

Student Reactions to Online Instruction at the SIUC Automotive Technology Program

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Abstract

In light of recent events necessitating the transition to online instruction, exploring ways to improve student perceptions of online instructional delivery is an important preparation for potential re-occurrences of this type of event. A survey was developed and administered to collect data regarding the student online educational experience at the Automotive Technology Program at Southern Illinois University Carbondale (the Program). The survey was designed to gather student exposure to various methods, as well as student perceptions of each method. The sample was generated from the population of students who completed at least one online technical course at the Program. Questions were designed utilizing descriptions of the subject matter, effectiveness, ease of use, appropriate length, and continued usage of each instructional method. Collected data was analyzed and stated in both paragraph and 100% stacked bar chart forms. The study documented student responses to the most applied online instructional methods at the Program. Responses indicated these methods were successful in providing a positive educational experience for the majority of students. Additionally, the study collected suggestions for instructors to implement in future online offerings to enhance learning and improve student experiences at the Program.

Introduction

The Automotive Technology Program at Southern Illinois University Carbondale (SIUC) is a nationally recognized baccalaureate program, providing a combination of theoretical and practical hands-on application in technical courses. These courses have traditionally been taught in a face-to-face format. To reinforce the direct instruction provided in the classroom, students perform diagnostic testing and repair procedures in a service lab. Training of this type enables students to practice actual automotive repair tasks in a supervised environment.

Due to the COVID-19 pandemic and resulting restrictions on social proximity, students in the Program were transitioned to an online teaching format during the spring semester of 2020. Labs were closed and face-to-face instruction ceased for the remainder of the semester. When students returned to class in the fall semester of 2020, the Program reopened classrooms and labs for face-to-face instruction. However, some instruction was performed in a hybrid format with a blend of online and face-to-face instruction. Online instruction was also available to accommodate students under mandatory quarantine. At Thanksgiving break, classrooms and labs were again closed and the remainder of the semester was taught remotely.

In light of the recent necessity of transitioning instruction into an online format, exploring ways to improve and broaden online instructional delivery methods can help prepare the Program for any potential re-occurrences of this type of transition. Discovering student perceptions of their online educational experience will provide information that can assist instructors in developing

improvements in their online delivery. Identifying the instructional methods students had the most positive perception of can guide instructors to add more of these methods. This action should improve student experiences at the Program. Finding ways to improve student perceptions of the applied methodologies is also a desired outcome.

In the interest of improving student experiences at the Program, this study will focus on the following research objectives:

- Document online instructional methods applied at the Program
- Gather student reactions and perceptions of applied online instructional methods
- Assess student responses to suggest best practices in future online offerings

If students did not react positively to a particular method, can the reasons be identified? Can we improve the method to achieve the desired outcome? Instructors at the Program are currently learning and developing the best practices to deliver online instruction. Gathering student feedback can assist in developing classes that will provide the best educational experience for all stakeholders.

Literature Review

One of the most common components of an online course is the Learning Management System (LMS). According to David (2013, pp. 4-5), an LMS is “a software application for the administration, documentation, tracking, reporting, and delivery of education courses or training programs.” Instructors can use the LMS to communicate with students, post assignments and grades, store slideshows and articles, host discussions, and essentially any other instructional task that is required. For instructors within the Program, SIUC has an existing LMS in the form of *D2L Brightspace*.

SIUC offers instructional support for D2L Brightspace through the Center for Teaching Excellence (CTE). An Online Bootcamp was offered by CTE in the summer of 2020. Attendees were able to practice developing an online class within a mock course shell. Assignments, announcements, weighted gradebook, and discussion boards were among the practice assignments attendees were able to learn about before using them in actual courses in the fall. SIUC encourages instructors to develop LMS strategies through training opportunities provided by CTE.

Various recommendations regarding online instructional strategies were found to be more suitable to specific applications. However, other suggestions were more generic and found applications relevant to all instructors. Darby (2019) advises putting personal touches into the courses, which lets students know who you are and what you expect of them. Creating a *Welcome to Class* video in the LMS is one way to provide such a personal touch to the course. Other authors provided more specific ideas to build course content that students could more easily understand. Sugar (2015) recommended the organization of content into modules and submodules in a logical manner to provide structure for students and make the course easy to navigate. Morris (2020) suggests the pre-planning step of creating a topical outline, then selecting separate video links for each bullet point.

With the LMS providing a framework for the course, the components of the course need to be designed and uploaded. Items such as assignments, readings, and slideshows are familiar to most

instructors who have previously taught in a face-to-face format. Other concepts including pre-recorded video, remote conferencing, and discussion boards may be new to instructors who have not taught online before. Some instructors at the Program have recorded personal video demonstrations, but to provide the bulk of the lesson virtually, more online content is required.

Before the pandemic, many instructors were not familiar with the concepts of synchronous and asynchronous instruction. These terms became more frequently mentioned during meetings and discussions. The concepts are easily defined. According to Wintemute (2021), synchronous learning happens in real time. All participants interact in a specific virtual place at a set time. Conversely, asynchronous learning does not require real-time interaction; content is available for students to access and complete on their schedule. As student learning styles vary, each of these methods would have advantages for some students and disadvantages for others.

Synchronous instructional methods commonly include some form of video conferencing. Platforms such as *Zoom* and *Microsoft Teams* enable students and instructors to interact with active discussions and live lectures. Synchronous instruction can resemble a face-to-face classroom experience in many ways. For example, questions can be fielded in real time and feedback can be immediately provided. Instructors who are more comfortable with traditional lecture than creating pre-recorded videos can appreciate this method of online instruction. However, the rigid schedule of synchronous instruction can create conflicts. Some students may have prior engagements or responsibilities that preclude them from attending synchronous classes at scheduled times.

Asynchronous instructional activities include self-guided lesson modules, pre-recorded videos, readings, case studies, discussion boards, and other content not tied to a live presence. These methods are more accommodating to students with existing schedules and those requiring a more flexible format. Asynchronous modules are completed at the students own pace, providing additional accommodations to learning styles. However, students who appreciate interaction may find themselves isolated in an asynchronous learning environment (Wintemute, 2021).

When delivering instructional materials in a virtual environment, motivating students and keeping them engaged in the learning activities remains an important goal. Multiple studies were found which explored the optimal instructional video length in regards to student attention span. According to Morris (2020), online content or lecture videos in excess of 12 minutes in length are commonly skipped over or simply not watched by students. The suggestion is made to keep online content broken up into short, focused segments of between 6-12 minutes in length. Lynch (2019) agrees, stating as video lectures are a passive activity, students simply tire of listening to excessive lecture in one sitting. By practicing a scenario after watching a six-minute video, students are more likely to remain engaged, and watch additional videos. Discovering student perceptions of appropriate content length could prove beneficial in improving online instruction at the Program.

In addition to self-developed video lectures and live-video lectures, instructors can add content to the course with externally sourced components. These resources can impact more students' learning styles and diversify the course. Instructional videos can be obtained from various training resources as well as popular video sites such as YouTube. While not as personalized, these videos can provide a more professional level of production and variety to motivate and

enhance student learning. While many resources are available, it is suggested to select only content videos that appropriately reinforce the lessons of the course. Jackman and Roberts (2014) exposed students to carefully selected YouTube videos based upon suggestions of the instructor's manuals or from professional videos covering key course concepts. Their results found overwhelmingly positive student perceptions of the videos in their study. By adding external video resources, instructors can build additional curriculum, but they should add value to the course and provide positive student experiences.

Traditional assignments such as textbook chapters, case studies, and assigned readings are easily convertible to an online format. These items are typically uploaded into the LMS along with a drop box for completed work. While similar in nature, online delivery affords the opportunity for assignments to be administered in a variety of new ways. Discussion boards can provide a venue for interaction while short, online quizzes can provide immediate feedback for formative assessment. While traditional assignments are familiar to most instructors, extra effort can ensure these instruments remain effective teaching tools in an online format. Face-to-face learning allows informal interaction which can be deficient in an online setting. To combat miscommunication when assigning work, Stanford Teaching Commons (n.d.) suggests being meticulous with instructions while avoiding elaborate and overly complicated assignments. Allocating extra time to clarify, remind, and communicate with students can mitigate problems and improve understanding.

Remote instruction inevitably includes some form of online assessment. Instructors still need to assess the students' achievement of the learning objectives of the course. At the Program, quizzes and tests were traditionally administered in a face-to-face setting under the supervision of an instructor. In an online application, this is not possible. Instructors can harbor inhibition about online testing due to the fact students can access reference material in a multitude of ways. This is sometimes regarded as academic dishonesty, or cheating, by instructors. Proctoring software and lockdown browsers attempt to keep students from accessing outside material, but are typically not without concerns of their own. Hubler (2020) reveals damaging effects to students regarding privacy and connectivity problems with online proctoring software. Determining best practices in online testing is critical to online instruction. Some instructors are writing questions based on applied knowledge rather than rote memorization. Others are increasing question difficulty while allowing open-notes during the exam. In both cases, determining student perceptions of the practice of online testing will benefit future applications of these strategies.

Methods

An informal questionnaire was sent to all technical instructors in the Program to survey the online methods used/expected to be used in the spring and fall semesters of 2020. Various known online teaching methods, as well as methods discovered through research were listed in the questionnaire. Of the 17 technical instructors surveyed, 12 completed and returned the survey, for an approximate 71% return rate. The results of this survey provided a starting point to develop the student survey. The six most identified methods were: D2L Brightspace, pre-recorded lectures, live video lectures, YouTube videos, assigned readings, and online testing.

Approval was received for a SurveyMonkey account through the SIUC Office of Information Technology and the Provost Office. The SurveyMonkey platform was used to design and

administer the 50-question student survey. The survey was organized into eight sections: Demographics, D2L Brightspace, Previously Recorded Lectures/Demonstrations (Asynchronous), Live Video Lectures/Demonstrations (Synchronous), Non-Instructor Videos/YouTube/External Videos, Assigned Readings (Articles/Chapters/Case Studies), Online Testing/Assessments, and Final Thoughts.

The intent of the study was to confirm applied online instructional methods at the Program and capture student perceptions of their experiences with these methods. To achieve this goal, a variety of select-response question styles were designed utilizing scaled, dichotomous, and multiple-choice response options. Question content included descriptions of the subject matter, effectiveness, ease of use, appropriate length, and continued usage of each instructional method. At the end of each section, supply-response text boxes were provided for additional student comments.

Survey design enabled students to only answer questions regarding methods of which they participated. For each section, students were asked if they were exposed to that particular teaching method. If they answered yes, they were allowed to continue in the section. If they answered no, they were directed to the next section.

The student survey was then sent to SIUC Office of Sponsored Projects Human Subjects Committee (HSC), along with a completed Application to Conduct Research. HSC determined this project did not meet the regulatory definition of human subjects research and approved the research to continue with no additional regulatory requirements. *HSC Reference Number: Q20004*

The sample was generated from the population of students who have taken a recent online technical course in the Program. Students were identified that registered for a technical course in either or both the spring and fall semesters of 2020. Near the conclusion of the fall 2020 semester, an email link to the SurveyMonkey student survey was sent to 366 former and current automotive students. Of these students, 73 returned a response, an approximate 20% return rate. Regarding academic standing, 36 respondents were seniors, 16 were juniors, 17 were sophomores, and 4 were freshmen. Of the respondents, 65 identified as male, 7 identified as female, and 1 identified as other. The survey revealed 34 students transferred into the program, while 39 students were non-transfers.

“Non-Traditional Students are defined by SIUC as having any of the following characteristics: are financially independent; have delayed enrollment in college (generally not entering directly from high school); are returning to higher education after stepping out at least once; are working full-time; are attending college part-time; have children; are married, widowed, or divorced; are commuting to college; or are a veteran.”
(Southern Illinois University Carbondale, 2021)

From the above definition, 12 respondents identified as non-traditional and 61 identified as traditional students.

At the conclusion of the collection phase, returned survey data was reviewed and analyzed within the SurveyMonkey platform. Demographic information of the sample group was identified and documented. Filters were used to isolate students by response in attempts to discover any existing patterns. Student responses to questions regarding each of the eight survey sections were compared to determine which instructional methods provided the most positive educational experiences. Student reactions to each method were determined to be best communicated by outlining in paragraph form. Student participation in each method was identified in percentages. Student perceptions and attitudes regarding qualities of each method were also stated in percentages.

In addition to the data result paragraphs for each method, charts were developed to display student responses to similar questions across different methods. Through experimentation with chart design, the desired visual display of data was achieved. Charts are color-coded and of the *100% stacked bar* style. This chart style was determined to provide the most consistent interpretation of the data among multiple experimented styles.

Results

D2L Brightspace

All responding students utilized D2L for some portion of their online content. Over 92% of students described D2L as at least somewhat helpful in increasing their knowledge of the subject material. Most students (75%) described D2L as easy to understand and navigate. Only 10% of students found D2L difficult to use. In easing the transition to online learning from face-to-face, over 87% of students described D2L as at least somewhat effective in this role. Over 91% of students believe D2L should continue to be used in cases where online learning is necessary. Student supplied comments regarding D2L agreed with the select response data. Multiple students suggested having all instructors organize content in a consistent fashion. Inconsistencies in D2L organization from class to class created confusion among some learners.

Previously Recorded Lectures/Demonstrations (Asynchronous)

Over 90% of responding students experienced asynchronous lectures or demonstrations as part of their online instruction. Most students (77%) thought the length of each recorded activity was “about right”. However, around 23% of students thought these activities were too long, while none thought they were too short. When asked for the appropriate length of these activities, most (80%) stated a length between 15-45 minutes was desired. No student desired a recorded activity in excess of 60 minutes. Approximately 37% of students found difficulty remaining engaged and attentive to the recorded activities while just over 29% regarded it easy to remain engaged. Of the students who stated difficulty in remaining engaged, over half additionally stated the recorded activities were too long. Of the students who responded the length of the recorded activities was too long, over 86% of these found difficulty in remaining engaged in the activity. Students were very supportive of these recorded activities when asked about increasing their knowledge of the subject material. Over 93% of students stated the recorded activities were at least somewhat effective in accomplishing this goal. While approximately 17% of students recommended to use less recorded activities in class, the remainder wanted the same amount or more. Student supplied comments regarding asynchronous activities provided a variety of feedback. While the majority of comments were positive, some statements regarding excessive

length and preference for face-to-face instruction were noted. Many student comments appreciated the ability to replay lectures multiple times.

Live Video Lectures/Demonstrations (Synchronous)

Just over 57% of respondent students experienced synchronous lectures and demonstrations as part of their online instructional experience. At almost 88%, the overwhelming majority of these students thought the length of the learning activity was “about the right length”. When asked of the appropriate length of each activity, almost 95% of respondents stated a length of between 15-60 minutes. Approximately 21% of students found difficulty remaining engaged and attentive to the live activities while just over 43% regarded it easy to remain engaged. Students were also very supportive of the live activities when asked about increasing their knowledge of the subject material. Over 90% of students stated the recorded activities were at least somewhat effective in accomplishing this goal. While approximately 18% of students recommended to use less recorded activities in class, the remainder wanted the same amount or more. Student supplied comments stated a desire for face-to-face instruction over online, but comments specifically regarding live activities were generally not as positive as asynchronous activities. Most negative comments referred to difficulty in paying attention.

Non-Instructor Videos/YouTube/External Videos

Approximately 82% of responding students were subjected to externally supplied videos as part of their online instruction. Almost 86% of students thought the length of these videos was “about the right length”. When asked of the appropriate length of each activity, all students responded with an answer of less than 60 minutes. Of these respondents, 81% requested a length of 30 minutes or less. Approximately 60% of students regarded these activities as easy or very easy to remain attentive and engaged, while only 7% stated difficulty. Students were similarly supportive of the external videos regarding increasing their knowledge of the subject material. Approximately 95% of students stated these activities were effective. Only 14% of students recommended using less recorded activities in class, with the remainder wanting the same amount or more. All responding students identified the external video resources as being aligned with their expectations of the course, with 84% stating mostly or extremely aligned. Student supplied comments stated appreciation for the external video resources. Instructors were praised for diligence in selecting external videos which were relevant and accurate. Comments included the opinion that instructors should create the majority of the content of the course.

Assigned Readings (Articles/Chapters/Case Studies)

Exactly 90% of students indicated they experienced reading assignments as part of their online instruction. Approximately 84% of responding students stated these assignments were mostly aligned with their expectations of the course. Most students (86%) stated the instructor provided a complementary assignment such as a quiz or writing summary, while approximately 14% replied this was not common practice in their course. The majority of students (74%) responded a time spent of approximately 30-60 minutes on each assignment, with a range of responses from less than 30 minutes to more than 120 minutes. Over 53% of students stated the reading assignments were very or extremely effective in increasing their knowledge of the subject material. However, approximately 12% stated these were only minimally or not effective at all. Over 29% of students suggested instructors use less of these types of assignments in their courses, with only approximately 16% of students suggested more. The remainder thought the

same amount of readings was appropriate. Student supplied responses were mixed, ranging from appreciation and perceived importance to aversion and statements of misalignment with expectations.

Online Testing/Assessments

Approximately 97% of the responding students experienced online testing in their course offerings. Students were exposed to a variety of allowances and supporting aides within this methodology. Over 81% of students indicated an open note/open book allowance, while only 22% stated they were allowed to work in groups. Approximately 71% indicated a specific day and time for the scheduled exam, and 64% stated a time limit for the exam. Immediate feedback of the exam results was indicated by 66% of respondents, while only 24% indicated they were allowed multiple attempts. Approximately 42% of students indicated the instructor supplied a study guide specifically for the online exam. When asked if online testing discourages students from learning the material beforehand, 51% of students disagreed. Only 29% of students agreed with this statement, while the remainder had mixed feelings. Regardless, the wide majority of students (90%) stated online testing methods should continue to be used in online course offerings at the Program. Student supplied responses indicated strong opinions both approving and opposing online testing. A few negative responses went as far as calling online testing “a joke” that encourages copying answers from fellow classmates. However, more responses indicated the exercise of looking up answers during the exam to be a helpful learning activity. Students placed less importance on memorizing answers, and referenced how most external situations requires the use of reference material, making online testing more aligned with real-world tasks.

Final Thoughts

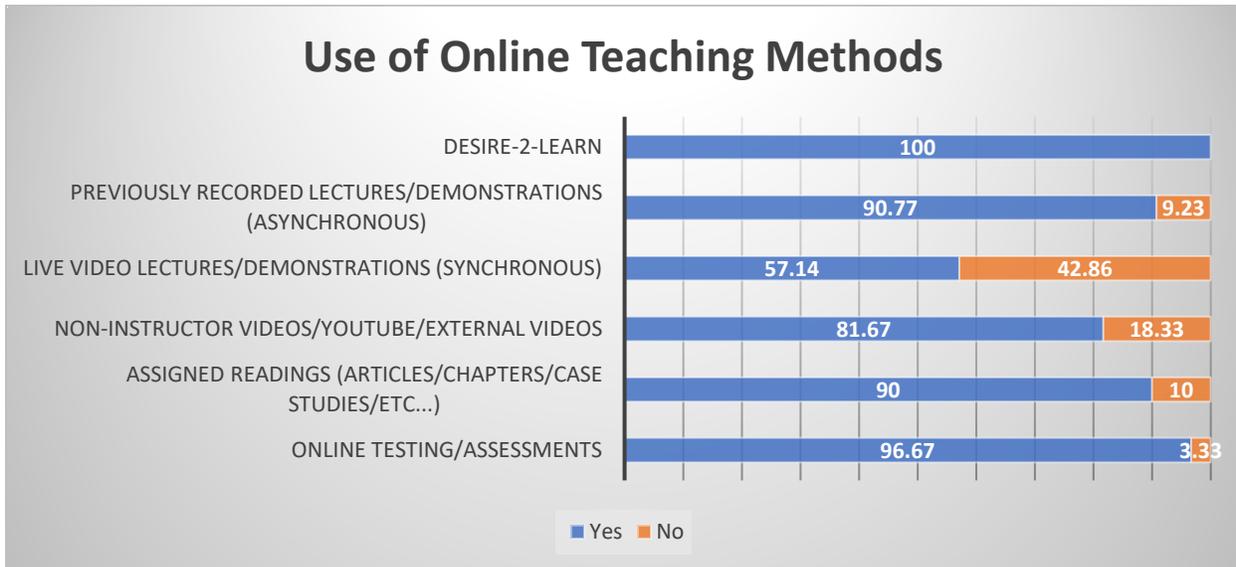
Five additional questions were asked regarding overall online instructional experience at the Program. When asked for total time spent learning, studying, and completing assignments, over 65% of students responded between 10-20 hours each week. Only 12% spent more than 25 hours per week, while 14% spend less than 10 hours. Students were asked their preference among synchronous and asynchronous methodologies. Responses were moderately spread, with a 10% preference for synchronous methods. Only 30% preferred just one method or the other, and the remainder sought a blend of the two methods. Students were asked about the importance of virtual office hours. Of these, 66% stated they were needed, while 34% stated they preferred an alternate method. Students were asked if technical courses could effectively be taught in an online format. Over 92% of respondents stated online portions should be limited to 50% or less, with 31% stating these courses should only be taught face-to-face. Only 5% of students stated a majority online delivery is an effective instructional strategy. Additionally, students were asked their preferred instructional delivery strategy for both automotive technical and core classes. Over 98% of respondents requested face-to-face instruction for their technical classes. Almost 75% of students requested online core classes, while 24% preferred face-to-face delivery. Only one student stated a preference for online technical classes.

Data Charts

When a particular question was asked across multiple survey sections, the responses were grouped together to provide additional analysis and comparison of the responses. When appropriate and practical, methods were grouped under a question pertaining to that method. The

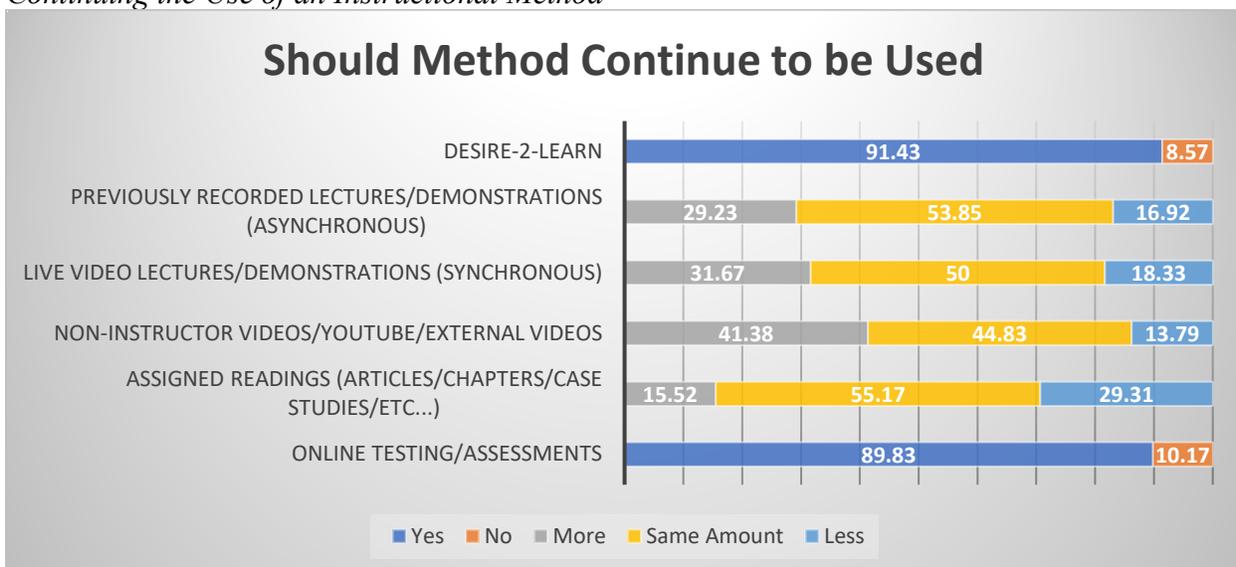
following figures display student responses to particular questions across the different instructional methods.

Figure 1
Student Exposure to Instructional Methods



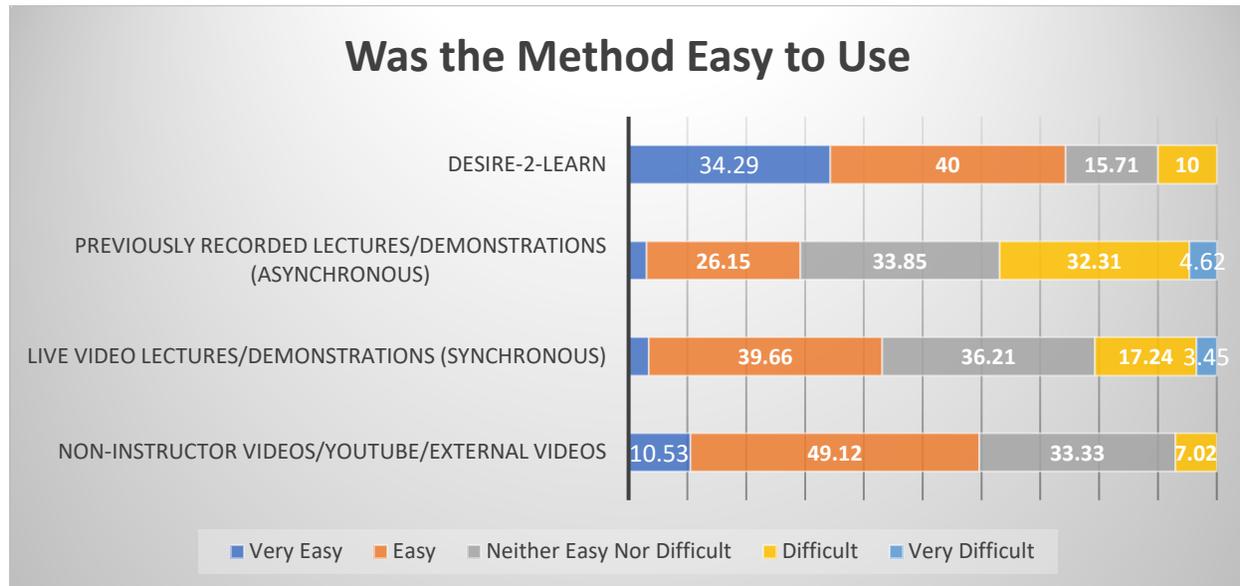
Note. Percentage of students who experienced a particular instructional method at some point in their online courses.

Figure 2
Continuing the Use of an Instructional Method



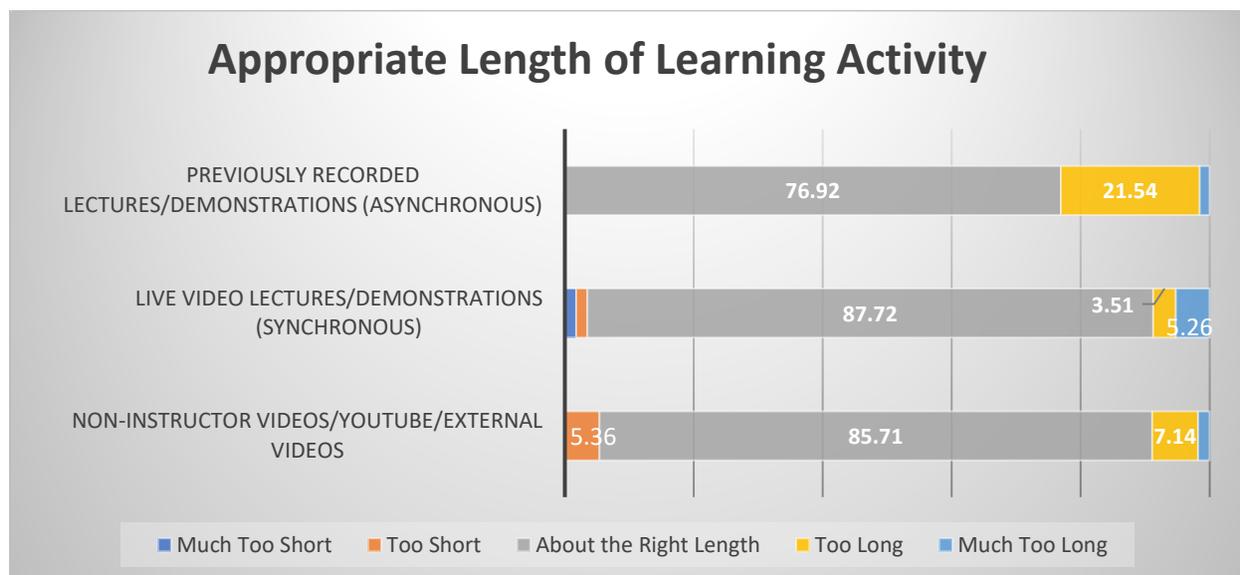
Note. Students were asked whether a particular instructional method should continue to be used in online course offerings. Differences in select responses should be noted due to appropriateness of a particular method to be offered in an increased or decreased capacity.

Figure 3
Ease of Student Participation



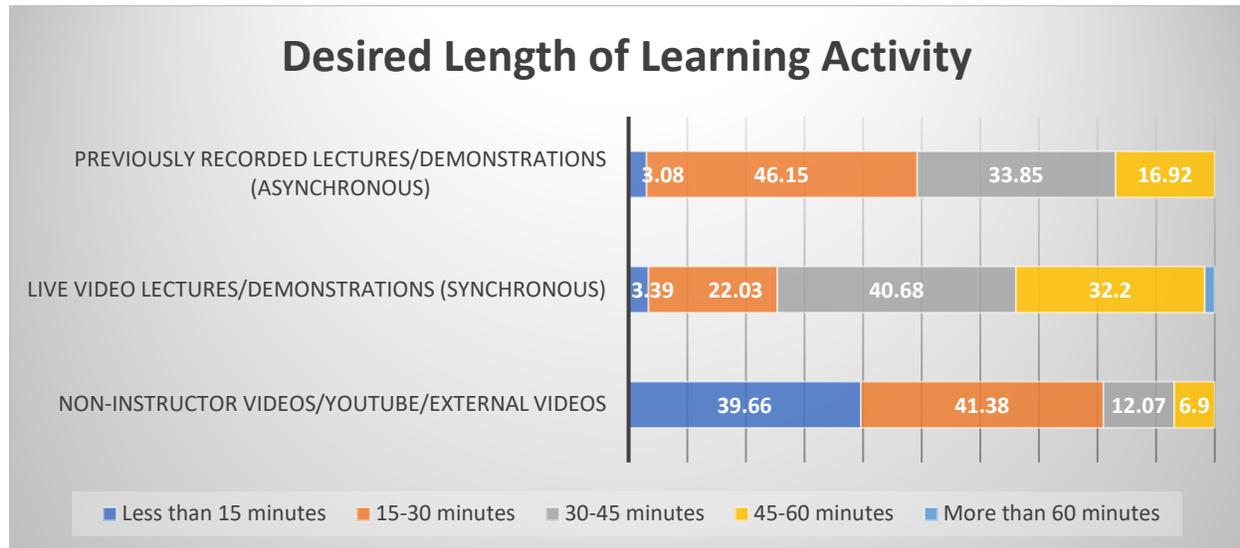
Note. Students were asked to rate the ease in which the learning activities within the instructional method were to participate. Questions included verbiage related to understanding, navigating, engaging, and remaining attentive to the activities.

Figure 4
Appropriateness of Activity Length



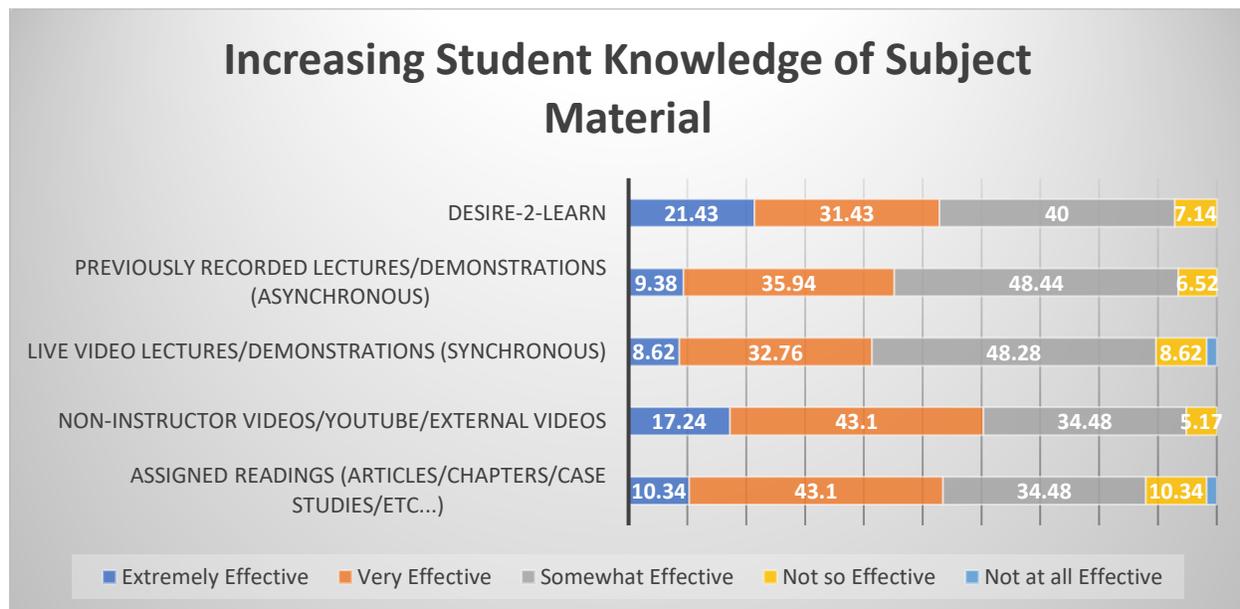
Note. Student responses regarding the perceived length of each learning activity within a particular instructional method. Methods not represented in this figure were not asked this question.

Figure 5
Desired Learning Activity Length



Note. Student responses regarding their desired length of each learning activity within a particular instructional method. Methods not represented in this figure were not asked this question.

Figure 6
Increasing Student Knowledge



Note. Student perceptions of the effectiveness of a particular instructional method to increasing their knowledge of the subject material.

Discussion

This study successfully documented student responses to the most applied online instructional methods at the SIUC Automotive Program during the spring and fall semesters of 2020.

Responses regarding length, ease of use, and effectiveness indicated these methods were successful in providing a positive educational experience for the majority of students in the Program.

Students seemed quite receptive of the D2L Brightspace LMS. Student suggestions for improvement supported Sugar's (2015) research regarding logical organization of content. Instructors are encouraged to attend CTE provided D2L training to create a more consolidated course organization and improve student experiences.

Both synchronous and asynchronous methods were generally well received by the students. However, most students found difficulty remaining engaged to learning activities in excess of 45 minutes. These results agree with Lynch (2019). Instructors are encouraged to design and select learning activities at a length between 15-45 minutes to maximize positive student perceptions and improve instructional effectiveness.

Student responses regarded externally sourced video content among the most effective and easiest to use of all methods experienced. These results aligned with Jackman and Roberts' (2014) findings. Instructors are encouraged to supplement online content with external videos carefully selected for accuracy and alignment with course concepts.

Responses indicated fewer students were exposed to synchronous delivery methods than any other method. However, many students indicated an appreciation and desire to participate in synchronous instruction. Instructors are encouraged to continue to utilize a variety of online instructional methods to motivate and address as many student learning styles as possible.

Student responses indicated an overwhelming preference for face-to-face instruction in technical automotive courses. Due to this discovery, online delivery of technical courses at the Program is suggested to be used in situations of necessity only.

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