First-Year Engineering Students, Social Media, and Course Delivery Preferences

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Abstract: University educators seek to engage students where they are, whether online, via social media or in the classroom. Educators may, as part of their service, support recruiting through high school student interaction either through camps or through on campus visits. University educators may be called upon to create activities to engage students in K-12, undergraduate and graduate students. It is a wide spectrum, but there are many activities which are shared by all including electronic devices. The current class of first year students were all exposed to online learning methods during pandemic closures. Many of these students have also had access to Google Classroom type coursework systems in their K-12 classrooms. There are concerns this group of learners do not have the attention span for traditional lectures and problem solving. In order to determine how Gen-Z prefers coursework delivery, a Qualtrics survey was created and disseminated to students in a first year orientation course for higher education engineering students. The survey includes questions on demographics and social media. Current first year engineering students were asked their preference on coursework delivery methods, via videos, social media or in person. While students still express a preference for in person education, they also expressed a preference for online submission of assignments for grading.

Keywords: First Year, Introduction Course, Social Media; Google Classroom, Online Grading

Introduction/Background:

There is evidence that certain engineering competencies can and should be developed in the first year, including personal and professional effectiveness [1, 2]. Competencies within these categories include responsibilities, ethics, communication, teamwork and autonomous work [2, 3]. As 3-dimensional modeling needs have increased, some of the other software like word processing and spreadsheet programs may no longer be a requirement in curricula [4]. Google Classroom has provided free software for word processing and spreadsheet programs to over 40 million users and 30 million students and teachers [5].

During the pandemic closures, there was also a variety of non-traditional coursework delivery methods in order to overcome the lack of interaction in the classroom such as; GroupMe, Remind, Slack, and Zoom [6]. With many traditional software programs, faculty have recognized the need students have for instruction [7], which may be counter-intuitive when considering Generation Z learners. That additional instruction may be face-to-face, via Course Management System videos or YouTube videos.

With the prevalence or dominance of Microsoft and Google for word processing and spreadsheet programs [5], and these being used in K12 education, the need for software education in the classroom may be diminished. Students still report the lack of perceived usefulness and support when asked about Google Classroom systems indicating that even after lengthy exposure, there is still a need for improvement [8]. There have been studies which are focused on how best to incorporate these tools into engineering and introduction to engineering courses for team-building and software skills development [9, 10].

Games are an option to create active learning and self-efficacy [11]. To create student engagement in soft skills, a variety of games have been created including “The Two Dollar Game” [12], “Marshmallow Dodgeball” [13], “How would you solve it?” and Team Jenga Game” [2]. These types of educational games, are also called “Serious Games” (SG) [11]. The authors have used soft skill games in the first year engineering orientation course for a variety of reasons. Using a game like “Marshmallow Dodgeball” provides students with a different application of engineering skills, creates peer-to-peer interaction, and burns off excess energy.

“Generation Alpha” or those born after 2010 [5] have never lived in a world without broadband internet [14]. While universities are not yet servicing these students, current students have had cell phones their entire lives, or since the 1990s [14]. Similarly, first year students have all been exposed to non-traditional coursework delivery during the pandemic. From that perspective, hypotheses were identified.
H1: Current 1st Year Students prefer to receive instruction via electronic delivery (videos, social media, etc.)
H2: Student preferences for electronic delivery will match their assignment submission preferences

Methodology

A Qualtrics survey was created and made available to several first year engineering orientation courses through the course management system announcements. It was opened in late Fall of 2023, which has an enrollment of 538 students over 6 sections, including an Honors and Transfer section. For summer of 2023, the enrollment was 151 students. The summer section utilizes more games, as it is a camp-like atmosphere. (For spring of 2024 the enrollment is 102 students over 2 sections) An IRB Approval was received before the survey was disseminated. The approved survey includes a consent form and students were notified that an incomplete form would be considered a non-response. College students enrolled in the course over the age of 18 met the acceptance criteria. No incentive was provided to students, and students were notified that the survey would not affect their grades.

Students were asked a series of demographic questions, which included gender, race, age, college classification and major of study. The next series of questions pertain to student use of computing devices (desktops, laptops, tablets, phones, watches, etc.) and software applications. Questions focused on student preference of search engine, how students utilize social media, how they interact with their devices, and how they use them for communication. Questions also included an inquiry as to the purpose and use of communication styles, either for school, professional or casual communication. Questions were typically formatted with multiple options, including an option for “Other” to insert text. There were also sliders and rank order questions to better understand student preferences. For all questions, there was either a “Prefer not to answer” option or an option “Other” to provide an alternative response to reduce pressure for responses.

Results/Discussion

Demographics

A total of 75 students responded. The respondents identify 75.7% male and 22.9% female, which is to be expected as this is an Introduction to Engineering course. One respondent identified as non-binary. The respondents are 52.9% “Caucasian or White”, 11.4% “African American or Black,” 8.57% “Hispanic or Latinx,” 5.7% “American Indian or Alaska Native,” 7.14% Middle Eastern or North African, 1.43% East Asian (Including Chinese, Japanese, Korean, Mongolian, Tibetan and Taiwanese), 1.43% “South Asian (including: Bangladeshi, Indian, Pakistani, Bhutanese, Nepali, Sri Lankan),” and 10% “Two or more ethnic identities.” One student selected “other” and indicated their nationality, but would be included in Middle Eastern or North African. The majority of the respondents were 18-20 years old, again which is expected for an entry-level course. There were 5 students between 21-48 and one student who identified as 17 years old. The majority of respondents student reported less than 30 credit hours completed, with 11 having more than 30 hours or the equivalent of a second-year student.

Respondents represented the following majors; Architectural Engineering (1), Engineering (2), Chemical Engineering (2), Civil Engineering (5), Computer Science/MIS (4), Construction Engineering Technology (1), Electrical and Computer Engineering (14), Industrial Engineering (2), Mechanical Engineering Technology (3), Mechanical and Aerospace Engineering (18), and Mechatronics (3). The college has 6 engineering programs, an architecture program and 4 engineering technology programs.

Software Applications Use and Preferences

When asked what their primary search engine was, respondents reported 64.4% Google and Google Chrome, 16.95% Safari, and 8.5% Bing and Microsoft Edge. Respondents who selected “Other” was indicated “Opera GX” (4) and DuckDuckGo (2). Students were asked to select ALL of the social media apps used. Respondents indicated their use with 53% Instagram, 21% Snapchat, 11% Twitter or “X”, 5% Pinterest, 5% Reddit, and 5% TikTok.

Respondents were asked to rank their preference for social media applications with 1 indicating highest preference (Figure 1). The rank order (1-9 with option for other) showed indicated a rank preference of 1st place for Instagram at a mean of 2.31, 2nd places SnapChat at a mean of 2.60, 3rd TikTok (4.26), 4th Facebook and FB Messenger (5.09), 5th Twitter or “X” (5.40), 6th Reddit (5.97), 7th Pinterest (6.21), 8th Threads (7.36), 9th WhatsApp (7.72), 10th“ Other, I have a preference for an app not on the list,” and 11th“ None, I do not have accounts with any social media sites.” The category “None, I do not have accounts with any social media sites” was ranked last by the majority of respondents.

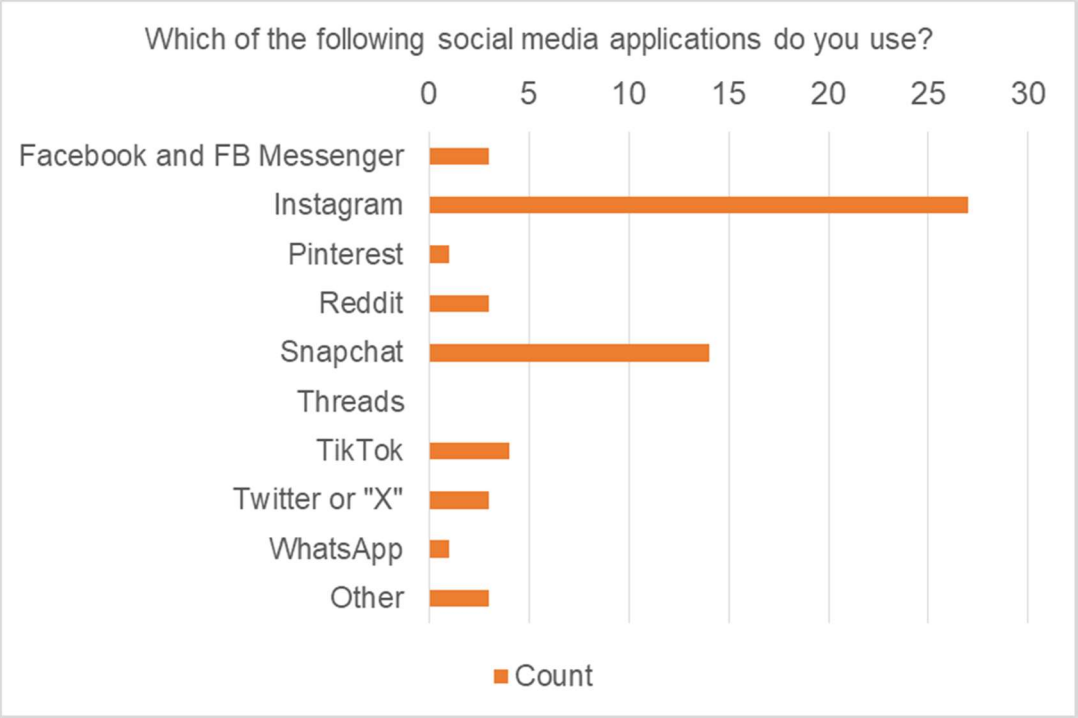

Figure 1: Introduction to Engineering Students Social App Preference

Respondents were then asked, considering their identified social media preferences to answer the following questions. For the question "What percentage of time is spent SCROLLING through content?" respondents indicated an average of 51.42% of the time. For the question, "What percentage of use is POSTING content?" respondents indicated an average of 10.98% of the time. For the question, "What percentage of use is direct or instant MESSAGING?" respondents indicated an average of 34.47% of the time. Not all responses added to 100%, so it is not evident what occurs during the remainder of the time. The average use was 96.67%. However, with over 50% of the time in social media being allocated to "scrolling," respondents are indicating a preference to passive interaction.

To understand how students interact with their electronic devices and applications, students were asked about their voice memo use. The majority of students (86.2%) indicated they do not use voice memos for notes to self. The majority of students (67.2%) also indicated they do not use voice memos to send messages. Respondents indicated using applications for sending voice messages via Snapchat (8), WhatsApp (4), and Instagram (1). Those respondents who indicated other apps added "Discord" (1), "Messaging App" (1), and "Imessages" (1). Respondents indicated use of virtual assistants with use of Siri (56.1%), Google Assistant (12.3%), and Amazon Alexa (7.0). The majority of the respondents (93.0%) indicated the use of text messaging. Respondents indicated for text messages, 87.72% type them out, while 3.5% use voice to text, and 5.3% send "Voice Messages." This is an interesting result, as the majority of respondents indicated that they did not use "Voice Memos" to send messages, clearly identifying that the term is not synonymous to "Voice Messages" from their perspective. The remaining respondents indicated that they use text and voice interchangeably (3.5%)

Communication Preferences

The next series of questions focused on communication preferences. When asked if EMAIL was effective for communication, 89% indicated it was effective while 11% indicated it was not (Figure 2). When asked their preference for communication methods, respondents identified; send a text message (63.2%), make a phone call (28.1%), and send an email (7.0%) (Figure 3).

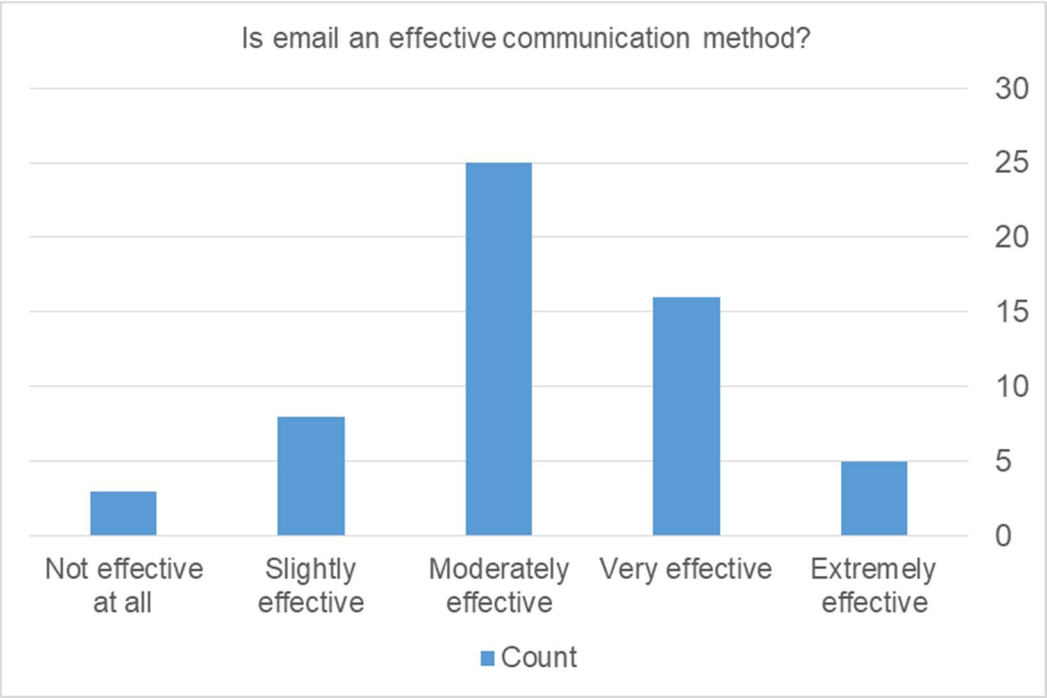

Figure 2: Introduction to Engineering Students Perception of Email

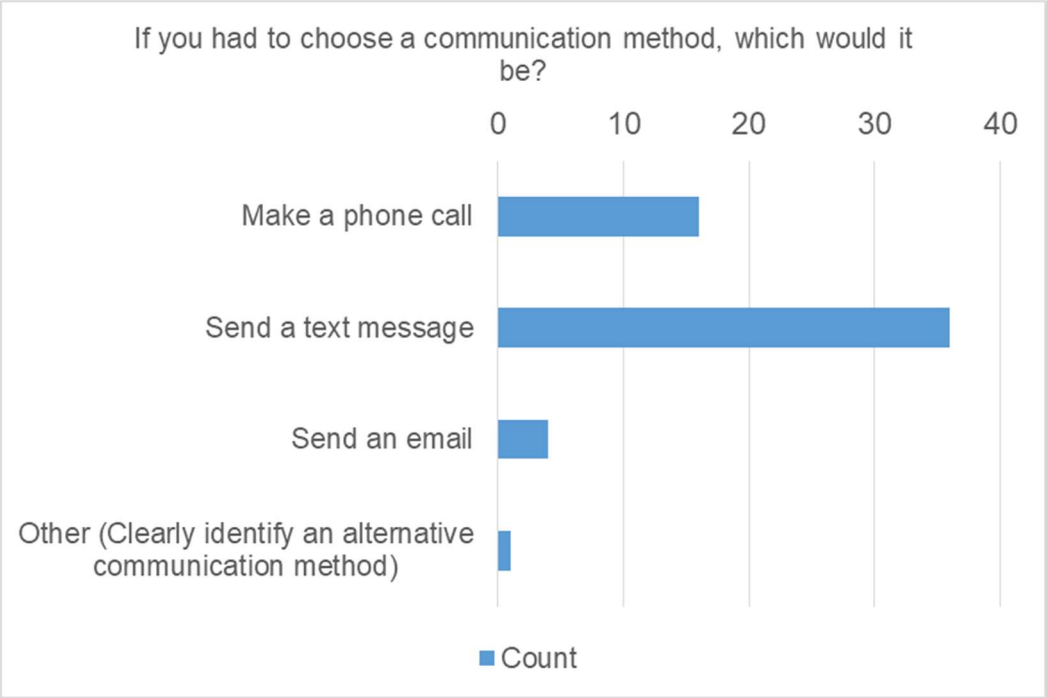

Figure 3: Introduction to Engineering Students Communication Preference

To further clarify, respondents were asked if communication styles reflected communication type, using a multiple response type question. For PERSONAL communication (survey defined as with friends & family), respondents preferred sending a text message (34.8%), over making a phone call (34.8%), direct or instant messaging (19.6%), sending an email (1.8%), or via social media by posting content (6.3%). When asked if they had access to their PERSONAL email account via an APP on their phones, all of the responses indicated "Yes."

For BUSINESS communication (survey defined as to make a doctor appointment or contact a business about a bill), respondents preferred making a phone call (65.5%), over sending an email (16.4%), direct or instant messaging (7.3%), sending a text message (5.5%), or via social media by posting content (3.6%). When asked if they had access to their WORK email account via an APP on their phones, the majority responded yes (76%).

For SCHOOL communication (survey defined as with your advisor, faculty, or the bursar), respondents preferred sending an email (87.3%), over sending a text message (5.5%), making a phone call (3.6%), social media by posting content (1.8%) or direct or instant messaging (1.8%). When asked if they had access to their SCHOOL email account via an APP on their phones, the majority responded yes (94%).

Educational Communication Style and Electronic Usage

Students were asked if they had downloaded their Course Management System (CMS) app to their phone. CMS was defined in the survey as Blackboard, Canvas, D2L/Brightspace, or Moodle. The majority of the students (86.0%) had downloaded the app.

When asked "Which coursework delivery method do you prefer?" the majority of the students responded "In person" (56.0%), followed by "A choice of in person, synchronous and asynchronous options for the same course" (22.0%), Hybrid delivery (work outside of class with work in the classroom) (12.0%), Pre-recorded videos (asynchronous video) (6.0%), andLive streaming content (synchronous video) (Figure 4). This is very similar to results found during and immediately after the Covid-19 pandemic [15]. Students have repeatedly identified the preference for in person classes [16], but also like the option of being able to have a choice of delivery methods.

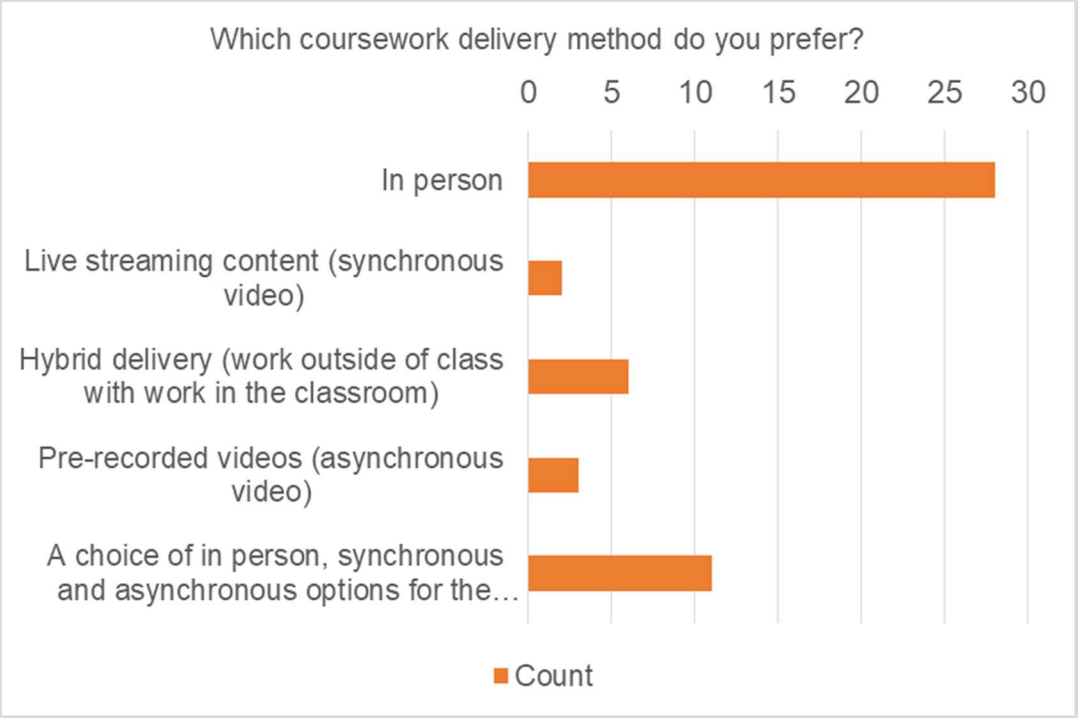

Figure 4: Introduction to Engineering Students Course Delivery Preference

Respondents were then asked "What is your preferred method for student work submissions?" This question allowed multiple responses. Respondents preferred pre-populated quiz content through their CMS (29.2%), online text boxes in their CMS (16.7%), a choice of online or in person (16.7), online submission of handwritten student work (14.6%), on paper submission of student work (11.5%), and interactive publisher-provided mastering skills (10.4%). (Figure 5). A similar question was asked about student work feedback, which also allowed multiple responses. Respondents indicated a preference for feedback via pre-populated quiz content through their CMS (24.4%), a choice of online or in person (23.2%), online text boxes in their CMS (14.6%), online submission of handwritten student work (13.4%), interactive publisher-provided mastering skills (11.0%), and on paper submission of student work (12.2%) (Figure 6). While is it evident that the 2023-2024 class of incoming students have a preference for online work submission and student work feedback, it may be a result of their experiences during pandemic or the use of Google Classroom by a variety of schools via use of Chromebooks [5].

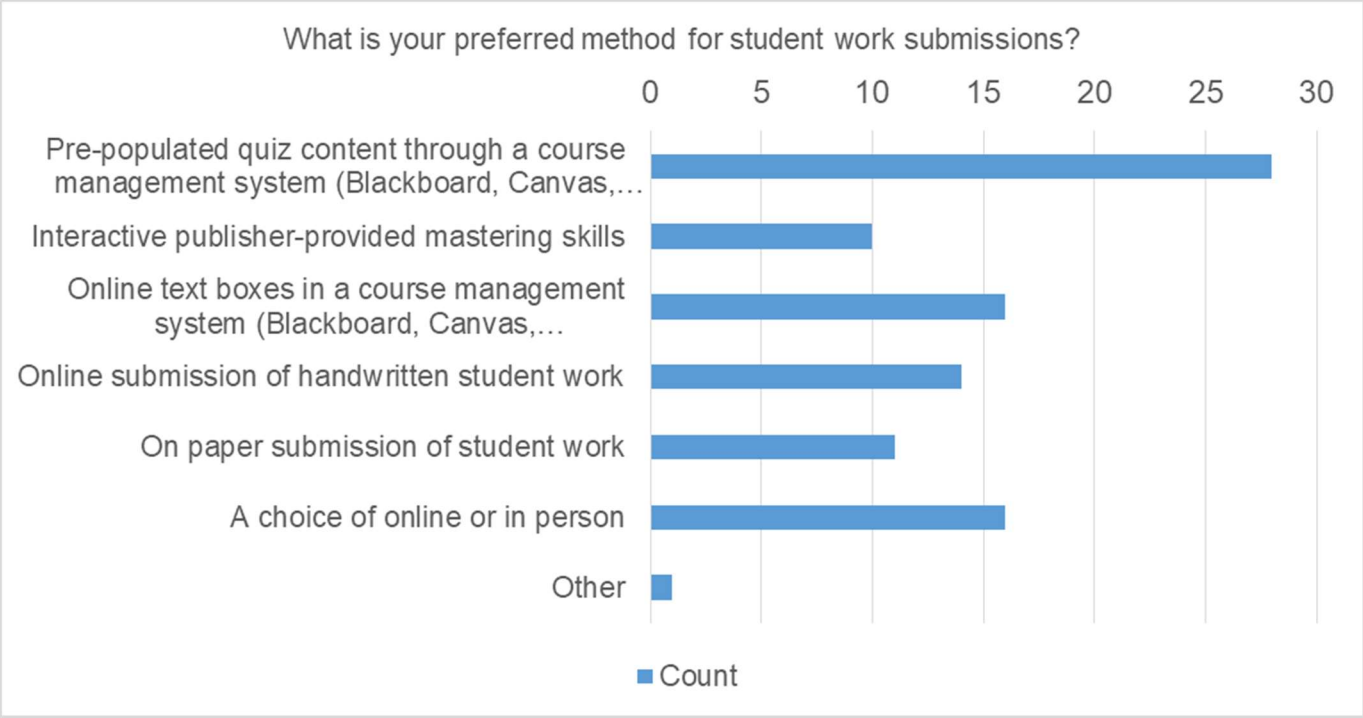

Figure 5: Introduction to Engineering Students Work Submission Preference

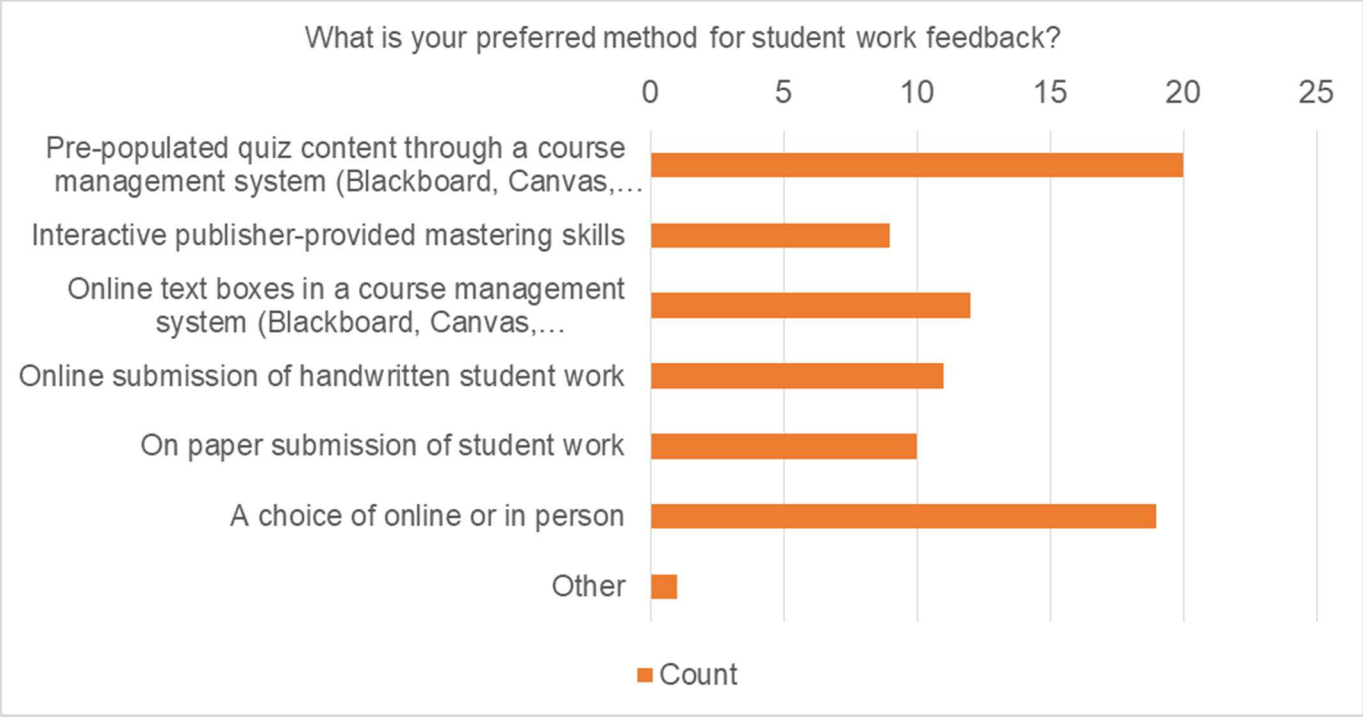

Figure 6: Introduction to Engineering Students Feedback Preference

Respondents were then asked; “Have you had university instructors ask you to follow a SOCIAL MEDIA presence for a portion of your course requirements?” The majority of student reported “no” (82.0%). To identify how students like to interact with social media, they were asked if like

to receive future coursework via SOCIAL MEDIA. The majority of respondents indicated “no” (78.0%). An additional question asked; “Have you had university instructors ask you to connect to them via a MESSAGING app for a portion of your course requirements?” Respondents reported “no” (82.0%). The next question asked if students would like to receive future coursework via a MESSAGING app? Again, the majority response was “no” (74%).

Considering how instructors and students interact via video apps, the following question was asked; “Have you had university instructors ask you to use VIDEO apps for a portion of your course requirements?” In this case, respondents indicated: no” (50%), and “yes” (48%). When asked about preferences of coursework delivery; “Would you like to receive future coursework via VIDEO apps?”, a majority (66%) indicated “no.”

Limitations

While the sample size may be a concern, there is literature to support reduced confidence rates (80% interval) based on student populations [17]. It is suggested that student populations who will respond to online surveys are also more apt to have positive outlooks on the courses where the surveys are implemented. While the minoritized student population might be quite small, the survey was given to multiple student groups across multiple course sections and semesters, and taught by multiple faculty.

Conclusions

A Qualtrics survey was used in a first year engineering course to determine social media and communication preferences. While respondents indicated a preference for using social media, it is their preference to scroll or via passive interaction. Respondents indicated limited use of “Voice Memos” to send messages, while instead indicating the use of “Voice Messages.” Some interesting data were collected about communication preferences. Respondents clearly identified difference preferences for communication based on the type. For personal communication, text messages were preferred, for business the preference was phone calls and for school it was email. While not unusual, it is interesting to note that as first year college students, they have identified the difference modes of communication having different or better aligned purposes.

Two hypotheses were identified for this research; H1: Current 1st Year Students prefer to receive instruction via electronic delivery (videos, social media, etc.), and H2: Student preferences for electronic delivery will match their assignment submission preferences. While these students have all been exposed to online learning during the pandemic, they still have a preference for in person course delivery. Conversely the respondents indicated a preference for online work submission and student work feedback. The online work submission and student work feedback loop preference may be a result of their experiences during the pandemic and/or the use of Google Classroom in their earlier education.

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