

We Can't Go Back: Student Perceptions and Remote Learning Protocols

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COVID-19 accommodation protocols at The Citadel allowed faculty and students affected by the virus to quickly implement video-based instruction. Extending student access to classroom lecture as recordings on the LMS is just another step toward streaming educational content, as YouTube has made possible for years. Video-based lecture technology also lowers the barriers to education, making connection more physically and financially accessible. After nearly three semesters of implemented video-based teaching protocols in place, students are seeing the value in remote learning contexts when in-person learning is not possible. This paper reports student perceptions of selected effective approaches to hybrid/hyflex learning, comparing student and faculty perceptions regarding its value and effectiveness at a largely residential institution.

Faculty who taught remotely during the pandemic underwent continuous professional development at The Citadel in order to ensure successful academic experiences for both faculty and students. Faculty reported feeling significantly burdened with learning about this course delivery mode. Additionally, some faculty struggled with institutional compliance and regionally-approved best practices for instructional design. This paper examines some of the best practices and challenges for building and deploying a set of standards for online instruction, noting that while arduous, high fidelity instructional design creates value for students and faculty, both online and offline, with students appreciating readily accessible course materials and recorded lectures. Best practice recommendations are driven by synthesizing qualitative faculty feedback and Likert-scaled student survey data. Faculty and student survey results show that face-to-face learning is still the 'gold standard' for optimal learning opportunities, however, the pandemic has accelerated the build-out of hyflex course deliveries and created sustainable systems and instructional design standards for online learning. Student perceptions show that they identify and value selected unanticipated benefits to hyflex learning, despite faculty misgivings. This report presents this conflict of perceptions as an opportunity to be seized, and is part of a longer series of studies on student perceptions of learning effectiveness. Validation of results is preliminarily supported by similar protocols adopted at other institutions, and record-setting successes at the Dean, Department Head, and Instructional Design-aid level. Going forward, as the pandemic is brought under control, the authors foresee students' expectations rising: video-recorded lectures and remote connection during live lecture no longer present unsurmountable technological barriers and they aid student learning.

1. Introduction

As a follow-on study to work reporting on student perceptions of COVID-induced hybrid/hyflex instruction [1] this work seeks to (1) contextualize longitudinal student survey data on the effectiveness of hybrid instruction and (2) compare student perceptions to faculty perceptions, identifying gaps and opportunities where present.

Our work represents a longitudinal effort, beginning in Fall 2020, to capture engineering students' responses to, perceptions of, and evaluations of hybrid instruction. While hybrid instructional and classroom technology is already a well-researched field [2] – [6], its implementation at The Citadel was limited and often reserved for graduate courses or special accommodations for an instructor. Prior to pandemic protocols, engineering faculty on occasion

recorded voice-over-Powerpoint lectures and some labs as supplemental content for otherwise face-to-face courses. Engineering faculty at The Citadel are well-trained in in-person pedagogical best practices thanks in part to mini-ExCEED workshops [2], as well as online instruction, which is offered as professional development through The Citadel's Center for Excellence in Instruction, Teaching, Learning, and Distance Education (CEITL&DE). Similar centers operate within higher education Institutions across America, and even with regular faculty trainings, it is well known and acknowledged that an instructor faces a daunting time management task when planning for face-to-face, synchronous, and asynchronous instruction in a single course, which may allow for students to connect online or in-person, as health protocols dictate [7].

Learning Platform Definitions

The following platform categories are used in the longitudinal survey data and defined here in terms of their function and implementation at The Citadel.

In-Person Instruction – used interchangeably with F2F, or Face-to-Face, this term captures the traditional teacher-centered lecture and problem-solving style employed at The Citadel [1].

Swivl – A robotic iPad mount that sits on a tripod or desk and automatically tracks the physical location of the speaker and records audio for the person holding the marker, a remote-control device [1]. “The Swivl offers a holistic response to the need of preparing for many delivery options within one integrated system. Classroom setup is easy for most instructors, and they can start/stop recording and upload recordings to their Learning Management System (LMS) for asynchronous students. Faculty can hear and see remote students during the class while also employing recorded instruction for those who missed class or for future remote/online offerings” [1]. This method was employed to reduce room occupancy while half of the students stayed in other locations, such as their dorm rooms, the library, empty classrooms, or at home and connected over the LMS and Zoom and the other half met in person. These student cohorts would rotate throughout the week.

Remote Synchronous – Instructors lectured over Zoom at scheduled intervals and all students attended class through the LMS and Zoom at scheduled times throughout the week. Lectures were live, recorded, and archived on the LMS for later access (for both students and instructors).

Remote Asynchronous – Instructors pre-recorded lectures, board notes, and presentations into a weekly module, which students accessed through the LMS. Classroom and group interaction was limited to group projects and discussion posts, typically.

2. Institutional Context

The Citadel moved through four pandemic protocol phases since Spring 2020. Phase 0 began midway through Spring 2020, requiring all faculty to teach remotely, both synchronously and asynchronously. Students were sheltering at home. Phase 1 began in Fall 2020 and extended through Summer 2021, characterized by social distancing and mask protocols in academic buildings. During this phase, many faculty (~21%) were accommodated to teach online, both

synchronously and asynchronously. For courses taught by non-accommodated faculty during Phase 1, students were alternated in the classroom on a fixed schedule, ensuring that only half the class was ever physically present with the other half attending virtually and some of the classes experimented with novel pedagogical approaches like flipped classrooms to account for additional content posted and captured by the Learning Management System (LMS) [3] – [7]. Phase 1 was characterized by a rapid pivot to a suite of auxiliary technology that was adopted within the School of Engineering and beyond. These tools included: Canvas Learning Management System, USB mini-document cameras, USB pen tablets, Zoom, Swivl robot + iPad pairing, among others [1]. As a result, during Phase 1, students attended class in-person, remotely, and sometimes completely virtually. During Phase 2, which began in Fall 2021, comparatively few faculty remained on the accommodation list (~11%), and courses were taught completely in-person, unless, a student was quarantined. In case of quarantine, a student connected to class virtually. As a result, very few courses were taught remotely, yet faculty still needed to be prepared for hybrid teaching every class period in case of student quarantine. Phase 3 pandemic protocols began in Spring 2022, wherein no faculty are teaching online for accommodation purposes and students are physically present for all classes. Faculty still have the equipment to livestream and do so when notified that a student is in quarantine. The defining features of these protocols are summarized in the table that follows.

Table 1: Phased Pandemic Protocols

	Faculty	Students				Duration
		In-person	Swivl	Remote Synch	Remote Asynch	
Phase 0	All remote	No	No	Yes	Yes	Spring 2020-Summer 2020
Phase 1	Faculty accommodated (~21%)	Yes	Yes	Yes	Yes	Fall 2020-Summer 2021
Phase 2	Limited accommodated (~11%)	Yes	Yes	Yes	No	Fall 2021
Phase 3	0 accommodations	Yes	Yes	No	No	Spring 2022

In Table 1 above, Phase 1 shows the conditions under which The Citadel decided to return to campus. The Citadel chose to return to campus to the maximum extent possible. For those faculty who sought medical accommodations, the administration allowed many to teach using different modalities with few restrictions in order to establish a return to normalcy as much as possible. The unique mission at The Citadel requires leadership training, physical training, in addition to the academic requirements. In Phases 2 and 3, fewer people sought accommodations for various reasons to include the additional technology training requirements discussed here, as well as the safety protocols implemented in Phase 1 that were shown to be effective.

Using CEITL&DE to mobilize and train all faculty in online instruction, the following training modules were created, which faculty were required to complete. These online-facilitated trainings began in Spring 2020 and continue through the present day. Some of these trainings target only academic leadership at the Department Head and Dean level. Table 2 describes the training modules that are offered to faculty, as well as which faculty groups are the appropriate audience. QOT references Quality Online Training and pulls specific criteria from Quality Matters (QM) and presents these standards as actionable items that faculty can build into their instructional design of their course and the LMS.

Table 2: Online Instruction Faculty Training [1]

Type of Training	Faculty Groups Identified
Live Streaming (Canvas/Zoom/Swivl)	Required training for all faculty teaching on-campus/face-to-face
Canvas Fundamentals-QOT #1	Required training for all faculty
Best Practices in Teaching Online-QOT #2	Required training for all faculty teaching online
Curriculum Mapping, Alignment, and Parity-QOT #3	Required training for all faculty teaching online
Best Practices in Assessments (Grading)-QOT #4	Required training for all faculty
Zoom Hosted Training	Optional training for all faculty
Respondus Monitor LockDown Browser Training	Required if you plan to use online proctored exams or quizzes
Evaluating Online Teaching	Department Heads

As a result of pandemic planning, the Continuity of Instruction (COI) plan was strengthened. Already a robust requirement of the regional accrediting body, the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC), our initial COI plan included language ensuring instruction in the event of extreme weather, but implementation procedures were under-described. Extreme weather events in the fall are common at The Citadel, and were the initial motivations for our COI. Student technical requirements also changed, as The Citadel adopted standard language that all syllabi must contain for Fall 2020 onward. Students were required to purchase specific equipment such as a webcam, reliable Wi-Fi if off-campus, scanning (possibly with a smartphone), and masks for on campus presence. Syllabi also contained Zoom etiquette expectations for students to include webcam on if attending class, appropriately dressed, awake, etc.

Our COI plan now allots two days for evacuation and then resumption of all learning through remote methods if an extreme weather event occurs. If an evacuation occurs on a weekend, then the academic calendar stays the same. If it occurs during the week, remote learning on the weekend will be implemented to return the schedule to the proper flow upon return. The return-to-campus protocol mirrors this approach if it does not occur on a weekend, which would be most desirable. These are a few of the implementation approaches that changed or were made more concrete as a result of the pandemic.

3. Methods

A survey instrument was developed to capture student attitudes toward educational technology throughout the phased protocols, and initial surveying of engineering students began in Fall 2020. The purpose of the survey was to capture student evaluations of selected technologies that The Citadel used to temporarily replace in-person learning. The authors were also interested in student perceptions of educational effectiveness. Suspecting a mismatch between student evaluations of educational technology and faculty perceptions, a version of the survey instrument provided in Appendix A was also given to 41 faculty. 233 engineering students from sophomore, junior, and senior courses were surveyed, asking them to rank or rate the following educational technologies in order of effectiveness beginning with Face-to-Face lecture; Voice-over-PowerPoint (VoPPT); Swivl-robot; Remote Asynchronous Instruction (RAS); Remote Synchronous Instruction (RS); Lesson Notes; PowerPoint slides; and Video.

For the purposes of this survey, F2F represents traditional lecture styles; VoPPT identifies PowerPoint lectures that play as videos of lectures with screen focus on the content, not the instructor; Swivl-robot identifies class contexts where the instructor teaches online students as well as in-person students; RAS describes lectures that are pre-recorded and available to students on demand; RS identifies virtual lectures that occur as a designated appointment but may or may not be recorded and made accessible to students later. Lesson Notes are simply lecture notes posted to the LMS prior to class; and Powerpoint slides function the same way. Video identifies instructional, third-party videos that are already freely available online that the instructor may deem relevant to the course material. In the case of RAS, RS, and VoPPT, students have no choice as to what they view—visual cues are reduced and attention is focused on one screen, which also makes group work and peer learning in real-time a challenge.

4. Results

Across student cohorts and across semesters, students were consistent in their rankings of these offerings, selecting Face-to-Face (F2F), followed by Swivl, Remote Synchronous (RS), Remote Asynchronous (RAS), and Voice-over PowerPoint (VoPPT) respectively, in that order. Figure 1 below summarizes students' longitudinal ranking comparisons for these learning delivery modes when asked about the previous semester. For example, Fall 2020 survey results report on students' perceptions from Spring 2020, the first semester of the pandemic. Spring 2021 results report on the perceived effectiveness of Fall 2020 teaching, and so on. Students ranked these modalities from highest to lowest effectiveness (Likert scale, 5 to 1), using F2F instruction as the baseline. Based on our previous study [1], students ranked F2F as the most effective modality using a percentage-wise comparison. This study confirmed the inter-rater reliability of the student responses by asking students for an absolute comparison of modalities. Subsequent rankings of the other delivery modes (Swivl, RS, and RAS) could then be ranked higher or lower than F2F. Most student respondents ranked all of the alternate delivery modes as less effective than F2F, with 3 outliers.

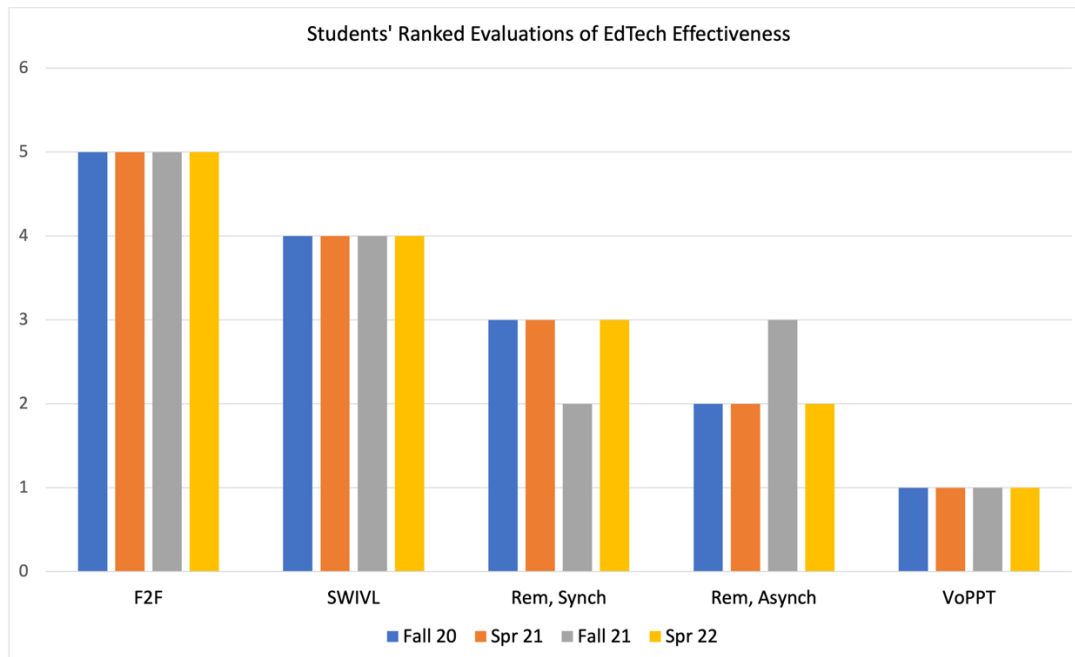


Figure 1: Students' Ranked Evaluations of EdTech Effectiveness over Four Semesters

In Fall 2021, there was a shift in student perception of RS and RAS, with RAS becoming more favorable. However, this change was within the margin of error of these two modalities during this time period. Surveys collected in Spring 22 identified three additional learning modalities (Lesson Notes, Powerpoint slides, and Videos), however, excluding these ranking categories and normalizing the resulting Likert scores results in the following rankings for that semester. Free text survey data revealed comments related to “Zoom burnout”. To explain this result, RAS instruction allowed students to learn at their chosen time and place without live engagement with the instructor or other students, which may have been helpful for those students experiencing Zoom burnout.

There is no evidence to suggest that students' grades were a factor in their perceptions of learning modality effectiveness. In a previous study, we compared engineering students' pre-pandemic and pandemic grades at The Citadel and found no significant difference in GPA. Those results are reproduced below in Table 3 [1]. While we did not compare students' resulting GPAs for these teaching modalities studied here, research overwhelmingly shows that students know what good, effective teaching and learning look like, as Lowman and others report [9].

We asked 41 faculty a variation of the questions given to students to gauge their perception of the effectiveness of different modalities. This survey was given in a similar format to the student questions and responses from the previous study [1]. Faculty who had taught under all protocol phases were asked to rank the relative effectiveness of Face-to-face lecture (F2F); Voice-over-PowerPoint (VoPPT); Swivl-robot; Remote Asynchronous Instruction (RAS); Remote Synchronous Instruction (RS); Lesson Notes; Powerpoint slides; and Video. Faculty were asked to evaluate each mode relative to F2F instruction, which was anchored at 100% effectiveness. Figure 2 summarizes a selection of these results. Faculty rated RS instruction the highest,

followed by Swivl, RAS, and VoPPT. These rankings do not align with student rankings. Faculty rated RS the highest, whereas students chose Swivl.

Table 3: Engineering Students' GPA Comparison Before and During Covid [1]

Term	Fall 19	Fall 20	Change	Spring 19	Spring 20	Change
	Pre-Covid	Covid		Pre-Covid	Covid	
Modality	Face to face	Hyflex		Face to face	Face to face & Remote	
Civil	3.024	3.169	+0.145	3.019	3.113	+0.094
Electrical	2.891	3.071	+0.180	2.720	2.961	+0.241
Mechanical	3.113	3.086	- 0.027	3.091	3.190	+0.099

In a subsequent Likert-scaled survey of faculty, many faculty members rated specific features of the Swivl offering comparatively low (overall average, 3.6), which likely reflects frustrations with the documented increase in classroom management needs, time investment, and fluency with technology to successfully run a Swivl classroom [1]. This initial investment is well known in the literature, and many faculty across institutions respond similarly to initial forays with Swivl-assisted courses [3] - [5]. In several faculty workshops, faculty expressed that the Swivl

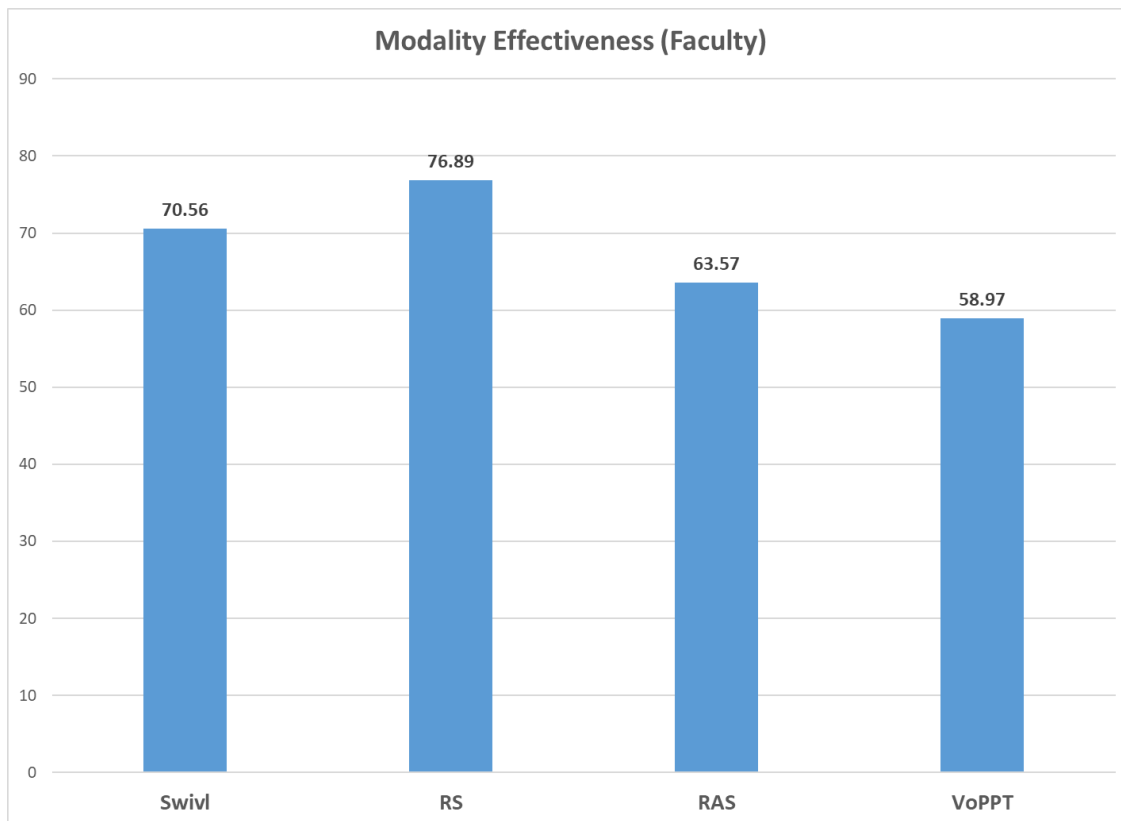


Figure 2: Faculty's Ranked Evaluations of EdTech Effectiveness

was difficult to engage students who were livestreaming as faculty attention was focused in the classroom and on those students present. In an RS modality, the instructor can see nearly all the students and deliver instruction. Additionally, in RS modes faculty tend to use Powerpoint to transfer knowledge, whereas faculty who use Swivl tend to use the whiteboard more to transfer knowledge. Swivl-using faculty likely prefer the white board because some remote viewers may experience difficulty reading a projected Powerpoint slide on a screen. Reflecting on student perceptions of RS, it is possible faculty came to over-value on RS instruction, resulting in some “Zoom burnout” reported by students in free text comments. Some of the cited contributors to “Zoom burnout” for students were Zoom-based faculty office hours, academic advising, extracurricular club meetings, and additional instruction all over Zoom.

Also of interest, faculty ratings of VoPPT effectiveness were higher than students’ perceptions, indicating a mismatch between these groups. Faculty are overestimating the value of VoPPT for students, and this may be an artifact of familiarity—many faculty already knew how to create well-designed PowerPoint presentations and VoPPT lessons prior to the pandemic.

5. Discussion

Faculty and student disagreement regarding the relative effectiveness of RS instruction and VoPPT instruction shows the widest gap in perceived effectiveness. Recall from Figure 1 that students’ ratings of these modalities were stable across four semesters. Students’ perceptions of Swivl were consistently the highest-ranked modality over four semesters, suggesting that this mode offered students an optimal next-best option in place of F2F instruction. Table 4 below summarizes updated, longitudinal data previously reported [1], and provides aggregate percentage ranks for each modality across students and faculty cohorts. 112 of 233 students are reported here due to differences in survey formatting. All 41 faculty responses are included. Differences in effectiveness rankings are captured in the third row of the table.

Table 4: Student and Faculty Aggregate Ratings of Teaching Modalities

Modality	F2F	Swivl – Hyflex	RS	RAS	VoPPT
Student Aggregate Rating	100% n=112	76.04	71.96	57.73	47.35
Faculty Aggregate Rating	100% n=41	70.56	76.89	63.57	58.97
Delta %		5.48	4.96	5.84	11.62

In free text comments attached to the survey reported on in Figure 2, faculty found Swivl classroom management to be daunting and time-intensive, and their survey results show faculty identification of RS instruction as the best alternative to F2F instruction. RS instruction is facilitated over Zoom at The Citadel, and can be used with or without the LMS, presenting a

lecture option that demands less monitoring and management on the part of the instructor. However, it is precisely this monitoring and management that students found to be beneficial—in free text comments many students noted that while not perfect, Swivl-assisted courses taught by teachers who employed them well were excellent and engaging. Students felt included in the course, and classroom dynamics and interaction could be lively and engaging. For whatever reason, Swivl-assisted courses captured student interest and engagement more than RS did, and the authors suggest this increased interest is tied to the more dynamic and active presentation style that is supported by Swivl. Of note, students can selectively choose what to pay attention to during F2F modes: lecture, group work, note-writing, board notes, etc. In contrast, during RS and RAS modes, faculty select the object of attention, and opportunities for interaction are reduced. This selective contrast may account for some of the mismatch between students and faculty regarding Swivl and RS instruction.

For faculty, though RS courses may require less technology, it may be worth reflecting on how much classroom interaction, the physical act of creating notes on the whiteboard, and the visual stimulus of the instructor moving about the room really contribute to student learning and engagement. After all, students know what good teaching looks like [9]. Lowman's two-dimensional model of good teaching, defined against the axes of Interpersonal Rapport and Intellectual Excitement, has been well attested in pedagogical studies [10]. Students consistently use the following adjectives to describe good teaching: caring, available, personable, and challenging [10]. Swivl, though not a perfect replacement for face-to-face instruction, may offer just enough of the classroom rapport dynamics to students that they perceive it has maintaining an edge over the more passive RS mode, wherein everyone is likely seated (including the instructor). Put another way, despite its initial learning curve, Swivl may allow faculty a means of displaying more of their natural teaching style than other modes of instruction.

Students were not the only group who faced challenges in adapting to pandemic protocols. Outside commitments like caretaking for children, the elderly, and sick family members likely motivated some of the faculty over-valuing of RAS and VoPPT modes. Managing existing and new time commitments required many faculty to resort to recording lecture videos when their children were sleeping and distractions would be minimal.

Perception mismatches between faculty and students can provide common ground for conversations steering institutional policy, educational technology, and support services. Follow-up studies to this project will investigate what resources faculty would need to feel adequately supported in a Swivl-assisted classroom, given students' preference for this as an alternative mode. This work will also investigate faculty reservations regarding Swivl and similar technology, assessing the degree to which concerns for privacy, academic freedom, and remote classroom access impact faculty adoption of this mode. This report provides a snapshot of student observations and expectations. Rather than relying just on intuition, this report functions as an invitation for curious faculty as to what worked and what could be improved from students' perspectives.

6. Conclusions

Some preliminary research suggests that while faculty and students both experienced an abrupt change in the teaching and learning experience as a result of COVID, students have been quick to adapt to these changes, with no significant differences found for students with minoritized identities and those belonging to dominant identity groups in the areas of disciplinary ‘belonging,’ and teaching and learning presence, to name a few [11]. Additionally, students adapted quickly to technology pivots that some faculty may have struggled with. Interestingly, students were consistent in their rankings of educational technology effectiveness, and results show a perceptual mismatch between students and faculty. Authors speculate that some differences may have emerged as artifacts of technology preferences for faculty rather than true evaluations of effectiveness. Faculty may have rated some modes of instruction higher because they were more familiar with them rather than those modes being more effective.

While RS, RAS, and Swivl instruction are acknowledged in the literature to be more difficult for instructors and require more preparation time, these delivery modes are likely to stay with us in higher education. Many institutions were already expanding their instructional delivery modes prior to the pandemic. The pandemic brought technology coupled with instruction to a wider audience, offered many conveniences, and lowered the barriers to accessibility for many. The purpose of technology use in this context is to support teaching excellence, but due to misconceptions—some of which were identified in this study—the full adoption of educational technology may not yet be widely accepted by faculty or employed to its fullest potential. This study identified mismatches in perceptions between students (learners) and instructors (learning facilitators). F2F learning may never disappear from the higher education landscape, while remote learning has gained a foothold that will likely endure after the pandemic. How instructors meet the changing needs of students will be a challenge.

The purpose of teaching is for students to learn. Faculty have a suite of classroom techniques and technologies, but in the end, student learning is paramount to convenience. As these technologies evolve, we need to continue to have touchpoints with students to measure effectiveness of educational technology. We recommend both passive and active measures of student engagement and perceptions. Passive measures could look like regular use of LMS engagement statistics that identify time on task within F2F, Swivl, RAS, and RS modes. Active measures may look similar to the longitudinal survey data presented here—listening to students when they tell us what works for them and what does not, and tracking those responses through time.

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Appendix A

All: Now that you have had a chance to see your grades from **the 2020-2021 year + Fall 2021**, reflect back on the different modes of instruction, we would like to survey you on the instructional delivery.

1. Year? Senior Junior Sophomore Freshman

2. Rank the following in order of effectiveness with **‘6’ being most effective and ‘1’ being least effective**. Compare the modalities only to each other in order to evaluate.

- ___ Voice over Powerpoint
- ___ Swivl-Hyflex (part face to face, part livestream)
- ___ Remote, asynchronous (pre-recorded instruction)
- ___ Remote, synchronous (live instruction)
- ___ Face to Face
- ___ Other

Rate the following statements on a scale of 1-5 with **‘5’ being strongly agree and ‘1’ being strongly disagree**.

1. My grades from Fall 20 were what I expected.
2. It is important to me that I see my instructor every lesson (in person or livestream).
3. Technology issues made Swivl-Hyflex stressful (i.e. wi-fi, logging in, etc.).
4. Swivl-HyFlex allowed for smaller in person classes. I found this a more comfortable learning environment.
5. Swivl-HyFlex allowed every other lesson remotely by livestreaming. I found the remote learning a more comfortable learning environment.
6. I was tempted or easily distracted to do other things (check phone, email, watch videos, etc.) while livestreaming.
7. Other students who were livestreaming were distracting (private chat, texts, etc.).
8. Other students who were not livestreaming (roommates, other students coming to room, construction) were distracting (private chat, texts, etc.).
9. I was able to overcome the distractions to do other things within the first few weeks of the fall term.
10. I was able to overcome the distractions to do other things by mid term.
11. I was able to overcome the distractions to do other things by the end of the term.
12. I was never able to overcome the distractions to do other things while livestreaming.
13. I feel livestreaming in the academic areas (room, library, empty classroom, etc.) was better than livestreaming from home.
14. I liked the fact that livestreaming allowed me to interact in real time vs. asking after class or in office hours.
15. At least one of my instructors made the Swivl-Hyflex recordings available if we missed class.

16. I found the Swivl-Hyflex recording useful (missed something and needed to see it again, gain clarification, etc.).
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17. Some of the information on the recorded lessons was hard to read (writing, glare, etc.).
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18. Every instructor should be required to allow their students to access recorded lessons.

19. What do you like best about the Swivl-Hyflex teaching (alternate face to face and livestream)?

20. What do you like least about the Swivl-Hyflex teaching (alternate face to face and livestream)?

21. What about the Swivl-Hyflex system make it easier for you to learn?

22. What about the Swivl-Hyflex is most stressful or distracts from learning?