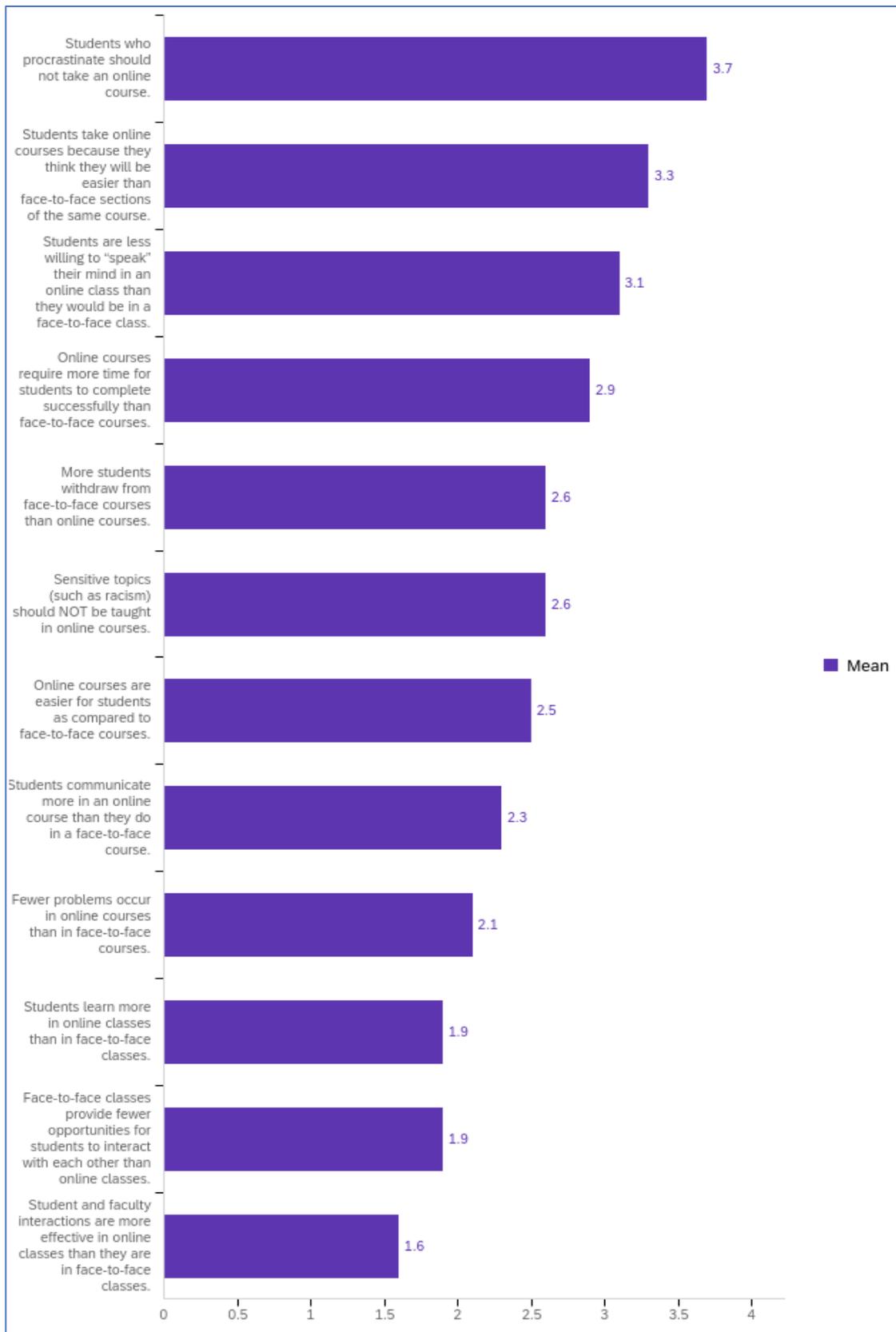


Figure 5: Average item scores for questions regarding online teaching

The Kruskal-Wallis test resulted in two items that were significantly different across the three groups. The findings follow:

- The item, “Students take online courses because they think they will be easier than face-to-face sections of the same course,” received higher ratings by teaching track faculty as compared to tenured/tenure-track and other faculty.
- The item, “Students communicate more in an online course than they do in a face-to-face course” received higher ratings by teaching faculty and other faculty as compared to tenured/tenure-track faculty.

Given that all other items did not have significantly different differences, one can assume that, generally speaking, the different types of positions have similar perceptions of teaching online courses.

An additional test was performed to compare the perceptions of individuals who completed the Engineering and Facilitating Online Learning (EFOL) training versus those who did not. Table 2 displays the means for the items by their participation in the EFOL. None of the items were found to be significantly different based on whether participants took the EFOL or did not take the EFOL.

Comparisons were also made between those participants who had taught at least 1 Mines Online course and those that did not. As with the previous analysis, no significant differences were found between these two groups on any of the items. Table 3 provides the average scores for these items by number of Mines Online courses taught.

Table 2: Item averages and standard deviations (in parentheses) for items by participation in the EFOL

	<b>Yes</b>	<b>No</b>
Students who procrastinate should not take an online course.	3.72 (1.06)	3.60 (0.91)
Students take online courses because they think they will be easier than face-to-face sections of the same course.	3.27 (1.06)	3.43 (1.02)
Students are less willing to “speak” their mind in an online class than they would be in a face-to-face class.	3.02 (1.11)	3.14 (1.16)
Online courses require more time for students to complete successfully than face-to-face courses.	2.99 (1.02)	2.70 (1.06)
More students withdraw from face-to-face courses than online courses.	2.57 (0.86)	2.59 (0.83)
Sensitive topics (such as racism) should NOT be taught in online courses.	2.60 (1.14)	2.65 (1.03)
Online courses are easier for students as compared to face-to-face courses.	2.53 (1.04)	2.43 (1.12)
Students communicate more in an online course than they do in a face-to-face course.	2.42 (2.08)	2.22 (1.02)
Fewer problems occur in online courses than in face-to-face courses.	2.22 (0.89)	2.04 (1.01)
Students learn more in online classes than in face-to-face classes.	1.93 (0.95)	1.82 (0.88)
Face-to-face classes provide fewer opportunities for students to interact with each other than online courses.	2.03 (1.15)	1.85 (1.10)
Students and faculty interactions are more effective in online classes than they are in face-to-face classes.	1.65 (0.81)	1.63 (0.88)

Table 3: Item averages and standard deviations (in parentheses) for items by participation in the EFOL

	<b>No Mines Online Courses taught</b>	<b>At least one Mines Online Course taught</b>
Students who procrastinate should not take an online course.	3.68 (0.97)	3.67 (1.05)
Students take online courses because they think they will be easier than face-to-face sections of the same course.	3.28 (0.95)	3.39 (1.13)
Students are less willing to “speak” their mind in an online class than they would be in a face-to-face class.	3.13 (1.10)	2.99 (1.18)
Online courses require more time for students to complete successfully than face-to-face courses.	2.90 (0.97)	2.86 (1.19)
More students withdraw from face-to-face courses than online courses.	2.69 (0.74)	2.49 (0.91)
Sensitive topics (such as racism) should NOT be taught in online courses.	2.72 (1.08)	2.51 (1.12)
Online courses are easier for students as compared to face-to-face courses.	2.41 (1.03)	2.52 (1.12)
Students communicate more in an online course than they do in a face-to-face course.	2.29 (1.03)	2.38 (1.11)
Fewer problems occur in online courses than in face-to-face courses.	2.19 (0.97)	2.07 (0.92)
Students learn more in online classes than in face-to-face classes.	1.79 (0.83)	1.95 (0.98)
Face-to-face classes provide fewer opportunities for students to interact with each other than online courses.	1.95 (1.10)	1.94 (1.19)
Students and faculty interactions are more effective in online classes than they are in face-to-face classes.	1.69 (0.87)	1.57 (0.80)

*Positive experiences and perceptions of Mines Online*

Faculty participants were asked to respond to three open-ended questions about positive elements or successes related to Mines Online: “When you hear your faculty colleagues talk about Mines Online, what are the most common positive comments?”, “Please share a SUCCESSFUL experience that you (or a colleague) had in regards to DEVELOPING a course associated with Mines Online.”, and “Please share a SUCCESSFUL experience that you (or a colleague) had in regards to TEACHING a course associated with Mines Online.” Each open response item was coded separately for common themes across participants, then compared across items. Table 4 summarizes the frequency of codes across items.

Table 4: Frequency of Positive Comments and Success codes from open response items

	<b>Positive Comments</b>	<b>Successes with TEACHING</b>	<b>Successes with DEVELOPMENT</b>
None/NA/Not discussed	41	40	36
Flexibility (for students and faculty)	30	4	0
Broader population of students	18	13	0
Good course structure	13	0	31
Trefny/OLEDs/Designers/Resources	9	0	18
Positive student interactions or feedback	8	30	0
Specific Technology or Activity Success	2	15	9
<b>Total coded statements</b>	<b>145</b>	<b>111</b>	<b>99</b>

The largest number of responses across groups was “N/A”, “None”, or responses noting limited experience teaching online or conversations about Mines Online. One participant provided additional details noting, “None. From my experience it has been an unorganized debacle that our department was forced to participate in and pay our faculty pennies on the dollar of what a proper online developer would be contracted for.” while another participant commented, “I have not heard many positive comments about Mines Online, likely because it is not that large yet (though we do have faculty in our department that have developed and taught online courses).” Another participant comments for each item “None. The online requirements at Mines are bloated, time consuming, and within content that could be delivered in 1/5 the time.” Overall, there was a large number of participants that indicated they did not have any successes with Mines Online to report for themselves or as discussed with their peers. It is important to note that to capture faculty perceptions, we asked about what faculty were hearing from their colleagues about successes and positive experiences broadly. The “N/A” or “none” comments reported here may indicate that colleagues are not discussing the positive experiences with Mines Online.

The positive experiences that were reported largely noted that online teaching allowed for more flexibility. These comments were both related to flexibility for the instructor (“I can teach the course from anywhere (i.e., not tied to campus)” and “teaching in pajamas”) as well as for the students (“scheduling flexibility for students, grad students balancing external job” and “The students have the ability to access and satisfy the course requirements (e.g., reading, videos for viewing, assignments for completing, and quizzes for evaluation on Canvas) within a flexible time frame.”).

The Flexibility theme was closely tied to another theme related to creating opportunities that allowed for a broader population of students to participate in Mines courses. Participants noted that a positive element of online courses was that they allow more diverse students to participate beyond the traditional undergraduate students on campus at Mines. Specifically, participants noted that online courses allowed residential students to take summer courses while at home on break, working professionals, and non-traditional students more broadly. One participant noted, “[An online course] makes class more easily available (e.g., a UG [undergraduate student] can fulfill a required class in summer while off campus, G [graduate student] can work full time and still take a class)”. Another noted, “Faculty have brought up a

specific student to highlight the fact they are either non-traditional or a minority that would have otherwise not been able to participate.” Other participants also noted that the broader population also allowed for students from broader locations and around the world could take Mines Online courses, with one participant saying “[A success of online teaching is] Attracting students from around the globe [to their program]” while another said a success was being “able to reach out to students that couldn't come to Golden to take a traditional class.”

One of the most common themes around successes discussed as part of the development of Mines Online courses was related to the pedagogical structure of the courses. This code was tied to mentions of learning objectives/outcomes, specific activities, or benefits of the online structure. One participant noted, “My courses are super streamlined both f2f and online due to the work I've put in to master Canvas,” indicating that by developing an online course within Canvas, they have been able to improve their teaching both online and face-to-face due to the course structure. Another noted, “I have developed my course based on research on best practices for online teaching which parallel those for in person. Face-to-face interaction is critical so we had synchronous meetings, breakout room discussions, and carefully set due dates in between these meetings to keep students as engaged and provide as much ownership in the content as possible.” Again, the participant notes the value of creating a quality online course to their face-to-face teaching as well. Another participant directly linked the success of their course structure to the content of the EFOL course: “I was not as familiar with Course Level Learning Outcomes and Learning Outcomes, so I got a lot out of the EFOL course. I liked the Course Map exercise which helped structure the course.” Another participant noted, “While developing my course, I learned that I had to incorporate different course material to keep students engaged. This means, I created calculation help videos, conducted more surveys for feedback and used more simulations (as opposed to live demos) to help with course development.” Each of the statements coded here were linked to elements of the course structure that were viewed as positive or successful. It should be noted that for the “Successes with Teaching” responses, participants did not reference the course structure, but did mention specific activities or technologies that supported their course, which will be discussed later in this section.

In the overall positive comments and the successes from development, specifically referenced working with the OLEDs and the Trefny team. Specifically, participants said:

- “Susannah Simmons is awesome and it's horrible that she's leaving. Luke Prather is extremely responsive to requests!”
- “The online course developers are WONDERUFL to work with”
- “Developer helped me better understand the greater need for specificity in outlining what students should expect.”
- “Working with Trefny online & faculty developers”
- “Strong and personalized support from Trefny.”
- “The OLEDs are amazing at designing the online courses in ways that are intuitive to follow, consistent, and clear for the students.”
- “I have really great support in Ana!”
- “The opportunity to work with the Trefny Center is a pleasure. They all hold expert competency. It would be impossible to do online pedagogy without them.”

- “I had (and still have) a great relationship with Ana, my Trefny colleague. I feel that she and I worked well together to transform my face-to-face class into a good online class.”
- “The OLED team and HIVE make development easier and help push me in ways that made my courses much better.”
- “I worked with Ana Ruiz and development of the course was quite a bit of work, but I could not have done I without Ana's help. She answers questions it would take me forever to answer, and also took the "fear of uncertainty" out of development.”
- “The team at Trefny is always helpful and at the top of their game.”
- “Instructional designer was very helpful and professional”
- “Impressed with the OLEDs and support for development”

One of the key successes and positive comments relating to TEACHING online was related to student interaction, positive student feedback, and the ability to engage students online. One participant noted, “50% of my students have sent me personal emails thanking me for the hard work involved and for their resultant learned subject matter.” while another noted “I had a team of three FT [Full Time] employees (all work for the same company) take my course and use the learning on the job to their manager's high satisfaction.” Another stated, “In the student comments at the end of the semester, several students said that they felt the recorded lectures were very effective, and they liked being able to replay them,” a similar sentiment around the value of replaying lectures being valued by students was noted by multiple participants: “Students appreciate the ability to go back and rewatch content that didn't make sense the first time. I hear all the time that the short >5min videos were a great teaching tool.” and “Students like the ability to re-watch especially difficult or confusing content.” Other participants specifically noted success with student interaction – both with the instructor and with other students: “Students worked effectively in small groups to solve homework problems and then present their work to the rest of the class via screen sharing.”, “I get to know my students better online. I see/hear everything they communicate, and I can focus in on a single student or a group of students better than in face-to-face courses.”, “Many students gave positive comments about the opportunity to interact with their peers.”, and “I see a lot more interaction via chat functions than I did in large lecture classes (>150 students), even though the content and class size was the same.”

Tied to the theme around positive student interaction and feedback and the development of the course structure, multiple participants mentioned specific activities or technologies that they felt were positive or successful when teaching. Some of the specific activities are listed below:

- “Videos were well received with peer review of each other's reviews of material presented”
- “We used breakout rooms to split into two groups and students did hands on activities at home. The discussion took more time and was a bit less rich than in class discussions for the same course when it's in person.”
- “Discussion forums were helpful to know student`s perspective and their background”
- “My graduate course had 6 [case studies] in the semester. I had all students meet real-time on Zoom to discuss the case. This was well received by the class because they got time to interact together.”
- “Creating several discussion topics based on real scenario and getting engaged with the students

in these discussions.”

Other participants just broadly mentioned Canvas as a helpful tool that they were better able to utilize after teaching online.

There were a few additional codes that were not as common (less than 6 statements) and/or not common across the three questions. Within the general positive comments, a few participants mentioned earning bonus money for teaching online while others mentioned the university being able to make money. A few participants also noted the efficiency of teaching an 8-week course over a 16-week course. When discussing successes teaching online, a few participants noted that they felt their course was higher quality than their face-to-face course while a few others noted they appreciated making additional money teaching online. Finally, when discussing successes with course development, a few participants noted they appreciated the empathy they gained from being placed in the students' shoes or thinking about the student experience during development.

Where some participants did not note any positive experiences, there were still several positive comments and experiences made about Mines Online from the participants across the three open-response items. The flexibility of teaching online, having positive interactions with their students, and feeling like they have a better structure for their course from the development process were among the most frequent responses for each item. Participants also recognized being able to reach a broader population of students with online courses and positive experiences working with OLEDs and Trefny Center during the development process. Many of these comments seemed to be framed as participants reporting their personal successes, more so than successes of colleagues. This may indicate that the positive elements of Mines Online are not being communicated frequently by faculty word of mouth.

*Challenging experiences and perceptions with Mines Online*

Faculty participants were asked to respond to three open-ended questions about barriers and challenges related to Mines Online: “When you hear your faculty colleagues talk about Mines Online, what are the most common challenges or barriers that they discuss?”, “Please share any barriers or challenges that you (or a colleague) have faced in regards to DEVELOPING a course with Mines Online.”, and “Please share any barriers or challenges that you (or a colleague) have faced in regards to TEACHING a course with Mines Online.” Each open response item was coded separately for common themes across participants, then compared across items. Table 5 summarizes the frequency of codes across items.

Table 5: Frequency of Barrier and Challenges codes from open response items

	Barriers & Challenges		
	General	Teaching	Development
Negative Student Perceptions and Lack of Interaction	49	46	11
Time Commitment & Increased Workload	35	20	3
Challenges of specific course context (ex. Labs)	15	6	4
Lack of quality/rigor in Online	12	0	0
Training, Trefny, and OLEDs	10	5	22
Structure and Oversight of Mines Online	6	5	13

Online is only to make money	3	9	6
8-week time frame	0	5	4
Challenges using technology	0	9	6
No barriers or haven't discussed Mines Online	6	6	0
<b>Total coded statements</b>	<b>171</b>	<b>121</b>	<b>113</b>

Overall, there were more statements made around barriers and challenges than positive comments and successes, with far fewer participants noting no barriers or N/A. Where some participants reported success in engaging their students, more participants noted the lack of interaction or engagement of their students as a general barrier/challenge as well as a barrier/challenge when teaching. One participant noted, “Students often don't talk during Zoom sessions and keep their cameras off. The ‘office hours’ conversations seem to be dominated by a small few that are willing to ask questions.” It should be noted that this response does point to a potential conflation between remote instruction and online learning, though it was noted multiple times in the survey to only focus on online, not remote. Another participant noted being concerned about “poor teaching evaluations, rude students hiding behind computers.” There were many general comments around the “lack of interaction” as well as concern that students do not engage and are less successful in online courses. One participant commented that when teaching online, a challenge/barrier was “students are not attentive, students don't do the work, just try to pass.” Another noted that it was “Often difficult to get students warmed up to open-ended discussions of readings/assignments.” While yet another noted the dynamic between keeping students engaged and students struggling with the more independent time management of an online course saying, “Student engagement is harder. Much easier for students to procrastinate, especially if they are taking a mix of online and in-person classes-- the online course is often given lower priority/less attention. Students ‘binge’ close to exams rather than pacing their learning.” Other participants noted struggling with really getting to know their students in online classes, making statements like “Difficult to get to know students on a personal level and difficult to do hands on work and offer experiences to student.” and “I often worry that I don't see when students are having mental health or other issues in the online environment.” Overall, a key barrier, both generally and when teaching online, was engaging and interacting with the students.

Across all three items, the time and workload to develop and teach an online course was noted as a barrier/challenge. Some faculty just listed “time” as their response while others were more explicit. In general, across the items, the time to develop the course was the primary challenge. One participant noted the barrier/challenge of the “Time to really develop a course that I'm excited to deliver. Development seems to come as an add-on to a 50–60-hour week.” The participant goes on to note a potential way to address this challenge would be “Some sort of meaningful release time might really make a difference... this occurs to differing degrees but is really unit-specific. Arguably the units that need to offer release the most, are the least likely to have resources and bandwidth to do so.” Another participant acknowledged the value of the development process, but also that it comes with a downside, saying “Mines' engineered learning is demanding (that's good - we want to be unique and rigorous) but the faculty time commitment (and compensation) are grossly underestimated/undervalued.” Another felt the development process included a “Completely unreasonable time commitment. It is not the job of TT faculty (i.e., high-level researchers and experts) to spend time on implementation details.” while another noted that “the timeline to create content is often onerous as it often occurs while teaching during the regular semester.” In addition

to the time to develop a course with Mines Online, it is important to note that this time is seen in addition to faculty's already busy schedules and existing commitments. One faculty member noted, "It's just a ton of work on top of faculty's busy schedules to make these classes." Generally, participants noted the challenges of the development time and the additional workload needed to be successful with Mines Online. One participant compared the development with a face-to-face course noting, the development "Takes a \*really\* long time. While perhaps they should be, the reality is that most F2F courses are not fully developed before a course starts. Doing this takes much more time than most faculty are given. It's really hard to make adjustments in real time based on student feedback about what is working, and what isn't." With respect to teaching, another participant noted, "I believe that the instructor needs to commit a good amount of time to reading and responding to student emails because this is the main way students can interact with the teacher. This can be a challenge." Other faculty also noted that with the shorter course term, the grading load increases as compared to a face-to-face course: "Short course duration is a challenge as it required faster grading." Another participant just noted that "I see the overburdening of my colleagues." The increased workload and time commitment for both course development and managing an online course were seen as a key barrier and challenge.

A number of participants also expressed challenges related to teaching different course contexts online or that online instruction had limitations. For example, one participant noted their challenge was related to the format of their course saying, "Teaching "hands-on" labs in an online environment" while another noted, "Reading and discussion-centric courses are difficult to transition to asynchronous delivery." Other participants noted that their course content was not appropriate for online course making statements like: "I think for fundamental course it is not good for teaching online. I definitely see the struggling from students in my higher-level courses.", "Some course content (e.g., how to teach STEM) is not appropriate for online instruction.", and "There are also concerns particularly with math/mechanics courses in how to give the material and feedback in an online setting - these challenges are very real and different than humanities classes that are mainly discussions and writing papers." Others just noted: "the class/es I teach don't translate to online" and "It is very difficult to teach technical material on-line." The varied course formats and content-areas seem to be seen as a barrier for some faculty to transition to online courses.

Within the general barriers and challenges item, multiple participants noted that they felt that online courses were of a lower quality or lacked the rigor of face-to-face Mines courses. This was not revisited in the teaching or development items. One participant noted, "Most believe - correctly or incorrectly - that the rigor and educational quality isn't the same as F2F." Another stated a barrier was "fear that online classes aren't as 'good'." Another framed the quality around student success and noted that "Students struggle to achieve the same level of learning." Another participant noted that Online instruction was "'Cheapening' or 'Diluting' of the Mines experience, quality of education, support."

The EFOL training was specifically mentioned as a barrier. The time commitment to complete the training was noted as one key challenge with faculty commenting that "The training is very long." and "The training is overbearing, takes too much time, and does not fit all the different types of courses here at Mines." Participants also noted that they felt the EFOL course was challenging as it did not specifically focus on STEM online education or concentrate enough on ONLINE education. One participant noted, "The EFOL course I took had ZERO examples of anything that had been done in an online STEM course."

So, most of the presented tools were effectively useless. I felt I knew more about online STEM than the developers.” Another participant noted, “EFOL doesn't actually teach anything about how you how to develop an online course and was generally a waste of my time.” One participant was very detailed in their feedback on why EFOL was a barrier stating:

*“Taking the EFOL class is a barrier. While the online class is useful, it is heavily weighted for "course development" vs. "online course development." I have developed over ten courses from scratch, and since the crux of EFOL is about the basics (writing course and class learning outcomes, developing appropriate assessments to assess CLO, pedagogical approaches, etc.), I found the majority repetitive. While it wasn't a 'waste of my time,' I found myself becoming frustrated at being required to take a 5-week course that fundamentally as 1-week related to online teaching and learning. And the course did not address many of the challenges of online learning, esp. assessment over the internet. The course should be divided such that faculty that have never developed a course before take the entire course, while those of us that have, take an abbreviated 1-2 week course. The 5-week course is a deterrent for faculty to develop classes. Finally, there needs to also be a recognition that many of these courses may not be 'developed' - they are existing courses that simply need to be transitioned online. EFOL assumes you are developing a new course.”*

The EFOL course seems to be a barrier for some faculty as it does not seem to align with their expectations for a training course for teaching online, or specifically teaching STEM online. It is important to note that revisions to the EFOL course are already underway that will address a number of these concerns.

There were also several challenges/barriers listed with respect to working with Trefny and the OLEDS. Some of these challenges were linked to specific experiences where the faculty's expectations were not met. One faculty shared, “I had a good partner/coach that I worked with the develop the course, but he was very busy with multiple development projects so the completion of the course regarding lecture recordings being converted to Vimeo took many months. As it dragged out files were lost from Zoom recording area and had to be remade later.” while another shared, “I developed my course well before the start of the course. The OLED did not really have or make time to finish the course in a timely manner and all had to be rushed at a time I was very busy myself. The course could have been better developed if the OLED would have been more available.” Yet another faculty noted a misaligned between their expectations for the course and the perspective of their OLED, “The course I developed was project-based. The structure was meant to present information and promote student discussion prior to students completing the projects. Structuring the flow of content to achieve this was difficult and was a regular discussion point between myself and the Trefny course developer.” The collaboration between OLEDS/Trefny with the faculty was perceived as a challenge as each member of the collaboration brought a different expertise. One participant noted, “Developers have no actual experience with technical content. They seemed completely unaware of any best practices or other developments for online engineering courses.” while another noted, “big divide between the courses I teach (and what is possible) and what the online developers know about our learning outcomes and how to accomplish them.” The divide between expertise and development collaboration with Trefny had one participant feeling that the “Trefny Center

does not trust faculty in delivering engineering content” while another felt that “although Trefny Center members don't teach engineering, they are very opinionated about how to teach.” There seems to be a challenge between some of the faculty and the OLEds to present an equal value between the pedagogical expertise of the OLEds and the content expertise of the faculty.

Linked to challenges of working with Trefny and OLEds was the faculty perception that a barrier with Mines Online is the oversight and structure that is being enforced. Where some faculty were very happy with the online course structure emphasized by Mines Online (discussed earlier), others found it to be a barrier that was constraining and infringing on their academic freedom. One participant noted, “Mines makes it WAY too difficult to become certified to teach online and to develop online courses. Way too much handholding and oversight. This has made me want to completely avoid teaching online.” Another said “I have heard others say it is simply not worth it because the management makes it so difficult. Some of the rules are very capricious. I would not try it unless there was a strong commitment to restructure the management.” Multiple participants noted the rigidity of the structure: “The approval process is burdensome and doesn't necessarily lead to a better product, it doesn't really allow for individuality (it's rigid).”, “[Other faculty] uniformly say that the administrative oversight of these courses is absolutely ridiculous. It is so vexing to them, and their examples are so explicit, that I would never try to get involved with one of these. You folks should know that you have a terrible reputation for being too detail oriented and self-absorbed with micro-managing these courses.”, and “Many (if not most) express a concern that the format (and specifically many of the intentional design elements) stand(s) in conflict with course content. In other words, they feel that content (and perhaps rigor) must be sacrificed in order to adhere to the Mines Online format.”, and “Some learning outcomes aren't measurable in the ways that developers want. The format seems quite rigid.” Where there are benefits to using good online education practices, the perception from faculty is that the format is rigid and does not allow for creativity or individual course needs.

There was also a less frequent, but still seen across question that Mines Online is about making money. One participant noted, “What's the end game? Money? Student success? I honestly have no idea, but I think it's money” while another stated “the priority seems to be making money over what is best for the students or the Mines brand.” This much less frequently expressed but did appear as a challenge/barrier across the different items.

There were also a few themes that were only discussed as barrier/challenges in the teaching and development items (not the general item). These were with respect to the 8-week course structure and challenges with technology. With respect to the 8-week course structure, comments were generally around the rushed nature when teaching online: “The 8-week online courses seem the height of crazy: too fast turn arounds between deliverables, while everyone is teaching and taking many other classes.” and “Colleagues say that the 8-week time period is too fast and does not allow students to digest engineering/technical concepts. Most students taking these online courses are working full-time and have limited time in their schedule.” With development, the challenge was noted as compressing 16-weeks of material into an 8-week course. Participants noted “The biggest challenge was trying to compress a 16-week course into eight 1-week modules without losing anything important.” and “I am not interested in teaching a class in half the time at twice the effort. Until we do 16-week courses, I will not complete

course development, unless I get a course release to create and then teach it.” With respect to the technology theme, for both development and teaching, participants noted learning to use Canvas multiple times as well general technology challenges, from finding the right software tool to connectivity issues while teaching.

There were a few codes that were less frequent (less than 6 coded statements) or that appeared in only one item. In the general barriers and challenges items, some participants noted that with online learning academic integrity was harder to uphold and more students were likely to cheat. Other participants noted that teaching online was a different skill set or just different from teaching face-to-face as a barrier. Some faculty also noted a lack of incentives to teach online. When discussing barriers and challenges when teaching online, there were a few participants that made statements that pointed to how online teaching wasn’t aligned with how they viewed their teaching values – speaking to being more of an administrator than teacher or the “fun” or “joy” being removed from the teaching experience. When discussing barriers and challenges with development, some participants also noted wanting more specific resources or templates for how to quickly integrate elements (for example, quizzes) into their courses.

Overall, there were several barriers and challenges perceived by the faculty. Largely faculty felt online instruction lacks the same interaction with their students or opportunities to integrate more student-centered activities. Additionally, there was a very common perception that the time and workload to develop and teach an online course was very high, which is challenging to balance with already heavy faculty workloads. Some faculty have had negative experiences working on online courses with Trefny and the OLEDs. There seems to also be a perception that the Trefny/OLED team feels their pedagogical expertise is more important than the technical expertise of the faculty they are working with. Again, it is important to note that some of these experiences are being reported as what faculty are hearing from their colleagues and more of the challenge/barriers comments were framed as what respondents had heard from colleagues. Faculty may be complaining to their colleagues about their experiences with Mines Online, increasing negative perceptions of online learning across the university.

#### *Awareness of Mines Online policies*

The survey included several items that tried to capture faculty awareness of the different Mines’ policies regarding online courses and the reasons that they were implemented.

For the first item, faculty were asked the following: “Mines decided to structure fully online programs in 8-week parts of term (semesters) based on research and review of best practices. Were you aware of the reasons for the 8-week policy?” Figure 6 provides the set of responses to this question. A total of 86 (48.3%) of respondents said that they were not aware of the reasons the 8-week policy was set. A total of 59 (33%) were somewhat aware; 33 (18.5%) were fully aware of the reasons.

When asked if they had any new data or research that could help to inform further discussions around semester length, the vast majority (163, 93.1%) responded with no. Those that did provide an answer to reasons why mostly discussed their own experience or criticized the approach. For example, one individual said, “Personal experience and talking to students. 8-weeks is difficult especially when they are taking the bulk of their

courses as 15-week courses.” Another person said that the 8-week course is like, “drinking from a firehose.” Another individual stated that, “I think we need to track the mental wellness of professors trying to pull it off. My colleague was not a happy camper.”

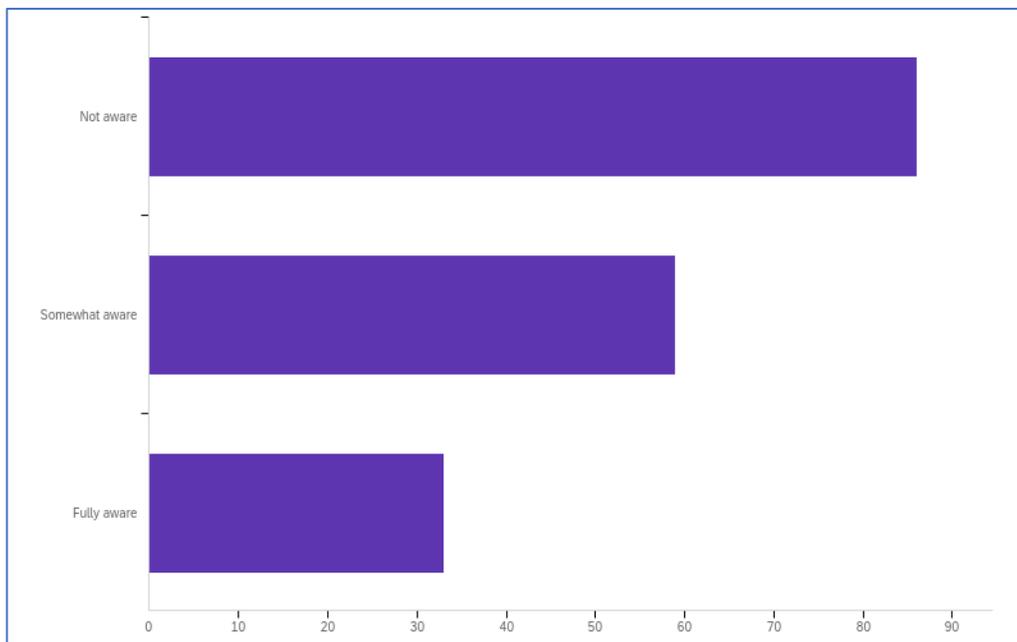


Figure 6: Responses to the question regarding awareness of the 8-week policy for online programs

The same set of comparisons was conducted to see if there are differences in the response patterns based on position type, participation in the EFOL, and whether they have taught at least one Mines Online course. An independent samples Mann Whitney U Test was conducted. Below are the findings:

- Tenure track/tenured faculty were significantly more likely to state that they were fully aware of the 8-week policy for online programs. Other faculty and teaching faculty were less aware.
- Faculty who had taken the EFOL were much more likely to be either somewhat aware or fully aware of the 8-week course policy, as compared to faculty who had not.
- Faculty who had taught at least one Mines Online course were also much more likely to be either somewhat or fully aware of the 8-week course policy.

The second item stated the following: “A committee of Mines faculty established Mines Standards for Online Course Development and Facilitation. Faculty Senate has organized a new committee to conduct the review of online courses against these standards and to periodically update the standards. Were you aware of this faculty committee and the Standards?” Figure 7 displays the responses to this item. A total of 72 (40.7%) said that they were unaware of the committee; 65 (36.7%) were somewhat aware, and 40 (22.6%) were fully aware of the existence of the committee and the standards.

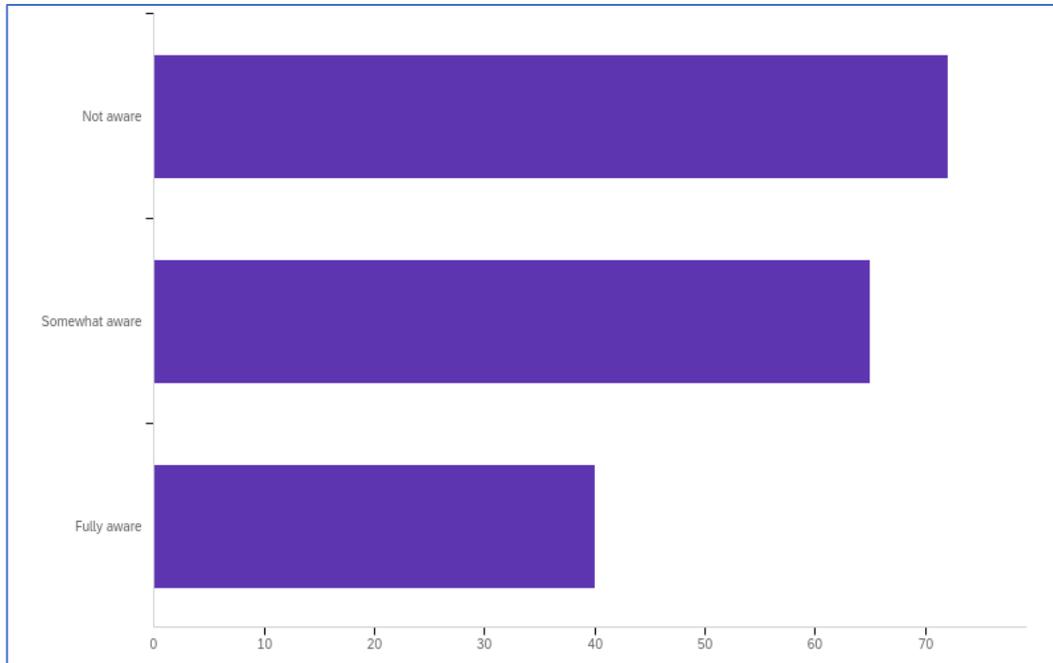


Figure 7: Responses to the question regarding awareness of the committee who established the Standards for Online Course Development and Facilitation

When asked if they had any new data or research that the committee should be aware of, the vast majority (171, 97.7%) responded with no. However, many participants did provide recommendations and comments for the committee. Recommendations included the following:

- Increase transparency on the committee (i.e., who is on it, send out meeting minutes and reports)
- Provide faculty with a summary of the best practices and research relating to decisions made
- Reduce the time needed to prepare an online course
- Change the period of course time to 14-16 weeks
- Integrate schedules with other courses and honor breaks (e.g., spring break)
- Survey and/or interview students and faculty about their experiences in online courses
- Study learning outcomes for online versus face-to-face courses
- More flexibility regarding delivery, design, and timeframes
- Increase standards for videos used in courses (better editing, no voice over PPTs)

In addition to recommendations, some participants used this as an opportunity to voice their concerns about online courses. These concerns included:

- OLEDs do not have the domain knowledge necessary to state a course is developed
- Decrease number of online courses
- The 8-week time period is not helpful for undergrads taking other courses
- Promote more in-person and synchronous online courses

As with the previous item, an independent samples Mann-Whitney U test was conducted to determine if there were differences based on position type, completion of EFOL, and whether respondents had taught online before. Below are the findings:

- No significant differences were found based on this item and position type.
- Faculty who completed the EFOL were significantly more likely to have known about the committee as compared to those who had not.
- Faculty who had taught at least one Mines Online course online were significantly more likely to have known about the committee as compared to those who had not taught online.

### *Perceptions of Mines Online*

Faculty were asked a series of nine items asking about their perceptions of Mines Online courses. The average score for each item is displayed in Figure 8. Based on this data, faculty tend to perceive that 1) students need to have good time management skills to be successful in a Mines Online course and 2) academic integrity violations are more likely in Mines online courses. These two items had the highest mean, suggesting a strong average endorsement of the items. The items with the lowest means were 1) only graduate courses are appropriate for Mines Online, and 2) it takes the same amount of time to teach online compared to teaching face-to-face, both of which had means less than 3.

The independent-samples Kruskal-Wallis test was conducted to examine whether differences exist in the perceptions of Mines Online by position type, EFOL participation, and whether the person taught online. Table 6 provides the descriptive statistics for the items by position type. The results of this test revealed the following:

- For the item, “Students must be more proficient with time management to be successful in a Mines Online course,” faculty in the “other” category had a significantly lower mean than faculty members who were either on the teaching track or tenure track/tenured.
- For the item, “Academic integrity violations are more likely in Mines Online courses as compared to traditional courses,” teaching faculty have significantly higher ratings than tenure-track/tenured faculty and other faculty.

Table 7 provides the descriptive statistics for the items by EFOL participation, which was tested for significance using the Mann-Whitney U test. Two items were identified as being significantly different based on EFOL participation. The findings follow:

- For the item, “Students must be proficient with time management to be successful in a Mines Online course,” faculty who completed the EFOL rated this item higher than those who did not complete the EFOL.
- For the item, “Students taking Mines Online courses are less prepared to take courses than Mines residential students,” faculty who have completed the EFOL rated this item lower than those who did not complete the EFOL.

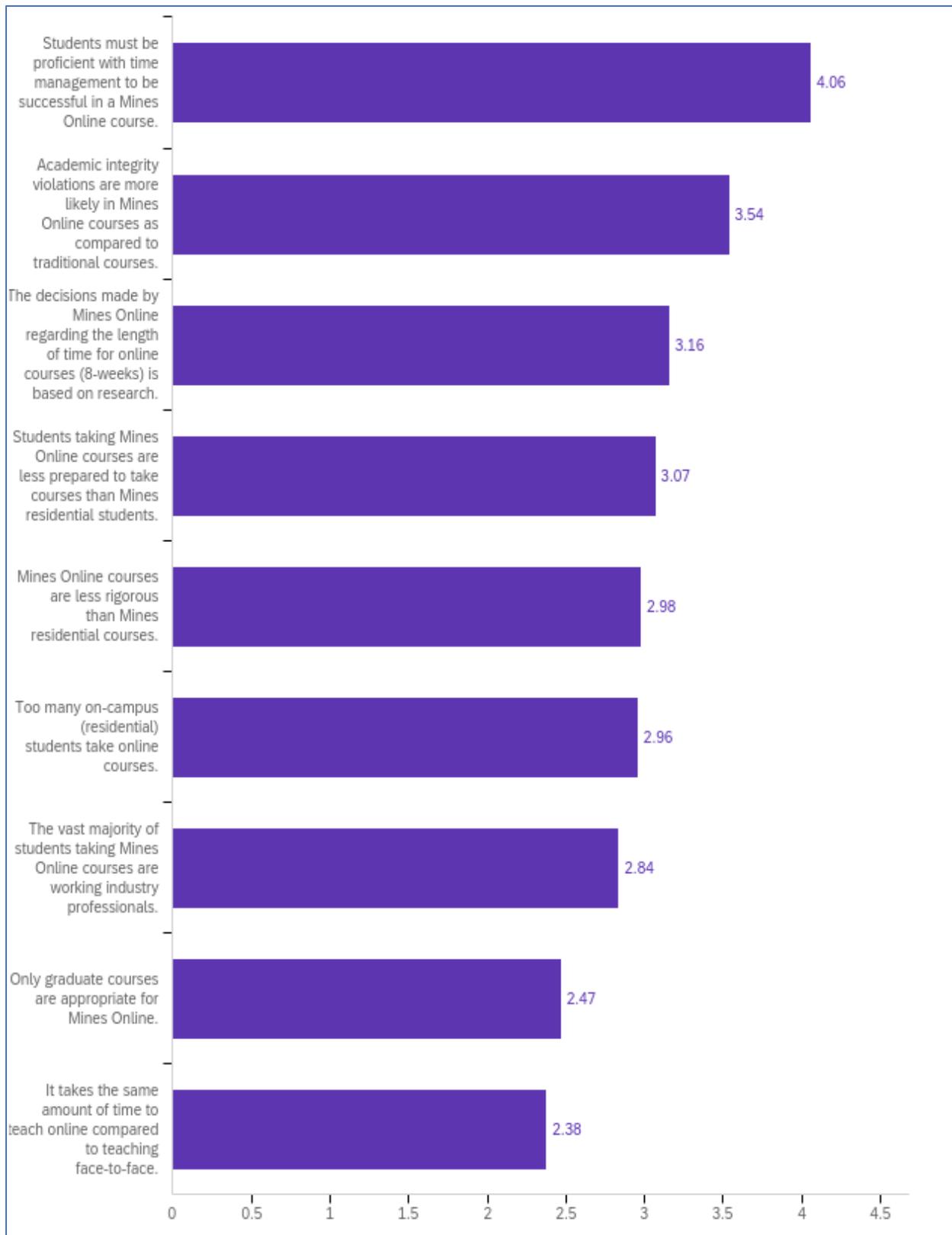


Figure 8: Average item scores regarding perceptions of Mines Online

Table 6: Mines Online Perceptions - Item averages and standard deviations (in parentheses) for items by position type (\* indicates significant differences among the groups)

	<b>Teaching Track</b>	<b>Tenure Track/ Tenured</b>	<b>Other</b>	<b>All</b>
<b>Students must be proficient with time management to be successful in a Mines Online course.*</b>	4.30 (0.69)	4.08 (0.81)	3.64 (1.25)	4.06 (0.90)
<b>Academic integrity violations are more likely in Mines Online courses as compared to traditional courses.*</b>	3.88 (1.05)	3.38 (1.13)	3.39 (1.02)	3.54 (1.08)
The decisions made by Mines Online regarding the length of time for online courses (8-weeks) is based on research.	2.98 (0.798)	3.23 (0.87)	3.25 (0.81)	3.16 (0.85)
Students taking Mines Online courses are less prepared to take courses than Mines residential students.	3.16 (1.06)	3.14 (0.92)	2.83 (0.91)	3.07 (0.96)
Mines Online courses are less rigorous than Mines residential courses.	2.89 (1.23)	3.14 (1.03)	2.72 (1.14)	2.98 (1.11)
Too many on-campus (residential) students take online courses.	2.95 (0.94)	3.08 (0.10)	2.72 (0.82)	2.96 (0.92)
The vast majority of students taking Mines Online courses are working industry professionals.	2.75 (0.90)	2.79 (1.01)	2.94 (1.04)	2.84 (0.96)
Only graduate courses are appropriate for Mines Online.	2.64 (1.23)	2.37 (1.10)	2.50 (1.16)	2.47 (1.14)
It takes the same amount of time to teach online compared to teaching face-to-face.	2.43 (1.20)	2.29 (1.05)	2.34 (1.03)	2.38 (1.09)

Table 7: Mines Online Perceptions - Item averages and standard deviations (in parentheses) for items by EFOL participation (\* indicates significant differences among the groups)

	Yes	No
<b>Students must be proficient with time management to be successful in a Mines Online course.*</b>	4.20 (0.82)	3.88 (0.96)
Academic integrity violations are more likely in Mines Online courses as compared to traditional courses.	3.54 (1.19)	3.58 (0.90)
The decisions made by Mines Online regarding the length of time for online courses (8-weeks) is based on research.	3.15 (0.81)	3.19 (0.87)
<b>Students taking Mines Online courses are less prepared to take courses than Mines residential students.*</b>	2.91 (1.00)	3.24 (0.88)
Mines Online courses are less rigorous than Mines residential courses.	2.88 (1.21)	3.08 (0.98)
Too many on-campus (residential) students take online courses.	2.99 (1.12)	2.93 (0.65)
The vast majority of students taking Mines Online courses are working industry professionals.	2.72 (1.15)	2.98 (0.69)
Only graduate courses are appropriate for Mines Online.	2.58 (1.27)	2.34 (0.98)
It takes the same amount of time to teach online compared to teaching face-to-face.	2.35 (1.11)	2.41 (1.08)

Comparisons were made for the perception items based on whether the faculty members had taught at least one Mines Online course. Table 8 provides the descriptive statistics for these items by whether they taught or not. The Mann-Whitney U Test found one item that had significantly different ratings based on whether the faculty member taught the course or not: “Mines Online courses are less rigorous than Mines residential courses.” For this item, faculty who had taught at least one Mines Online course were likely to rate this lower. Faculty who had not taught for Mines Online rated this higher.

Table 8: Mines Online Perceptions - Item averages and standard deviations (in parentheses) for items by courses taught (\* indicates significant differences among the groups)

	No Mines Online Courses taught	At least one Mines Online Course taught
Students must be proficient with time management to be successful in a Mines Online course.	4.02 (0.92)	4.10 (0.87)
Academic integrity violations are more likely in Mines Online courses as compared to traditional courses.	3.52 (0.94)	3.56 (1.22)
The decisions made by Mines Online regarding the length of time for online courses (8-weeks) is based on research.	3.19 (0.82)	3.12 (0.88)
Students taking Mines Online courses are less prepared to take courses than Mines residential students.	3.13 (0.77)	3.01 (1.14)
<b>Mines Online courses are less rigorous than Mines residential courses.*</b>	3.14 (1.02)	2.81 (1.19)
Too many on-campus (residential) students take online courses.	2.98 (0.78)	2.94 (1.07)
The vast majority of students taking Mines Online courses are working industry professionals.	2.96 (0.76)	2.71 (1.14)
Only graduate courses are appropriate for Mines Online.	2.44 (1.03)	2.50 (1.27)
It takes the same amount of time to teach online compared to teaching face-to-face.	2.40 (0.96)	2.36 (1.23)

### *Level of Satisfaction with Online*

Faculty were asked to rate their level of satisfaction with different aspects of online, on a scale of 1 to 5. Figure 9 displays the average ratings of these items. The highest average rating was for the “quality of students in online courses” which averaged a 3.03 on the 5-point scale. The remaining items were all less than 3, indicating that on average, faculty are not satisfied with many aspects of online courses.

Table 9 displays the averages by position type. The Kruskal-Wallis test indicated that two items were significantly different based on position type. The findings follow:

- For the item, “The quality of students in online courses,” other faculty were likely to rate this higher than teaching track and tenure-track/tenured faculty.
- For the item, “Academic integrity rates in online courses,” Teaching Track faculty were likely to rate this as being less satisfied as compared to tenure-track/tenured faculty and other faculty.

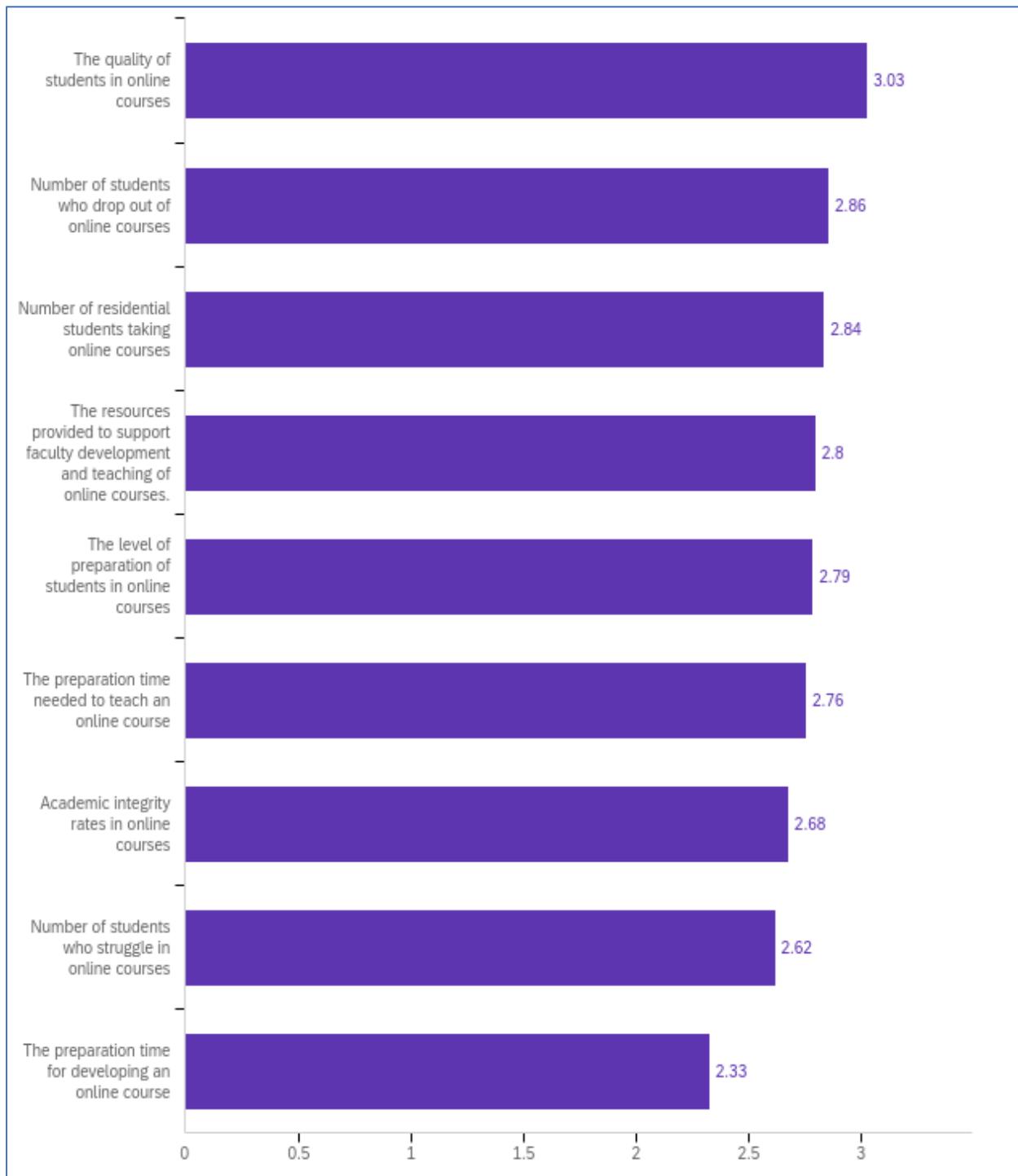


Figure 9: Average item scores regarding satisfaction of online courses at Mines

Table 9: Online satisfaction- Item averages and standard deviations (in parentheses) for items by position type (\* indicates significant differences among the groups)

	<b>Teaching Track</b>	<b>Tenure Track/ Tenured</b>	<b>Other</b>	<b>All</b>
<b>The quality of students in online courses*</b>	2.85 (0.76)	2.99 (0.80)	3.24 (0.81)	3.03 (0.81)
Number of students who drop out of online courses	2.84 (0.68)	2.79 (0.66)	3.00 (0.54)	2.86 (0.64)
Number of residential students taking online courses	2.78 (0.74)	2.83 (0.75)	2.94 (0.53)	2.84 (0.70)
The resources provided to support faculty development and teaching of online courses	2.95 (1.21)	2.61 (1.31)	2.97 (1.32)	2.80 (1.28)
The level of preparation of students in online courses	2.63 (0.84)	2.77 (0.86)	3.11 (0.95)	2.79 (0.89)
The preparation time needed to teach an online course	2.73 (0.96)	2.69 (1.03)	2.92 (0.91)	2.76 (0.98)
<b>Academic integrity rates in online courses*</b>	2.39 (.93)	2.75 (0.87)	2.97 (0.97)	2.68 (0.94)
Number of students who struggle in online courses	2.59 (0.85)	2.59 (0.86)	2.72 (0.74)	2.62 (0.83)
The preparation time for developing an online course	2.29 (1.01)	2.22 (1.03)	2.58 (0.91)	2.33 (1.00)

Table 10 provides the descriptive statistics for faculty’s satisfaction with online courses by participation in the EFOL. Using the Mann-Whitney U test, three items were found to be significantly different between the two groups. The findings follow:

- Faculty who took the EFOL were more satisfied with “The quality of students in online courses.”
- Faculty who took the EFOL were more satisfied with “The resources provided to support faculty development and teaching of online courses.”
- Faculty who took the EFOL were more satisfied with “The preparation time needed to teach an online course.”

Table 10: Online satisfaction - Item averages and standard deviations (in parentheses) for items by EFOL participation (\* indicates significant differences among the groups)

	<b>Yes</b>	<b>No</b>
<b>The quality of students in online courses*</b>	3.15 (0.92)	2.87 (0.60)
Number of students who drop out of online courses	2.94 (0.68)	2.75 (0.57)
Number of residential students taking online courses	2.80 (0.86)	2.88 (0.41)
<b>The resources provided to support faculty development and teaching of online courses*</b>	3.02 (1.41)	2.52 (1.04)
The level of preparation of students in online courses	2.85 (0.94)	2.73 (0.80)
<b>The preparation time needed to teach an online course*</b>	2.95 (0.96)	2.53 (0.93)
Academic integrity rates in online courses	2.74 (1.02)	2.60 (0.80)
Number of students who struggle in online courses	2.74 (0.85)	2.48 (0.77)
The preparation time for developing an online course	2.36 (1.08)	2.28 (0.89)

Table 11 provides the descriptive statistics for the satisfaction items by courses taught. The Mann-Whitney U test found one item that had significantly different ratings for faculty who taught at least one Mines Online course and those who did not. The one item that was different between the two groups was “The quality of students in online courses.” Faculty who had taught at least one Mines Online course had significantly higher ratings than those who had not taught for Mines Online.

Table 11: Online satisfaction - Item averages and standard deviations (in parentheses) for items by courses taught (\* indicates significant differences among the groups)

	<b>No Mines Online Courses taught</b>	<b>At least one Mines Online Course taught</b>
<b>The quality of students in online courses*</b>	2.89 (0.57)	3.17 (0.97)
Number of students who drop out of online courses	2.83 (0.49)	2.89 (0.76)
Number of residential students taking online courses	2.85 (0.55)	2.82 (0.82)
The resources provided to support faculty development and teaching of online courses	2.67 (1.04)	2.93 (1.47)
The level of preparation of students in online courses	2.76 (0.60)	2.83 (
The preparation time needed to teach an online course	2.71 (0.78)	2.82 (1.12)
Academic integrity rates in online courses	2.65 (0.82)	2.71 (1.06)
Number of students who struggle in online courses	2.63 (0.66)	2.62 (0.96)
The preparation time for developing an online course	2.33 (0.88)	2.33 (1.11)

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## **Appendix: Mines Online Faculty Senate Survey**

The purpose of this survey is to gather feedback from Mines faculty on their experiences and perceptions with teaching online. This survey is being conducted by independent evaluators, Sarah Zappe and Stephanie Cutler. Data from this survey is anonymous and will be presented back to the Mines Faculty Senate and Mines Online in summary form only. Raw data will not be shared with anyone at Mines. For questions about the survey, please contact Sarah Zappe at [ser163@psu.edu](mailto:ser163@psu.edu).

Please respond with how much you agree with the following statements about Online Learning **in general**. For these items, ONLINE COURSES refer to courses that were prepared through the collaborative build process and have passed Mines' Online Course Design Standards review. They do NOT refer to REMOTE instruction, such as emergency remote teaching during the COVID pandemic.

	Strongly Disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Online courses are easier for students as compared to face-to-face courses. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students learn more in online classes than in face-to-face classes. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students are less willing to “speak” their mind in an online class than they would be in a face-to-face class. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Students communicate more in an online course than they do in a face-to-face course. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online courses require more time for students to complete successfully than face-to-face courses. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Face-to-face classes provide fewer opportunities for students to interact with each other than online classes. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Student and faculty interactions are more effective in online classes than they are in face-to-face classes. (7)

Fewer problems occur in online courses than in face-to-face courses. (8)

More students withdraw from face-to-face courses than online courses. (9)

Students who procrastinate should not take an online course. (10)

Students take online courses because they think they will be easier than face-to-face sections of the same course. (11)

Sensitive topics (such as racism) should NOT be taught in online courses. (12)



Q3 Have you completed the Engineering and Facilitating Online Learning (EFOL) training?

Yes (1)

No (2)

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Q4 Have you ever completed any other training on how to teach online?

Yes (please describe) (1) \_\_\_\_\_

No (2)

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Q5 Have you taught an online course?

Yes (1)

No (2)

*Skip To: Q9 If Have you taught an online course? = No*

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Q6 How many different online courses have you taught?

---

Q7 How many different Mines Online courses have you taught?

---

Q24 What level of Mines Online courses have you taught? (Check all that apply)

Undergraduate (1)

Graduate (2)

---

Q25 Did you teach the same course for Mines Online as well as face-to-face?

Only online (1)

Both online and face-to-face (2)

---

Q8 How many times have you taught online (i.e., number of sections of courses that were offered online)?

---

Q9 Have you ever developed (or helped to develop) an online course?

Yes (1)

No (2)

*Skip To: Q12 If Have you ever developed (or helped to develop) an online course? = No*

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---

Q10 How many different online courses have you developed (i.e., created content, worked with an instructional designer, etc.)?

---

Q11 How many different online courses have you developed through Mines Online (i.e., created content, worked with an instructional designer, etc.)?

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What level of Mines Online courses have you developed? (Check all that apply)

Undergraduate (1)

Graduate (2)

---

Q12 When you hear your faculty colleagues talk about Mines Online, what are the most common positive comments?

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Q13 Please share a SUCCESSFUL experience that you (or a colleague) had in regards to TEACHING a course associated with Mines Online.

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Q14 Please share a SUCCESSFUL experience that you (or a colleague) had in regards to DEVELOPING a course associated with Mines Online.

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Q15 When you hear your faculty colleagues talk about Mines Online, what are the most common challenges or barriers that they discuss?

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Q16 Please share any barriers or challenges that you (or a colleague) have faced in regards to TEACHING a course with Mines Online.

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Q17 Please share any barriers or challenges that you (or a colleague) have faced in regards to DEVELOPING a course with Mines Online.

---

Q18 Mines decided to structure fully online programs in 8-week parts of term (semesters) based on research and review of best practices.

Were you aware of the reasons for the 8-week policy?

Not aware (1)

Somewhat aware (2)

Fully aware (3)

Q19 Are you aware of any new data or research that might inform further discussions around semester length?

Yes (1)

No (2)

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Q20 If yes, please provide citations or links below.

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Q21 A committee of Mines faculty established Mines Standards for Online Course Development and Facilitation. Faculty Senate has organized a new committee to conduct the review of online courses against these standards and to periodically update the standards.

Were you aware of this faculty committee and the Standards?

- Not aware (1)
- Somewhat aware (2)
- Fully aware (3)

---

Q22 Are you aware of any new data or research that the committee should be aware of?

- Yes (1)
- No (2)

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Q23 What recommendations, if any, do you have for that committee?

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Q27 For this section, we will present different possible perceptions of Mines Online. Please rate your level of agreement with each statement.

Strongly disagree (1)

Somewhat disagree (2)

Neither agree nor disagree (3)

Somewhat agree (4)

Strongly agree (5)

Only graduate courses are appropriate for Mines Online. (1)

The vast majority of students taking Mines Online courses are working industry professionals. (2)

Academic integrity violations are more likely in Mines Online courses as compared to traditional courses. (3)

Students must be proficient with time management to be successful in a Mines Online course. (4)

Students taking Mines Online courses are less prepared to take courses than Mines residential students. (5)

Mines Online courses are less rigorous than Mines residential courses. (6)

The decisions made by Mines Online regarding the length of time for online courses (8-weeks) is based on research. (7)

Too many on-campus (residential) students take online courses. (8)

It takes the same amount of time to teach online compared to teaching face-to-face. (9)

Q28 Please rate your level of satisfaction with each of the following items.

Extremely dissatisfied (1)

Somewhat dissatisfied (2)

Neither satisfied nor dissatisfied (3)

Somewhat satisfied (4)

Extremely satisfied (5)

The preparation time for developing an online course (1)

The preparation time needed to teach an online course (2)

The resources provided to support faculty development and teaching of online courses. (3)

Academic integrity rates in online courses (4)

Number of residential students taking online courses (5)

The quality of students in online courses (6)

The level of preparation of students in online courses (7)

Number of students who struggle in online courses (8)

Number of  
students who  
drop out of  
online courses  
(9)

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Q29 How long have you been teaching?

- Less than 2 years (1)
  - 2-5 years (2)
  - 6-10 years (3)
  - More than 10 years (4)
- 
- 

Q30 What is your gender?

- Male (1)
  - Female (2)
  - Non-binary / third gender (3)
  - Prefer not to say (4)
- 
-

Q31 What is your rank?

- Assistant Teaching Professor (1)
- Associate Teaching Professor (2)
- Teaching Professor (3)
- Assistant Professor (4)
- Associate Professor (5)
- Professor (6)
- Professor of Practice (7)
- Assistant Librarian (8)
- Associate Librarian (9)
- Librarian (10)
- Assistant Research Professor (11)
- Associate Research Professor (12)
- Research Professor (13)
- Other (list) (14) \_\_\_\_\_

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Q32 What is your primary department?

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Q34 What interdisciplinary programs are you affiliated with (if applicable)?

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Q33 What are your course subjects/program areas? (list all)

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