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Weaving Academic Grace into the Fabric of Online Courses and Faculty Training: First-Year Engineering Student Advice for Online Faculty During the COVID-19 Pandemic and Faculty Responses

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Weaving Academic Grace into the Fabric of Online Courses and Faculty Training: First-Year Engineering Student Advice for Online Faculty During the COVID-19 Pandemic and Faculty Responses

STUDIES IN ENGINEERING EDUCATION

EMPIRICAL RESEARCH

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ABSTRACT

Background: In the spring of 2020, COVID-19 forced the majority of higher education online, resulting in a wave of new online students uniquely positioned to offer fresh perspectives and advice to faculty.

Purpose: This study investigated the advice offered to online faculty by first-year engineering (FYE) students who were forced online during the pandemic and faculty ideas to address the student advice.

Methods: This multi-methods study included qualitative data from 233 FYE students (in 67 teams across four class offerings) who provided advice for online faculty through an end-of-year team assignment, leveraging analytic induction methods for analysis. The Quality Matters Online Instructor Skill Set was used as the theoretical framework for viewing the student results (Quality Matters, 2016). After being presented with the student results, 41 faculty participants within two workshops brainstormed ways to respond to FYEs' advice. Faculty workshop participants organized their own brainstorming/discussion results by themes within community documents.

Results: Students forced online expressed the following needs/desires: instructional design practices appropriate for the online environment; understanding, flexibility, and patience from their faculty (which we defined as Academic Grace); instructor social presence; appropriate pedagogy for online learning environments; effective assessment; technologically capable instructors; and instructor understanding of their institutional context. Faculty advised responding to online students with more Academic Grace.

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Academic Grace; understanding, flexibility; patience; bichronous online; student perception

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Conclusions: This work reveals a new competency missing from traditional online instructor skills, that of Academic Grace. To embed Academic Grace within online courses, we propose that faculty consider a flexible bichronous model for online courses, in which students can choose to attend synchronous live lectures/classes or cover the material asynchronously at their own convenience. In this model, lecture/class recordings and supplemental asynchronous materials should be provided to foster fluid student movement between the learning modes. We also recommend online faculty training efforts include the components of Academic Grace: understanding, flexibility, and patience.

1.0 INTRODUCTION

The spring 2020 COVID-19 outbreak forced faculty to shift their courses online, many without any prior training in online teaching. Correspondingly, university students enrolled in traditional face-to-face programs found themselves suddenly thrust into the online environment. Studies prior to the pandemic examined the opinions of university students who chose online learning, showing that students traditionally turned to online learning as a matter of convenience, due to time and location restrictions imposed by day jobs, family, military duties, and so on (Dutton et al., 2002; Fox, 2017; Gillingham & Molinari, 2012; Jaggars, 2014; Jarvie-Eggart, Freeman, & Kempainnen, 2019; Scott et al., 2012). Overall, students tended to prefer in-person learning to online (Aguilera-Hermida, 2020; Clayton et al., 2018; Jarvie-Eggart, Freeman, & Kempainnen, 2019; Naik et al., 2021; Wang, 2021). Even during a global health crisis, students preferred learning in person rather than online. Studies of students forced online due to the pandemic documented similar preferences for in-person learning over online instruction as expressed prior to the pandemic (Aguilera-Hermida, 2020; Naik et al., 2021; Price Banks & Vergez, 2022; Wang, 2021).

Despite being commonly referred to as digital natives, studies of undergraduate students revealed that their digital skills focus primarily on email, research, and social media, with varying experience in the use of the information and communication technology required for online learning (Pechenkina & Aeschliman, 2017). In fact, prior to the pandemic, students exhibited anxiousness about online learning (Abdulla, 2012).

During COVID-19, online learning may have presented a particular challenge for first-year college students, as it required extra discipline and self-regulation when compared with traditional face-to-face learning. Prior to the pandemic, the characteristics of successful online students were found to include greater emotional intelligence, self-regulation skills, self-discipline, time management, organization, planning, self-evaluation, and internal locus of control (Kauffman, 2015). We anticipated these skills to be the least developed among our newest learners, first-year students. Consequently, we suspected that first-year online college students faced a double hurdle of developing the skills to succeed in college and developing the skills to succeed online; we believed, therefore, that first-year students would be especially well positioned to point out the difficulties of online learning and make suggestions to faculty.

This study built on previous work that summarized the best practices in online instruction (Freeman & Jarvie-Eggart, 2019) and provided a unique perspective from students about what makes good online education. This work investigated a cohort of first-year engineering students forced online due to the COVID-19 pandemic, their advice for online faculty, and faculty responses to their advice. The students in this study did not choose online learning, and, missing the traditional drivers for it, possessed a unique perception of the experience, especially as neophytes to higher education. The additional pressures and stresses the pandemic placed upon online learners exacerbated the typical needs of online students. Efforts to respond to their needs pointed us toward essential instructor characteristics that should be incorporated into faculty training, as well as a more accommodating structure for online classes. To provide a context for viewing our results, we begin with a summary of the expectations of students learning online prior to the pandemic, as well as the experiences of students learning online during COVID-19.

2.0 BACKGROUND LITERATURE

Studies conducted prior to the pandemic provide insight as to what students previously expected in quality online instruction. Reflecting on these expectations situates our results in the context of existing knowledge and reveals students' needs that emerged as particularly relevant as a result of the pandemic. Students' needs and expectations for online learning pre-COVID-19 pandemic generally aligned with the recommended best practices in online education. Online students have expressed desire for lectures offered in multiple media formats (Pechenkina & Aeschliman, 2017). Students also prefer variety within online supplemental learning resources (Hughes et al., 2019; Pechenkina & Aeschliman, 2017). Offering variety allows students to learn in their preferred method, from video, to podcasts, to written lecture notes and transcripts, and can help instructors address accessibility issues in online courses.

Once students have utilized online resources to complete their assignments, timely feedback on their assignments provides essential formative feedback to facilitate the progress of online students (Getzlaf et al., 2009). Students often had questions based on instructor feedback and needed opportunities to resolve these one-on-one with instructors. Similar to in-person students, online students desired access to their instructors outside of their course, such as through instructor office hours (Edwards & Helvie-Mason, 2010; Li & Pitts, 2009; Young, 2006). Thus, online instructors are encouraged to maintain office hours just as they would for in-person classes (Freeman & Jarvie-Eggart, 2019). Office hours provide an opportunity for students to resolve their learning difficulties one on one and communicate with their faculty.

Communication has been recognized as a key element in quality online instruction (Freeman & Jarvie-Eggart, 2019; Quality Matters, 2018). Clearly communicated expectations were found to be important for the success of online students (Cohen & Ellis, 2004). To accomplish this clear communication, students expressed preference for instructors with good communication skills (Davidson, 2019; Mishraa et al., 2020; Murphy et al., 2020; Young, 2006). Online instructors must also be proficient in digital communication media. Technical and computer skills were found to be important to students learning online (Davidson, 2019; Mishraa et al., 2020; Murphy et al., 2020; Young, 2006).

These online student expectations regarding learning resources, feedback, communication, and the technical skills of instructors align with the recommended best practices for online instructors (Freeman & Jarvie-Eggart, 2019; Quality Matters, 2016; Quality Matters, 2018). This work sought to understand how the emergency online learning experience of first year engineering students can expand our knowledge of online students' needs and the recommended best practices for online instructors. The impacts of the COVID-19 pandemic on student lives inform online faculty about the exigence for flexible methods of instruction, as well as shed a light on systemic socioeconomic inequities.

2.1 STUDENT EXPERIENCES LEARNING ONLINE DURING COVID-19

Studies of students learning online during the COVID-19 pandemic have provided an essential setting for understanding the results of this work, revealing student preferences for instruction methods, as well as the impacts of the pandemic on their lives and learning. Absent the ability to learn in person, students learning online during the pandemic have expressed preferences for synchronous classes (De Souza et al., 2021). Synchronous classes provide students with a real-time interactive experience, closer to that of in person learning. As a result, students in synchronous classes during the pandemic indicated greater learner satisfaction (Mohandas & Mentzer, 2021) than those engaged in asynchronous formats. Class format (synchronous vs. asynchronous) may be especially important, as studies have documented the reduction in student motivation when learning online during the pandemic (Aguilera-Hermida, 2020; Liu et al., 2021; Means & Neisler, 2021; Wang, 2021). Synchronous classes may be more motivating for online students, as motivation was found to be higher among undergraduate engineering students taking synchronous classes during the pandemic (De Souza et al., 2021). The pandemic not only affected students' motivation, it also impacted their ability to be mentally and physically present in online classes.

Studies of students during the pandemic have also documented the unique impacts the pandemic itself has had on students' personal lives. During the CODIV-19 outbreak, mental health emerged as a major concern for students. Students' ability to learn suffered during the pandemic as a result of these mental health impacts (Aleksejuniene et al., 2022; Blankenship & Jones, 2021; Herold & Chen, 2021; Hilliger et al., 2021). Students struggled to focus on academics when experiencing depression, stress and anxiety. Mental focus and ability to study were also impacted by altered learning environments during the pandemic. In addition to mental impacts, the pandemic influenced students' physical ability to study and access online classes. Some students, especially those of lower socioeconomic status, experienced a lack of dedicated study space during the pandemic (Lagi, 2020; Thompson & Rodriguez-Nikl, 2021). Economic disparities also caused some students to struggle with access to computers and the internet during the pandemic (Hart et al., 2021; Herold and Chen, 2021; Jaggars et al., 2021; Jones & Chacko, 2021; Lagi, 2020; Landa et al., 2021; Means & Neisler, 2021; Naik et al., 2021; Noor et al., 2020; Pokhrel & Chhetri, 2021).

Taking students' preferences and needs into account, many studies have documented effective teaching methods or instructional responses during the pandemic (Abel, 2021; Ally et al., 2022; Bakir & Phirangee, 2021; Dietz et al., 2021; Hart et al., 2021; Heath & Shine, 2021; Magana et al., 2022). However, few have focused solely on student advice for online faculty. Murphy et al. (2020) did ask students, among other interview questions, what professors should do differently to improve delivery in online courses. Students in their study indicated that faculty should keep using learning management systems (LMS)s, managing courses, engaging their students, communicating constantly, being understanding and flexible, and leveraging technology. Students in their study also said that faculty could improve their online course delivery through more engagement, increased leveraging of technology, better course management, better use of the LMS, and more constant communication. Our study expands upon this work by focusing solely on first-year engineering student advice for online faculty, as well as providing suggested faculty instructional responses. Existing efforts to address online course quality inform current understandings of expectations from online instructors, providing the framework through which we view our results.

2.2 ONLINE COURSE QUALITY

With the rising popularity of online programs to accommodate students who are bound by time and place, efforts to ensure the quality of online courses have emerged. The established standards for quality in online education provide context for examining the students' needs expressed in this study.

The University of Maryland system has been among the leaders in the online education quality effort for decades. From 1997–2000, their Web Initiative in Teaching project developed a Peer Course Review for Online Learning Rubric (Sener, 2019). Within this Rubric, peer reviewers internal to a faculty member's institution used a four-point scale to rate online and hybrid courses from poor to superior. This became the seed work which ultimately led to the 2003 Quality Matters (QM) project that created an assessment rubric including eight general standards and 42 specific standards used by inter-institutional peer-review teams to assess and certify the quality of an online course (Quality Matters, 2018). Faculty and education experts participated in the regular rubric updates to ensure alignment with best practices and educational research. Faculty who have applied the QM Rubric in their classes noted better alignment of assessment and activities with objectives, as well as increased course accessibility, resulting in easier student navigation of the online course and learning outcome improvements (Finley, 2012; Wang, 2019). Due to the success of the QM Rubric, its use has grown well beyond the MarylandOnline Community. As of 2020, QM had trained more than 52,000 faculty and staff from over 1,300 member institutions, among all 50 states of the US and 20 countries (Zimmerman et al., 2020). Other university systems have developed rubrics and standards for their online courses, including the Michigan Community College Virtual Learning Collaborative scale for rating online courses (Michigan Community College Virtual

Learning Collaborative, 2020), the California State University-Chico Rubric for Online Instruction (California State University Chico, 2020), and the Monterey Institute for Technology and Education Online Course Evaluation Project (The Monterey Institute for Technology and Education, 2005). However, the QM rubric became the most widely used outside of its developing organizations, likely due to its inter-institutional peer review process creating a collaborative network across universities. In fact, as of 2021, Quality Matters was implemented at two-thirds of the US News & World Report's Best Online (bachelor's) Programs (Quality Matters, 2021). Quality Matters has emerged as the organization that sets the standards for online course quality. Their efforts to address quality in online instruction also include identifying the essential skills and competencies of online instructors themselves. In 2016, the MarylandOnline organization performed a literature review examining 196 papers for online instructor and teaching competencies (Diehl, 2016). Based on this research, Quality Matters published an Online Instructor Skillset (OISS) that included the following six key areas of competency for online instructors: institutional context; knowledge of online teaching technologies; instructional design requirements for online courses; pedagogy of online teaching and learning; online course assessment; and social presence, including effective communication (Quality Matters, 2016). These six areas of competence are implemented as a theoretical lens through which to view the results of this work. This theoretical framework was chosen because it includes online instructor competencies based on published online education research established by the premier organization addressing quality in online education. Viewing the results through this framework allowed us to determine whether the currently suggested skills for online instructors align with the recommendations students have based on their self-perceived needs.

3.0 THEORETICAL FRAMEWORK

Quality Matters mapped individual skills within the OISS onto their Teaching Online Certificate program (Quality Matters, 2022). Within this document, a breakdown of the sub-skills required within each competency area is provided. The OISS recommends that faculty understand the institutional context of their online teaching. This includes understanding student discipline, behavior, academic integrity, and evaluation policies. It also means that instructors understand student privacy, disability, and copyright rules and regulations. The OISS suggests faculty possess knowledge of online teaching technologies. This includes an understanding and ability to use typical computer programs like word processors and web browsers used for online teaching, proficiency in the course learning management system (LMS), maintaining a secure computer operating system with updated anti-virus software, the ability to identify relevant technologies for course objectives, the ability to help students with basic technical issues, and understanding the need for equitable access to learning technologies. When it comes to the instructional design requirements for online courses, the OISS advocates that instructors be able to judge and select course resources, communicate their expertise, and be aware of quality assurance standards for online courses. Pedagogy recommendations within the OISS pertain to understanding the importance of motivation in active learning, modeling time-management, fostering student engagement, and understanding learning theory, including how learners' social, cultural, and religious perspectives affect learning. With regards to online course assessment, instructors should understand how to select and design assessment online, provide timely and effective feedback, involve students in self-assessment, curb academic dishonesty, link assessments to outcomes and activities, and assess the effectiveness of their own teaching. The OISS suggestions about social presence in online teaching include understanding certain factors (cultural, cognitive, emotional, and disability status) that can impact student communication online, modeling and fostering effective communication, managing conflict, maintaining a presence, and effective use of internet-based communication technologies.

Each of these six areas of competencies, and their component skills, provided us with a theoretical lens for the viewing of the results of this work.

4.0 RESEARCH QUESTIONS

As concern arose about whether the university would continue to be online in fall 2020, we questioned what students might want to change or improve about their online learning experience. Partnership approaches to learning are on the rise, such as through student-faculty learning communities, but institutions rarely seek pedagogic advice from students (Healy et al., 2014). Our intent with this research focus was to engage students as partners in the process of improving online instruction. Since first-year students seemed the least likely to have developed the necessary self-regulation and time-management skills for success online, we were particularly interested in their perspective. Thus, our research questions were as follows:

1. What advice do first-year engineers (FYEs) forced online have for faculty teaching online?
2. How might faculty alter their teaching in response to the students' advice?

5.0 METHODS

Our approach in asking students for teaching advice was grounded in the liberation pedagogy of Paulo Freire, in which education is a mutual process between students and faculty to free all involved from traditional systems of oppression (Freire, 1970). By asking for and responding to online student advice about teaching, this novel approach to research turned students into co-creators in online pedagogy development. Trusting that the lived experiences of first-year college students themselves learning online during the pandemic can provide insight into good online instruction, this study uniquely asked novice learners in higher-education to provide advice for online faculty. Recognizing that faculty should respond in partnership to students' needs, this study also provided faculty suggestions for instructional responses to that advice.

The study took place at Michigan Technological University, a US Midwestern university known for its engineering and science programs. This multi-methods study included two parts: FYE advice for online faculty, provided through a spring 2020 end-of-year group assignment, and faculty responses and ideas related to the student advice, gathered in two follow-up faculty workshops in the fall of 2020.

5.1 POSITIONALITY STATEMENT

Our research team recognizes the influence that our individual lived experiences and perspectives have on the research process (Walther et al., 2013). Positionality can influence the research topics, theories of knowledge creation, ontologies developed, methodology utilized, relation to participants, and communication (Secules, et al., 2021). In this study in particular, prior experiences teaching and learning online, and relationships to student participants may have influenced the researchers' perspectives. Two members of the team had extensive experience teaching online prior to the pandemic, have previously published about best practices in online instruction, hold beliefs in the efficacy of well-designed online instruction, and were motivated to understand how the student experience of emergency online instruction might inform online instruction in general. All members of the research team held positions at Michigan Technological University at the time of this study, bringing unique perspectives on the COVID-19 experience within the context of our University. Three members of our research team were instructors who taught courses within the first-year engineering program during the spring 2020 semester. The lived experiences of these faculty provide insights specific to the classroom experience during the COVID-19 pandemic and the experience of suddenly shifting to online learning. Similarly, two co-authors worked within the University's Center for Teaching and Learning during the spring 2020 semester. The lived experiences of these team members also provided perspectives related to the faculty's emergency transition to online teaching and learning. Although the majority of the research team provide faculty or administrative perspectives, one member of the research team was a graduate student at the University and enrolled in classes during this time, who also held an appointment as a teaching assistant for the FYE courses during this study's development and data collection, providing perspectives of both teacher and student.

5.2 PARTICIPANTS

Within the FYE program, across four offerings of the same course, 233 students completed the group assignment working in 67 teams. Demographic data was not collected. However, according to the Office of Institutional Research at Michigan Technological University, in the 2019–2020 school year, the College of Engineering was 0.11% American Indian/Alaskan Native, 0.68% African American, 1.5% Asian/Asian American, 1.8% Hispanic/Hispanic American, 79.3% White, 12% International Students, and 3.9% Multiracial. Women earned 24.6% of the undergraduate engineering degrees awarded in 2018 at Michigan Technological University.

The faculty workshops included 26 participants in one workshop at Michigan Technological University in September 2020, as well as 15 participants at a second workshop conducted during the Educational Technology Organization of Michigan (ETOM) Fall 2020 Virtual Conference in November 2020 (Jarvie-Eggart & Singer, 2020). Attendance at the workshop internal to Michigan Technological University included 10 participants from the college of engineering (38%) as well as faculty from social sciences, humanities, mathematics, computer science, biology, military science, and Michigan Technological University Honors College. Attendance at the ETOM workshop included only one engineer (7%), as well as faculty from chemistry, industrial science, fine arts, social sciences, mathematics, and health sciences.

5.3 DATA COLLECTION AND ANALYSIS PROCEDURES

At the end of the 2020 spring semester, FYE students, who had transitioned to online learning mid-semester due to COVID-19, were given an assignment to provide advice for faculty who might teach online in the upcoming fall semester. This assignment was an extension of an assignment we had given the previous year that asked end-of-year FYE students to provide advice for the following year's incoming FYE students (Jarvie-Eggart, Singer, & Mathews, 2019). It was also expanded in 2020 to include advice for online students; see Singer & Jarvie-Eggart, 2021, for the results of the student focused advice. The assignment asked students to create a "PowerPoint slide with your advice for online faculty. This should include any suggestions your team members have for creating quality online courses. [2 points]." The assignment was completed as an in-class activity that was due at the end of class. Students worked within their semester-long, four-person teams to complete the assignment. All student teams completed this assignment across all four classes. Guidance provided to students indicated that "each tip should be a legitimate suggestion which would help a first-year student succeed in college or the online class format. Sarcastic comments will earn no points."

An institutional review board (IRB) for human-subject research exemption application was submitted to gain access to the assignment and workshop data for the purposes of this study. Permission was granted, and the project was deemed "exempt" from full IRB review by the IRB Director.

Qualitative analysis of the student advice was based on analytic induction, with a focus on allowing themes to emerge from the data at hand, while still being informed by prior work (Case & Light, 2014; Patton, 2015; Vedel et al., 2020). Responses were anonymized and coded for common themes by two researchers independently, meeting to discuss, working through constant comparison, and repeating coding cycles as necessary until theoretical saturation occurred (Corbin & Strauss, 2015). In this study, initial codes were deductively proposed from previous research (Jarvie-Eggart, Singer, & Matthews, 2019), while at the same time data was examined for new emergent codes. A codebook defining the codes was created, which was then maintained and updated with each coding cycle until codes became stable. This combined inductive-deductive approach for thematic coding without strictly separating the deductive and inductive cycles has been utilized in other engineering education research (Buswell, 2021). Descriptive (or topic) coding was utilized, in which codes encompassed short phrases or a single word describing the topic of the data. Simultaneous coding techniques were also utilized, in which the same data (passage of text) could be interpreted as pertaining to multiple codes (Saldaña, 2016). Codes were grouped

together into larger themes for reporting based on the QM OISS (Quality Matters, 2016). The theoretical framework (QM OISS) was applied as a lens to make sense of the results of the coding, and to determine any disconnects between the needs and suggestions of online students and the essential skills of online instructors promoted by the premier organization addressing quality in online education. Major codes are shown in Table 1 within their larger theme groupings, shown in bold.

Table 1 Major Codes and Themes.

CODE		DESCRIPTION OF CODE
INSTRUCTIONAL DESIGN		
CI	Organization and Design of LMS	Having materials in the LMS organized and easy to find, having materials posted in a timely manner.
OLR	Online Learning Resources	Providing resources specific to the online course: videos, supplemental readings, notes, activities, review sessions, and requests for additional practice material.
R	Routine	Maintaining a course routine: establishing instructional, assignment, and grading schedule.
WL	Workload	Student workload in an online environment: don't give too much or too little work, be mindful of workload in other classes, do not make classes too easy.
LP	Lecture Preparation (asynchronous)	Positive comments about video/lecture prep and recorded videos.
LP-	Lecture Preparation (asynchronous)	Negative comments or dislike of video/lecture prep and recorded videos.
A	Synchronous Class	Preference for, or positive comments about, the use of Zoom meetings, attending class, delivering lectures in online class, and maintaining the schedule or routine of in-person classes.
A-	Synchronous Class	Dislike of, or negative comments about, the use of Zoom meetings or requirements for synchronous class.
LC	Live Lecture Capture	Capturing live lectures (not pre-recorded lectures) or requests for it.
ACADEMIC GRACE		
P	Patience	Patience with students, their struggles with the online environment, and technical difficulties.
X	Flexibility	Deadline flexibility, assignment and general flexibility, and awareness of time changes/time zones.
U	Understanding	Understanding what students are going through, understanding during grading, generous, open to student feedback, and compassionate.
SOCIAL PRESENCE		
EL	Email	Instructor's use of email as a communication tool: frequency of emails, need for faculty to monitor their email better and respond promptly.
CD	Communicating Deadlines	Communicating due dates and deadlines, reminders, and weekly update videos.
CM	General Communication	Communication to students that is not email or due date specific.
F	Faculty Interaction	Wanting more faculty interaction or better-quality interactions in the online environment, desiring remote office hours.
PEDAGOGY		
TW	Teamwork	Discussion of preferences for group work and ways to improve group activities in the online environment.
SSI	Student-Student Interaction	Employing active learning and promoting student-student interactions.
EN	Student Engagement	Degree of attention, interest, and optimism toward context/course. Positive advice related to student engagement in an online environment.

(Contd.)

CODE		DESCRIPTION OF CODE
EN-	Negative Student Engagement	Degree of attention, interest, and optimism toward content/course. Negative comments toward student engagement in an online environment.
ASSESSMENT		
EX	Exams	Advice related to exam structure of course: discussion of time allotments and open-notes structure. Student concerns regarding cheating in the online environment.
G	Grading	Grading or receiving feedback on course assignments in a timely manner, providing rubrics to students, making grades available in LMS.
TECHNOLOGY		
CT	Course Technologies	Instructor competency of course technologies: making sure everything works, understanding how to use the LMS and other course software.
FIC	Faculty Internet Connection	Instructor internet connection quality and its importance for class.
INSTITUTIONAL CONTEXT		
IR	Institutional Resources	Awareness of university resources such as learning centers, counseling services, and reference to campus policies (exams, lateness).

In the wake of COVID-19, IDEAhub, our university's incubator for pedagogical innovation, partnered with our Center for Teaching and Learning to offer a series of "Online Education Sessions" to support faculty and staff in the sudden transition to online learning. In September 2020, results from the qualitative analysis of FYEs advice were presented to potential online faculty in a workshop. After a short question-and-answer period, 26 faculty participants were sent into breakout sessions to discuss and brainstorm instructional responses to the advice offered from students. Four breakout rooms were provided, each with its own topic based on the themes which emerged in the student advice: Instructor Presence, Academic Grace, Supporting Online Students, and Learning Management System (Canvas) Organization. Faculty selected which breakout room they wanted to be placed into by topic. A community (Google) document was created with overarching questions to guide the discussion in each room. The faculty attendees were asked to record their ideas collaboratively within the community document and report back to the main session. A facilitator was assigned to each room to keep discussion on topic.

A similar workshop was conducted at the Educational Technology Organization of Michigan (ETOM) Fall 2020 Virtual Conference in November 2020 (Jarvie-Eggart & Singer, 2020). Attendance at this conference included faculty and teachers from universities and schools across the state of Michigan. It was suspected that discussions on LMS organization might devolve into the nuances between the various LMSs used at different institutions. Thus, at ETOM, the breakout room discussion regarding the LMS was eliminated. A facilitator/note taker was assigned to each room to encourage on-topic discussion. Again, faculty participants selected which breakout room they wanted to be placed into by topic. The 15 faculty participants in this workshop were initially asked to type their comments in a provided community document (Google doc), and additional details were filled in by the facilitator as discussion occurred.

In both faculty sessions, the resulting collaboratively produced community document was naturally organized by thematic topics during their creation. No additional coding was conducted. The suggestions provided by the faculty participants of both workshops are summarized in the results section.

5.4 TRUSTWORTHINESS

Several methods were used to increase the overall trustworthiness of the results. The constant comparison method was used during data analysis to increase the validity of findings (Corbin & Strauss, 2015). Through investigator triangulation, two researchers coded the data independently, meeting to discuss and resolve differences, as a means of reducing individual subjective bias (Flick,

2018). Although some of the researchers were instructors in the classes where data was gathered, data was not accessed for analysis until after the semester was complete. Additionally, both the faculty workshops provided a means of achieving greater trustworthiness of the results through providing time and space for peer review (Corbin & Strauss, 2015).

6.0 RESULTS & DISCUSSION

Student advice most frequently pertained to the *Instructional Design* of the course, followed by *Academic Grace* (defined as understanding, flexibility, and patience), *Social Presence* in online classes, *Pedagogy*, *Assessment*, *Technologies*, and *Institutional Context*. Themes within the results aligned with the six online instructor competency areas of the OISS, with the exception of the emergent theme of *Academic Grace*. There may be some overlap between the code for understanding within Academic Grace and the OISS social presence and technologies area of competencies. Within the OISS, social presence is meant to include instructors' understanding of various factors (cultural, cognitive, emotional, disabilities) that affect online communication (Quality Matters, 2022). However, students in this study were requesting understanding with much more than impacts to their communication in the online classroom. Additionally, the technologies competency area of the OISS recommends instructors understand the need for equitable access to learning technologies (Quality Matters, 2022). When discussing struggles with their own internet connections, the students in this study expressed a need for understanding and patience. The pandemic, as well as the switch to emergency remote learning, greatly impacted students' personal lives in all areas, well beyond internet access. As a result, students requested greater flexibility and patience to deal with these impacts. Thus, Academic Grace (understanding, flexibility, and patience) emerged as a stand-alone theme alongside the six OISS competency areas. Results presented and discussed in this section include those from the qualitative analysis of FYE student advice for online faculty as well as results from the faculty-organized summaries of their proposed instructional responses to that advice.

Advice provided by FYEs gave us insight into what they need from online instructors, while the faculty workshop responses built upon the FYE student suggestions with additional concrete actions that online faculty might take to improve their courses and teaching. When we view all these results in the context of the literature, new recommendations can be made for online courses and instructor training. However, it should be noted that the majority of the online classes that students experienced in the spring of 2020 were due to an emergency transition to online. These were not courses developed for online delivery and may not reflect the best practices of online learning, but they do reflect the practices of faculty who were forced to transition to online rapidly with little training or preparation.

6.1 INSTRUCTIONAL DESIGN

The most commonly mentioned theme that emerged from the student advice was that of the importance of good Instructional Design in online courses. Included within this theme were comments pertaining to the *Organization and Design of the LMS* in an easy-to-follow manner (CI), students' desire for additional *Online Learning Resources* (OLR), their need for established *Routine* (R), students' desire for a balanced *Workload* (W), positive and negative comments about synchronous *Lecture Preparation* (LP/LP-), positive and negative comments about *Synchronous Classes* (A/A-), and comments about *Live Lecture Capture* (LC).

FYE students advised faculty to keep the LMS organized and easy to navigate. This included maintaining a consistent LMS structure for the entire semester and discussing the LMS setup with students. Students also advised that faculty should check that the LMS is prepared to be used by students before each class period, including testing to make sure all links work within the LMS. In the words of one student:

> "Post the materials for the day at the beginning of the day, or before the day they are meant to be gone over."

In considering course organization, faculty typically design LMSs to support the existing structure and instructional techniques of the course (Arbaugh, 2010). However, navigating online courses may not always be easy for students. The variation in LMS organization between faculty members is often a source of student frustration (Cudney et al., 2017). Faculty workshop participants suggested organizing courses in a consistent and predictable way, particularly in the first-year courses. Faculty also advised universities to provide a list of minimum expectations for courses in their LMS as a means of ensuring uniformity across courses. Faculty participants recommended that institutions provide a showcase of exemplary online courses to help instructors in their online course design. When it came to familiarizing students with the LMS, faculty suggested providing short introductory videos orienting students to the course or developing an assignment that helps students become familiar with each course, as consistent with best practices (Abdulla, 2012; Freeman & Jarvie-Eggart, 2019; Ladyshewsky, 2013; Richardson et al., 2016; Quality Matters, 2018). Research on students' learning online during the COVID-19 pandemic has also suggested training students in the appropriate technologies for online learning, such as the LMS (Lei & So, 2021).

Within the theme of instructional design, students also expressed a desire for additional online learning resources specific to the course material. Even prior to the pandemic, students desired access to online learning resources, such as e-books, live lecture broadcast, lectures provided in multiple media formats, the ability to play lectures offline, online study spaces with requestable tutors, live online chats, and mobile apps (Pechenkina & Aeschliman, 2017).

Instructional design concerns also included a balanced workload. Students indicated that the amount of work should be consistent with the workload of an in-person class.

> "Try not to make more work for students compared to in-person classes, at the same time, don't give less as it won't help with students' learning if you do."

A preference for routine within the design of their instruction was expressed within student advice, especially with regard to assignment due dates and grading schedules. FYE students also advised faculty to keep a consistent schedule for the class to avoid further confusion in the online environment.

> "Make virtual classes at their normal times so students can have a schedule."

As first-year students are still developing the self-regulation skills required for online learning, including self-discipline and time management, they may benefit from the additional calendar structure provided by synchronous learning. The lack of their normal routines due to sheltering at home during the pandemic was another difficulty students faced during the pandemic (Blankenship & Jones, 2021). Maintaining a normal schedule for class may be one way in which instructors can reduce stress on students.

Fully online courses have been offered in asynchronous format, with no specific log-on times, and synchronous format, where content is typically delivered through a video conferencing platform at a scheduled time allowing for face-to-face conversation between faculty and students (Chen et al., 2004). Although students do find both formats useful, some pre-pandemic studies have indicated student preferences for synchronous classes (Gillingham & Molinari, 2012; Peterson et al., 2018). A similar preference was found among mechanical engineering students during the pandemic due to increased student engagement and motivation in synchronous classes (De Souza et al., 2021). This preference was exhibited in our FYE students. The coded student advice revealed more positive comments towards synchronous style classes than asynchronous. Students commented on their ability and the ability of their peers to participate in synchronous lectures and ask questions to the teaching team with immediate feedback. In the quote below, a student is referring to Huskycast, the university's online video storage platform.

> "Using Zoom is way better than Huskycasts, It allows us to actual(ly) talk and ask question(s) in an easy and quick form."

Engineering instructors teaching during the pandemic were more likely to utilize a synchronous format for remote virtual classes, often providing recordings of classes to watch later (Fadda et al., 2021; Thompson & Rodriguez-Nikl, 2021). Real-time virtual classes may have been selected because they required less pre-work and transition effort from faculty, who were pivoting quickly online during the pandemic, and also provided much needed human interaction during isolation (Fadda et al., 2021). One instructor chose to teach synchronous live classes online during the pandemic both in response to student requests and out of a desire to maintain social presence in the classroom (Dietz et al., 2021). Increasing students' sense of instructor presence may lead to greater student satisfaction with the experience. Among FYEs studying online during the COVID-19 pandemic, learner satisfaction was higher for synchronous versus asynchronous modes of instruction (Mohandas & Mentzer, 2021). Students may have enjoyed this format for its ability to relieve some of the social isolation that accompanied the COVID-19 pandemic.

However, some FYEs also recognized the need for accommodation in those times they could not attend class and suggested synchronous classes be recorded for later viewing. These students cited flexibility and the ability to work at their own pace as their main reasons for wanting recorded lectures. The faculty in workshops suggested providing asynchronous work options for students who miss synchronous secessions. These faculty recognized the desire of many students to attend synchronous online courses, while also acknowledging their need for flexibility in attendance method. A review of the COVID-19 literature found that students learning online during the pandemic have expressed the need and desire for both attending synchronous video sessions as well as watching pre-recorded videos (Pokhrel & Chhetri, 2021). Recording live classes can provide students with more flexibility in their attendance method (Fadda et al., 2021), and course grades have been shown to increase with lecture attendance, whether in person or online (Weiling & Hofman, 2010). Instructor-generated videos have also been shown to improve the performance of online students, including a higher pass rate and lower attrition rate (Hegeman, 2015). University students studying online during the COVID-19 pandemic indicated they re-watched online videos, pausing them to take notes (Mishraa et al., 2020). Thus, making recorded lectures/classes available will benefit the students. Recording lectures/classes need not be time consuming, as there is little need for editing of recorded lectures/classes. Students have been shown to like the unscripted portions of lectures, such as examples, jokes, and interruptions, which faculty often edit out (Hughes et al., 2019).

In contrast, the asynchronous format was chosen and promoted by some instructors during the pandemic as a means of providing maximum flexibility to students and instructors (Dietz et al., 2021; Heath & Shine, 2021). These instructors recognized the time and schedule disruption the pandemic had brought to student lives. Preference for lecture format may depend on the individual circumstances and life-stage of the learner. Meanwhile, some engineering faculty who taught online during the pandemic believed that neither asynchronous pre-recorded nor synchronous live lectures were better in all situations (Abel, 2021).

6.2 ACADEMIC GRACE

A new theme emerged in addition to the OISS recommended areas of competency: that of Academic Grace, which encompasses the codes *Understanding* (U), *Patience* (P), and *Flexibility* (X). FYEs advised that online faculty should be understanding about the challenges faced while learning in the online environment, as well as the impacts of the pandemic on their personal lives. As a result of these challenges and impacts, they required patience and flexibility from their faculty.

Understanding has been observed among the characteristics of good in-person teachers (Crawley, 2013; DiBenedetto, 2011; Slate et al., 2011). It is also among the traits of excellent engineering professors (Pomales-Garcia & Liu, 2007). Faculty understanding and empathy were especially important during the pandemic. Being able to consciously take on the perspective of others has been considered a central component of empathy building for engineers (Walther et al., 2017). The abilities to emotionally connect with students, care for them, and empathize with

them were found to be necessary skills for online faculty, as students learning online during the pandemic desired faculty understanding of their new barriers and stressors and what they were going through (Mishraa et al., 2020). Students mentioned the difficulties of learning from home, referencing a lack of dedicated study spaces and frequent interruptions by family members. Some students detailed the difficulties of logging onto class from their dining room tables alongside parents and siblings, who were also working and learning online. The following quotes explain the students' desire for faculty understanding of their struggles with distractions while learning online from home:

> "Understand that not everyone has a good space to study and work, and will struggle and may need extra time."
>
> "Be considerate with work, there are a lot of distractions at home for us students that make learning difficult, distractions we can't do anything about."

Dedicated space to study in at-home environments was also a struggle for students during the pandemic. International students, especially those in developing countries, may lack a solitary place to study at home (Lagi, 2020). US engineering students from higher economic backgrounds were more likely to have a quiet place to study during the pandemic (Thompson & Rodriguez-Nikl, 2021). Faculty should be aware of the inequities within their classroom communities regarding access to quiet study spaces.

FYEs requested patience and understanding from instructors about their troubles with unstable home internet connections, which were not as reliable as campus connections for students.

> "Understand that students will possibly be experiencing technical difficulties (ex: bad Wi-Fi)."

Many students faced issues with access to the internet or computing resources during the COVID-19 pandemic (Hart et al., 2021; Herold & Chen, 2021; Means & Neisler, 2021). These issues were more common in the lives of lower-income students, minoritized students, and rural students (Jaggars et al., 2021). International students, especially those from developing countries, which may lack network infrastructure, were also likely to struggle with access to the internet and computers (Jones & Chacko, 2021; Lagi, 2020; Landa et al., 2021; Naik et al., 2021; Noor et al., 2020; Pokhrel & Chhetri, 2021). To address these distributive justice issues, it is recommended that online programs offer to print and mail materials and loan tablets to students forced online due to the pandemic (Lagi, 2020). However, these efforts may not be enough. During the COVID-19 transition, many California community colleges did practice technology distribution and still estimate that about one third of students will face barriers accessing class despite these efforts (Hart et al., 2021).

Overall, personal and school responsibilities tended to increase for students due to both the pandemic and the transition to emergency online instruction (Herold & Chen, 2021). Learning disruptions were caused by their own illness and caring for sick family members (Herold & Chen, 2021; Pokhrel & Chhetri, 2021). Caring for children became an issue, especially for female students (Means & Neisler, 2021). Grocery shopping became a risky activity (Blankenship & Jones, 2021). University students were also experiencing mental health impacts of stress and anxiety, affecting their ability to focus (Herold & Chen, 2021; Hilliger et al., 2021). As a result, faculty teaching online during the pandemic reported a reduction in student engagement and performance (Simms & Baker, 2021).

Understanding our students requires not only attempting to understand where they struggle with technical concepts and course material, but also attempting to put ourselves in our students' shoes and empathize with the difficulty of life during a pandemic, the technical difficulties of online learning, and the struggle to develop the additional self-regulation required by online learning. Understanding of FYEs' needs has been promoted as a means to help them through the stress of learning online during the pandemic (Dofe & Kurwadkar, 2021). Faculty also had specific suggestions for creating greater understanding with students. When in doubt, faculty suggested

that they can ask students what they need to succeed. Faculty recommended sharing real-life stories with the students to demonstrate empathy and humanize instructors.

Online students have been shown to prefer instructors who can adapt to their needs (Young, 2006). Understanding of students' unique circumstances often led faculty to respond with greater flexibility with regard to deadlines and instructional delivery methods. The work of Murphy et al. (2020) showed that online students desired instructor support through understanding and flexibility during the pandemic. Flexibility is not uniquely required of online instructors. Flexibility has also been known to be among the characteristics of good in-person educators (Crawley, 2013; Slate et al., 2011). Students predict that future online educators will require flexibility, especially in regard to class requirements, schedules, and methods of communication (Davidson, 2019). Students in our study requested flexibility in many areas, but most often with assignment deadlines and the acceptance of late submissions. COVID-19 itself was a cause of students missing classes or reducing study time. Some took time off for their own or a family member's illness or were actively isolating from others in their home, creating a need for deadline flexibility from instructors.

> "Try to be flexible and understanding when students ask for extensions as this is a very uncertain and difficult time for many of us, where the health and safety of ourselves and families may take priority over school."

Extending deadlines during the pandemic allowed engineering students to continue learning online despite challenges (Marquez & Garcia, 2021). Dofe and Kurwadkar taught FYEs online and indicated that they incorporated flexibility about deadlines as a means to help them through the stress of the pandemic (Dofe & Kurwadkar, 2021). Faculty workshop participants suggested offering "slip days," where students are allowed a certain number of 24-hour due-date extensions to use without explanation.

Student preference for recording live lectures was often accompanied by the codes for flexibility and understanding. Live lecture capture is a way for faculty to act on their understanding of student needs, building flexibility into the course itself to accommodate students who must miss the class. Instructors do not have to apply synchronous and asynchronous formats as binary options within online course design. Educators create the world of online education and should not limit themselves to false dichotomies within course structures. The most accommodating option for all online learners would be to offer synchronous classes with the flexibility to asynchronously complete any and all class sessions missed.

In 2020, Martin et al. coined the term "bichronous online learning" (p.1) to describe courses which blend synchronous and asynchronous methods. In bichronous courses, students can participate in the asynchronous portions of the course at their own convenience in time and location while still participating in synchronous activities as they occur, with the amount of synchronicity varying by course. Bichronous courses typically require material to be completed in the specified format but do offer a mix. The blended format has been suggested for use in massive open online courses (MOOCS) to take advantage of the benefits of both synchronous and asynchronous methods for online students (Xie et al., 2018). Demonstrating a need for the flexible bichronous class format, online students have been shown to desire live lecture broadcasts, lectures provided in multiple media formats, and the ability to play lectures offline (Pechenkina & Aeschliman, 2017). However, if ultimate flexibility were designed into a bichronous format, each learning objective could be met either through synchronous or asynchronous materials, based on student choice. In a truly flexible bichronous class format, learners could complete course materials, alternating their participation methods as life circumstances require. Indeed, some online instructors took a bichronous approach during the pandemic. For example, one FYE program offered a mix of faculty-recorded lectures and synchronous TA-lead design workshops during the fall semester of 2020 (Malladi et al., 2021).

In addition to understanding and flexibility, the final component of Academic Grace is patience. Patience itself has been identified as a desirable characteristic of in-person faculty (Crawley, 2013; DiBenedetto 2011; Slate et al., 2011). It may have been especially necessary during the sudden transition to online learning in the spring of 2020. Mishraa et al. (2020) argue that patience of

everyone involved in online learning during the pandemic would help us all, including faculty, students, staff, and administrators.

FYE students expressed a need for faulty patience as they struggled with the challenges of simply adjusting to online learning.

> "Please be patient. It is significantly harder to teach and learn only online. The nature of assignments and tests will have to change structurally to better fit the medium."

Students thrust online due to the COVID epidemic were forced to develop the skills to become online learners mid-semester. They requested patience from their instructors, indicating it was harder for them to learn online. Additionally, life disruptions caused by the pandemic affected their ability to participate in class, as many students experienced issues with access to computers, the internet, and quiet places to study, especially those of low income and international students (Hart et al., 2021; Herold & Chen, 2021; Jaggars et al., 2021; Jones & Chacko, 2021; Lagi, 2020; Landa et al., 2021; Means & Neisler, 2021; Naik et al., 2021; Noor et al., 2020; Pokhrel & Chhetri, 2021; Thompson & Rodriguez, 2021). As the diversity of online student populations increases, it is anticipated that patience will continue to be an essential characteristic of online faculty in the future (Davidson, 2019).

Faculty participants indicated ways of responding to students' expressed desires for Academic Grace (patience, flexibility, and understanding) in online courses. Faculty suggested starting with an attitude of "yes, and" to employ every tool possible to help students succeed, including incomplete grades, extra credit, course substitutions in a degree path, etc. On the whole, workshop participants agreed that although it is always possible that some students will "take advantage" of flexible policies, it is always better to extend Academic Grace where it is not warranted than to not extend Academic Grace where it is warranted.

6.3 SOCIAL PRESENCE

Codes within the Social Presence theme included those for communicating with students through *Email* (EL), *Communicating Deadlines* (DL), *General Communication* (CM), and students' expressed desires for increased *Faculty Interaction* (FI) in the online environment.

Communication itself is a means of building mutual understanding between faculty and students, about both faculty expectations and student needs. Even prior to the epidemic, students indicated that clear expectations, timely feedback, and effective communication are essential characteristics of good online instructors (Cohen & Ellis, 2004; Davidson, 2019). FYE advice regarding faculty communication included three sub-categories: general student-faculty communication, communication regarding assignment due dates, and communication through email. Students placed emphasis on clear and concise communication from faculty members to eliminate confusion about class expectations, assignment objectives, and course goals.

> "Make expectations of how the class will be run and graded clear, especially compared to in-person classes."

FYE advice highlighted the use of email as a method for faculty to communicate course announcements and updates. Students advised faculty to check their email frequently and to respond to students in a timely fashion. However, despite expecting faculty to respond to emails quickly, some students found it difficult to keep up with their own email and indicated they may even miss some themselves. Thus, students requested patience and understanding from faculty, essential elements of Academic Grace, when students were late responding to faculty emails. To ensure they did not miss important information, many students expressed the need for faculty communication through a multitude of different mediums, allowing students the desired flexibility to find information in a myriad of formats.

> "Communicate as much as possible via websites, email, etc. to ensure students have what they need to succeed."

Communications specific to course deadlines were also addressed in FYE student advice provided to faculty. Students advised faculty to provide clear due dates that are expressed in advance, so students have adequate time to meet them.

> "Make sure due dates are clear, you miss out on those small reminders in class when it's online."

The Quality Matters Higher Education Rubric requires that instructors communicate expectations for online classes (Quality Matters, 2018). Results from the faculty workshops yielded some suggestions when it came to communicating course expectations. Faculty recommended sending out a weekly reminder email with upcoming class information and deadlines. They also promoted sharing email guidelines with students to help clarify how quickly students can expect to get answers to emails (ex. 24-hour turnaround, 48-hour?). Research performed since the beginning of the COVID-19 pandemic has reinforced the importance of communicating with students forced online in emergency remote instruction (Marquez & Garcia, 2021; Mishraa et al., 2020; Murphy et al., 2020).

Online FYE students expressed a desire to have more dialogue with their faculty and more opportunities to ask questions, and they indicated that faculty should put in extra effort to interact with online students. Regular, substantive faculty-student interactions in online courses are required by the Higher Learning Commission and the US Department of Education (Code of Federal Regulations, 2020; Higher Learning Commission, 2020). Frequent and meaningful instructor-student interactions have been found to improve student achievement, satisfaction, and persistence online (Ladyshewsky, 2013; Richardson et al., 2016). Faculty-student interactions provide a venue for faculty to better develop an understanding of their students' needs as well as an awareness of the concepts and skills their students are struggling with in class.

> "Give students opportunities to ask questions or get help in smaller, more efficient, settings rather than within the entire class (coming into breakout rooms, staying after class)."

Faculty workshop participants recognized the need to solicit greater interactions from students in online classes and suggested various methods. Faculty suggested encouraging students to bring questions to class. Faculty also encouraged reaching out to students individually.

FYE students expressed a desire for more opportunities to ask questions and dialogue with their online faculty. Office hours are another platform for faculty interactions. Student advice included comments about holding office hours online, expressing a desire for them.

> "Please try to have some sort of online office hours. Even if it is by appointment only, but having a talk, face to face, can clear up issues better than email."

Pre-pandemic studies noted that online students tend to have a favorable attitude toward office hours (Edwards & Helvie-Mason, 2010). Remote students utilize online office hours as they would face-to-face office hours (Li & Pitts, 2009). Virtual office hours can provide a similar experience as face-to-face office hours, allowing students the opportunity to ask questions in a one-on-one setting (Freeman & Jarvie-Eggart, 2019). Faculty participants recognized the importance of holding remote (Zoom) office hours for students and suggested utilizing an appointment reservation calendar with a variety of times for students, especially those in asynchronous classes. Dofe and Kurwadkar encouraged instructors to offer extended office hours to accommodate students during the pandemic (Dofe & Kurwadkar, 2021).

6.4 PEDAGOGY

Advice within the theme of Pedagogy included expressed preferences regarding the use of *Teamwork* (TW), promoting *Student-Student Interactions* (SSI), and positive and negative comments about fostering *Student Engagement* online (EN/EN-).

Students learning online during the pandemic have expressed a preference for interactive learning (Jones & Chacko, 2021). Students in this study expressed a desire for group work to be incorporated into their online courses. While student advice did reflect some difficulty in maintaining group interactions in online environments, students advised faculty to keep group work within the structure of the online course.

> "Having teammates makes the online classes significantly easier."

Students also suggested that faculty promote active participation and collaboration within the online environment.

> "Break out rooms are super helpful for discussions as they're less intimidating than the large class with 100+ students, so including those sessions helps students stay engaged and have better collaboration."

There is also evidence that FYEs had difficulty fostering community in virtual environments during the pandemic, even in synchronous Zoom classes (Barker, 2021). Training may improve students' experiences working together. Teamwork facilitation and conflict resolution training were found to be helpful for students working in teams during the pandemic (Magana et al., 2022). Faculty workshop participants also advocated designating student leaders for breakout room discussions and popping in and out of them to interact with students. Bakir and Phirangee (2021) described best practices for promoting engagement in Zoom during the pandemic, including conducting ice breakers, using think-pair-share activities, conducting knowledge checks, initiating brainstorming discussions, utilizing case studies, and having students prepare minute papers. Dofe and Kurwadkar (2021) taught FYEs online and promoted the following means to help them through the stress of the pandemic: using Zoom breakout rooms for peer interactions, use of Flipgrid video discussion for active engagement, and use of social Zoom hours for active engagement.

Students also advised faculty to find ways to engage with students more in the online environment, with much of their advice centering around dialogue with students and offering students opportunities to ask questions.

> "Give students opportunities to ask questions or get help in smaller more efficient settings…"
>
> "Have a general question board where students can anonymously submit questions, and the whole class can see the response!"

The need for high-quality faculty interactions was also expressed by FYEs. Students indicated that faculty should make more effort than normal to engage with students in online settings. FYE students also suggested using discussion forums. In an asynchronous environment, implementation of online discussion activities can promote both faculty presence and student engagement (Wang & Woo, 2007). To promote a sense of community and discussion, it has been recommended that students be asked to post introductions to themselves at the onset of online classes (Freeman & Jarvie-Eggart, 2019; Quality Matters, 2018). The Quality Matters Higher Education Rubric also requires that instructors clearly state expectations for discussions (Quality Matters, 2018). Clear expectations for discussion etiquette and a well-designed rubric for grading discussions will help ensure quality participation (Freeman & Jarvie-Eggart, 2019).

As a note of caution, the students admonished faculty against requiring students to turn on their cameras and advised faculty to be understanding of their unique home learning environments during the pandemic.

> "Don't force in-class participation, again you do not know what environment they are in."

Home learning environments may provide barriers to student engagement in synchronous online courses.

6.5 ASSESSMENT

Student advice with regard to Assessment pertained to two specific codes: *Exams* (EX) and *Grading* (G). Exams are a critical part of summative assessment in most college courses. Students urged faculty to consider the format of exams being given. Students encouraged faculty to show flexibility with exams, allowing students a larger time frame to complete the exam. Additionally, concerns of cheating and use of outside resources were expressed by students. To address this, FYE students suggested faculty adopt open-note exams.

> "If you decide to have an online final just make it open book/note because most people will use their notes regardless."

Abel argued that faculty teaching online during the pandemic should "understand that everyone is adapting" and promoted multiple small-stakes assignments in favor of one big exam (Abel, 2021, p.5).

Students suggested that faculty could reduce the challenges in the online environment and promote better understanding of course expectations and material through clear grading rubrics and quick grading turnaround time

> "Timely grading of assignments is always important and helps a lot with online instruction so we know what we can do better on."

Many students requested instructors be more flexible about due dates for assignments.

> "Be more lenient on due dates. A lot of problems can occur for students in an online learning environment."

Both faculty and students tend to agree that a 10% reduction in points per day late is an effective grading policy to be enacted when extenuating circumstances are present (Santelli et al., 2020). Surely, the COVID-19 epidemic is a prolonged global extenuating circumstance and an argument in itself for leniency with grading policy. A few students also commented that they should be provided with less severe, or more lenient, grading when taking online classes. In response to this advice, faculty workshop participants suggested providing students with one or two automatic make-ups for testing.

LMSs can automate both assignment submission and return, as well as auto-grade assignments, resulting in faster assessment feedback and automatically updated gradebooks for student viewing. Prior to the pandemic, students were shown to believe that online learning was helpful for assessment, promoted faculty-student discussions of assignments and grades, allowed for prompt feedback, and increased the ease of student access to graded work (Gillingham & Molinari, 2012). During the pandemic, low-stakes computer-corrected quizzes assembled from random question banks were used by some instructors to hold students accountable to stay current in class (Fadda & Thamban, 2021).

6.6 TECHNOLOGIES

Codes included in the theme of Technologies used in online classrooms were those for *Course Technologies* (CT) and *Faculty Internet Connection* (FIC). A study of the digital transformation of learning space since the COVID-19 pandemic noted two primary areas in which technologies were implemented: digital education, including Zoom, LMS, and social media; and digital subjects, including learning analytics and various software specific to courses (Bygstad, 2022). Within this study, FYE students' advice focused on the digital education realm, perhaps because they were offering general advice applicable to faculty across all courses. Student advice with regard to using the course technology pertained primarily to adequately using the LMS (Canvas). Students also suggested enabling and leveraging the LMS calendar functions for better deadline communication and warned faculty against creating their own course websites as an alternative to utilizing the campus LMS:

> "If you can put a course on [C]anvas, try not to use a third-party website that costs extra to students."

Students particularly desire online instructors with computer skills who can use multimedia tools in online learning (Davidson, 2019). Especially during the pandemic, students expressed their desire for faculty with computer knowledge and LMS skills who could leverage technology (Mishraa et al., 2020; Murphy et al., 2020). Technical skills are a requirement for all engineering faculty, whether online or in person. Undergraduate engineering students have indicated that faculty being up-to-date with real-world technology is essential for an excellent engineering education (Pomales-Garcia & Liu, 2007).

The reliability of instructors' technologies, such as their internet connection, also affected their teaching quality. Students expressed a desire for faculty to have stable internet connections so that lecture video quality would allow faculty voices to be clear and students to be able to easily see when faculty are writing.

6.7 INSTITUTIONAL CONTEXT

Only one code that emerged from the data aligned with the OISS recommended area of competency in Institutional Context, that of *Institutional Resources* (IR). Student comments indicated a general lack of awareness among faculty about existing campus resources to help them learn, such as learning centers. Interestingly, one student suggested creating a learning center that did exist and was offering remote (Zoom) assistance during the pandemic, of which the student was clearly not aware:

> "Create a virtual first year ENG learning center for individuals to be able to get help from other students that may not be in their group or section, as well as being able to talk to the coaches that have lots of knowledge on MATLAB and the course in general."

Thus, it becomes apparent that instructors must not rely on the university to promote its own resources such as learning centers and counseling services but should take it upon themselves to inform students of these services. As one student put it:

> "Make it clear to students that there are still resources available online to help them succeed."

Although faculty workshop participants did not offer any advice in this area, it is the authors' suggestion that faculty make extra effort to advertise campus resources within their classes.

7.0 CONCLUSION

A crisis like COVID-19 provides a unique occasion to examine and reflect on educational practices, revealing opportunities for transformative change. This study examined the perspectives of FYEs forced online during the pandemic. Much of the student advice offered to faculty aligned with established best practices within the QM OISS areas of competency in understanding institutional context, online teaching technologies, instructional design, pedagogy, assessment, and social presence (Quality Matters, 2016). Although many of the instructional suggestions that faculty offered within response workshops aligned with these best practices, the workshops themselves provided additional space for dialogue and reflection on pedagogy and encouraged their promotion within future teaching. The workshops also offered the researchers early peer feedback opportunities on the coding results. In addition to those competency areas included in the OISS, another major theme among online student needs emerged from this study, that of Academic Grace (understanding, flexibility, and patience) from faculty.

Academic Grace is largely absent from the OISS. The OISS does contain some elements of understanding within the sub-skills mentioned under the social presence and technologies competency areas (Quality Matters, 2022). Specifically, it recommends faculty understand

factors which affect student communication as well as the need for equitable access to learning technologies. Under pedagogy, the OISS includes a sub-skill that recommends, "The instructor has a basic knowledge in learning theory and understands how students' social, cultural, and religious disposition influence learning." (Quality Matters, 2022, p.5). However, students in this study were asking for understanding with social and learning contexts that were forced upon them, not with regard to their own dispositions. Their need for understanding went well beyond communication and access to learning technologies to broader life impacts.

Although the components of Academic Grace—that is, understanding, flexibility, and patience—may have been especially needed by students transitioning online due to the COVID-19 pandemic, these are also general traits necessary for good teaching in any format (Crawley, 2013; Davidson, 2019; DiBenedetto, 2011; Mishraa et al., 2020; Pomales-Garcia & Liu, 2007). The faculty agreed that, when in doubt, Academic Grace should be extended to students. Certainly, the spring 2020 transition to online learning included new problems and challenges posed by the general life disruptions caused by the COVID-19 pandemic. However, the lives of typical online learners also provide challenges and disruptions to learning. Online learners tend to be older than their counterparts and are often balancing careers and families, the main drivers of their need for the convenience and flexibility of online learning (Jarvie-Eggart, et al., 2019; Noel-Levitz, 2014). The extension of Academic Grace to these students, who may be juggling work deadlines or sick children, is also warranted and should not be restricted to pandemic times. Thus, we recommended that understanding, patience, and flexibility be recognized as essential skills for online instructors and included within online instructor training, guiding the development of faculty skills in response to the student needs revealed in this work.

Teachers in particular acknowledge the need for "endless patience" among faculty (Crawley, 2013, p.342). It has been argued that patience should be a targeted goal of educator training (Sezer et al., 2020). Professional development for online faculty is most often targeted toward disciplinary content, pedagogical techniques, theoretical approaches, or expectations of institutions, or certain faculty populations, such as early career (Elliott, et al., 2015). It does not typically address the development of instructor characteristics that may relieve barriers to student success, such as understanding, flexibility, and patience. Even those studying the impacts of the pandemic, who are aware of its effects on students, have not advocated for including training in understanding, flexibility, and patience for online faculty. Hart et al. studied the ways in which the California community college system supported students during the pandemic, noting the importance of training new online faculty (2021). They focused on the importance of training online faculty in the technological tools for delivering courses online. A literature review of online professional development for teachers found their training to focus on the following outcomes: increased content knowledge, improved instructional practices, high participant satisfaction, and self-efficacy (Bragg et al., 2021). However, neither of these studies indicated any evidence of training online faculty in understanding, flexibility, and/or patience. Before the elements of Academic Grace (understanding, flexibility, and patience) can be incorporated into online faculty training, work must be done on how to train instructors on these qualities that students find essential. Further work could examine the impact of faculty training in Academic Grace on online student retention and success.

Designing learner flexibility into online class formats can be viewed as another means of weaving Academic Grace into the fabric of online courses. It has been recommended that faculty consider students' needs when choosing online class formats (Dietz et al., 2021). A balance of the students' needs for connection and instruction with their need for flexibility can best be met by a flexible bichronous structure. We recommend that instead of viewing synchronous and asynchronous classes as an either/or proposition, online faculty consider a flexible bichronous model. This versatile online class format incorporates Academic Grace by allowing students to participate in the manner that works best for them, flowing seamlessly between the two formats. Flexible bichronous classes would require making lectures/classes available in both live and recorded formats, as well as providing asynchronous materials to support the learning of students absent

from synchronous sessions. We also recommend that universities consider providing standard guidelines for the structure of online classes within their LMSs to aid students in navigation and reduce confusion.

Although incorporating Academic Grace into the fabric of online engineering courses presents advantages for students, it may put additional strain on the time commitments and responsibilities of faculty. Faculty time restrictions are a well-known barrier to the implementation of instructional and communication technologies into their teaching (Moser, 2007; Reid, 2014; Watty et al., 2016; Wingo et al., 2017). Faculty's limited ability to carve out the time to develop adequate competence in the technologies required for teaching online can be a significant obstacle to quality online instruction. Additionally, the academic culture of engineering has traditionally undervalued teaching, with measures for promotion and tenure placing larger value on research metrics such as funding awarded and publications (Shin et al., 2014). However, nearly all engineering faculty are required to teach and thus must balance this responsibility with research and service activities. Faculty may be deterred from incorporating Academic Grace (patience, understanding, and flexibility) into the structure of their online courses due to the additional effort it may require on top of their already packed schedules. For example, extending flexibility to students with regard to assignment submission may require additional time spent grading. However, we argue that incorporating Academic Grace within the structure of online courses could be supported by teaching and learning centers within universities. These types of centers routinely provide training and support for LMS implementation by faculty, reducing the time burden of learning these technologies. They can also help develop resources, such as course shells, which reduce the time to set up a course. By showing faculty how to leverage autograding capabilities, they can help to cut down on grading time. Although the development of these resources to support faculty is outside the scope of this research, future work could study the development and implementation of these resources and explore additional methods not referenced above.

8.0 LIMITATIONS

It should be noted that the study university is significantly less diverse than the national population of undergraduate students. Further work could investigate advice that more diverse student populations have for online faculty, noting that the literature has documented internet and computer access issues for underrepresented students (Jaggars et al., 2021). Previous research has shown that stress and financial issues were also experienced more often by minoritized students during the pandemic (Thompson & Rodriguez-Nikl, 2021).

Additionally, this work reflects the opinions of FYEs and may not necessarily be translatable to online students of all disciplines and those students beyond the first year. It should also be noted that before the COVID pandemic, the primary motivation for online learning among students enrolled in fully online courses was convenience of time and place of learning. Some students, like active-duty military who may suddenly be called to any time zone in the world, may prefer asynchronous formats. These students may feel that they are missing out on essential instruction if they never attend synchronous sessions in a flexible bichronous format class. Further work could investigate whether these students are less satisfied with the suggested new format. The students in this study were largely silent on the subject of laboratories, likely due to the fact that the course in which they were surveyed did not have a laboratory component. Future work could explore online student advice for conducting laboratories.

As with any qualitative analysis, our coding occurred within the context of our own worldviews and may include our own inherent biases and assumptions. Coding was performed by an instructor and TA for the FYE program. Finally, the data from the faculty workshops was not coded in a similar manner as the student provided data. As transcripts of these discussions were not taken and coded, the full richness of the faculty advice may not be fully captured by the provided breakout room summaries.

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COMPETING INTERESTS

In his role at Michigan Tech's Center for Teaching and Learning, Thom Freeman normally trains faculty to teach online though a course he developed, ED5101, Foundations of Online Teaching. During the summer of 2000, additional sections of ED5101 were offered to prepare faculty for online teaching in the fall semester. Michelle-Jarvie Eggart taught one of these classes. Additionally, Michelle Jarvie-Eggart, Brett Hamlin, and Amy Hamlin were instructors of record in the courses in which the students were surveyed. Amanda Singer was a teaching assistant in one of the courses as well.

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