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Résumé de l'article

The paper reports a collaborative self-study on instructor's and students' experiences in a HyFlex course in a higher education institution. The COVID-19 pandemic acted as a catalyst for the resurgence of multi-modal course delivery such as HyFlex instruction in higher education settings. The reported collaborative self-study aimed to examine both the instructor's and the student's perspectives on HyFlex learning. One instructor and seven students in a HyFlex class participated in the study through shared individual and collaborative reflections on their experiences. The findings indicated the benefits, potential, and challenges of HyFlex learning and instruction.

INSTRUCTOR'S AND STUDENTS' PERSPECTIVES ON HYFLEX LEARNING: A COLLABORATIVE SELF-STUDY

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ABSTRACT

The paper reports a collaborative self-study on instructor's and students' experiences in a HyFlex course in a higher education institution. The COVID-19 pandemic acted as a catalyst for the resurgence of multi-modal course delivery such as HyFlex instruction in higher education settings. The reported collaborative self-study aimed to examine both the instructor's and the student's perspectives on HyFlex learning. One instructor and seven students in a HyFlex class participated in the study through shared individual and collaborative reflections on their experiences. The findings indicated the benefits, potential, and challenges of HyFlex learning and instruction.

KEY WORDS: Collaborative self-study; Hyflex learning and instruction; Multi-modal instruction; Self-study

INTRODUCTION

The COVID-19 pandemic acted as a catalyst for the already rapidly growing distance learning trend in higher education. Nearly every higher education institution transitioned their courses into online delivery resulting in a variety of course delivery methods including hybrid, blended, and multi-modal methods with the latter becoming more prevalent due to the COVID-19 pandemic (Keiper et al., 2020). The flexible and resilient

learning environments that emerged during the pandemic remained in place in higher education settings even after campuses reopened (Ali, 2020). Many faculties are employing multi-modal instruction to accommodate health risk concerns. One emerging course delivery format is called HyFlex, where instruction consists of both online and in-person student attendance in the same course, allowing flexible participation modes for the students (Beatty, 2019).

In the years leading up to the pandemic, HyFlex courses grew in popularity as higher education institutions became aware of the potential that mixed modalities had in meeting the changing learner needs. Graduate studies and high enrollment programs particularly benefited from increased retention and customized student experiences (Sowell et al., 2019). Post-pandemic studies about HyFlex learning have also proposed that COVID-era pedagogies illuminated teaching innovations that should not be forgotten as learning transitions to a new normal (Konkin et al., 2021). The flexibility that this modality affords to learning environments, course delivery, student engagement, and assessment activities continues to significantly shape the trajectory of higher education, but is not without obstacles (Howell, 2022).

The transition to long-term HyFlex learning options will undoubtedly be challenging for instructors with limited training, time, resources, and learning design skills, and for students who must adjust to the new learning format (Karma et al., 2021). Questions remain: How do instructors design, deliver, and manage HyFlex learning environments? How do students navigate through the new learning environment where a combination of in-person and online presences co-exist? How can equivalency be ensured to maintain equitable student experiences and evaluations? The purpose of this research was to examine both instructor and the student perspectives on HyFlex learning environments through collaborative self-study research.

LITERATURE REVIEW

Online education has long been a trend in higher education, undergoing exponential growth since the start of the 21st century. One of the pioneer journals in the field of online learning, the *Journal of Asynchronous Learning Networks* (now known as *Online Learning Journal*), was established in 1997, around the time when online education began to gain popularity in higher education. Since then, the research on online learning and teaching has flourished, resulting in a great number of publications and journals primarily devoted to this area of research. Pre-pandemic, much of the online education practices were conducted through learning management systems (e.g., Blackboard, Canvas) with the use of asynchronous discussion forums as a primary interaction and communication tool. Some synchronous instruction practices were documented as well, such as Blackboard Collaborate. Both types of online environments had students and instructors at different locations.

The hybrid flexible environments (HyFlex) where students could choose to participate in-person or online via distance through synchronous technologies has only recently gained popularity. Limited research had been conducted on this type of learning before the pandemic (Raes et al., 2018). HyFlex learning evolved from hybrid learning or blended learning. There are various definitions for hybrid and blended learning, and these two terminologies are often used interchangeably. Some scholars define hybrid and blended learning in similar ways. For example, Linder (2017) defined hybrid learning as a combination of face-to-face activities and technology-mediated learning. It often means reduced in-person time because some learning activities are taking place outside of the classroom or through technology-mediated activities such as synchronous online instruction. Similarly, blended learning combines in-person instruction with technology-mediated instruction (Graham & Dziuban, 2008), or is a blend of in-person instruction and online instruction (Saichaie, 2020). While students experience a combination of in-person learning and technology-mediated learning in hybrid or blended learning environments, the HyFlex class allows the students to choose to attend the class either in-person or synchronously online (Butz et al., 2016; Hastie et al., 2010).

The concept of HyFlex learning emerged before the COVID-19 pandemic. Beatty and colleagues (2006) at the San Francisco State University (SFSU) developed the HyFlex course design as part of an effort to offer their programs online (Beatty, 2019). The HyFlex course delivery that SFSU developed added an online component but maintained in-class attendance as an option. Students could choose to attend the class in-person or synchronously online at a location of their choice. This course delivery format became widely adopted in educational settings during the pandemic and continued to be a trend in higher education as universities transitioned back to in-person learning in the fall of 2021 (Rider & Moore, 2021). HyFlex course delivery as part of multi-modal instruction has the potential to offer flexibility to adult learners, allowing them to better manage work, school, and personal commitments (Abdelmalak & Parra, 2016). HyFlex learning can also contribute to instructor's academic preparedness and students' academic excellence (e.g., Azimzadeh et al., 2021). In an analysis of 19 research articles about HyFlex learning in higher education, Howell (2022) found that HyFlex learning promoted student agency because of its allowance for student choice and flexibility. Howell suggested that HyFlex learning environments be designed with support for student self-regulation to manage this flexibility and agency. When comparing the modalities of non-traditional students enrolled in two large sections of an undergraduate finance course, Calafiore and Guidici (2021) discovered that equal overall class performance was possible for students enrolled in both hybrid (blended) and HyFlex sections. While grade distributions in the courses were higher in some cases for HyFlex learning, students' final grades did not reflect a difference. With this in mind, we must consider other added benefits for HyFlex instruction.

At the same time, emerging flexible learning environments present new challenges to the instructors and the students. For example, Leijon and Lundgren (2021) found that faculty experienced challenges interacting with both in-person students and online students. One faculty member felt that his movement was constrained to the area in the teacher station as

he had to handle the computer and the whiteboard while interacting with the camera. Another faculty member admitted that the interaction with the students in the classroom required all her attention and she lost focus on the online students. It was challenging for professors to manage a HyFlex learning environment where they had to take attendance, differentiate the learning, and develop meaningful social interactions between students (Howell, 2022).

While HyFlex instruction offers students flexibility to participate either in-person or at a distance, students have found it challenging to participate in class discussions and group project collaborations (Kohnke & Moorhouse, 2021). In Kohnke and Moorehouse's (2021) study of nine postgraduate students' HyFlex learning experiences, some participants found it hard to get the instructor's attention when the instructor was talking to the students on Zoom, and online students found it difficult to get the instructor to join their breakout room when they needed the them. Similar conclusions were found in a study of HyFlex learning at Kings College London (Detyna et al., 2023). Based on the data, the researchers found that HyFlex learning was associated with cognitive overload and challenges with social presence. They suggested that institutions should use multiple high-quality audio-visual tools in the classroom and increase pedagogical training for instructors.

In addition to the challenges that HyFlex learning can present to students' equal access to learning and ensuring equivalencies, questions about academic integrity and reusability have been raised (Eshet et al., 2023; Jacka & Lindsay, 2022). When designing HyFlex courses, sustainability and reusability of design are significant incentives for faculty adoption. Models that can be employed and modified as appropriate for the long-term are critical for instructors who express concerns that the development of a HyFlex model will increase the time and skills needed to develop multi-modal courses. A study by Mills (2022) about HyFlex teaching in higher education laboratory courses demonstrates that consistent use of learning management systems and course materials not only ensures equitable student access, but also streamlines faculty design loads when materials can be reused and revised over time.

Beyond faculty preparedness, the student-driven nature of HyFlex learning environments is best fostered by intrinsic motivation to learn. Bockorny et al. (2023) suggest that the flexibility of HyFlex reduces student stress and increases positive learning experiences through personal agency. In their examination of a pre-pandemic graduate course, Abdelmalek and Parra (2016) found that accommodating individual student learning needs and personal circumstances led to a positive perception of accountability and motivation.

The re-emergence of HyFlex learning due to the COVID-19 pandemic presents a challenge to better design and deliver HyFlex learning in higher education, and at the same time offers an opportunity for more research in this area to better understand faculty and students' learning experiences in order to better accommodate the student's needs and better support the instructors (Romero-Hall & Ripine 2021). Universities need to explore and learn from how HyFlex was used during the pandemic (Busta 2021) and ensure

thoughtful planning, careful analysis, and continual assessment and evaluation (Rider & Moore, 2021) as they consider adopting HyFlex course delivery as part of their offerings moving forward. This study aimed to contribute to the literature in the field of HyFlex learning by presenting a case of a HyFlex graduate course and sharing both the instructor's teaching experience and the students' learning experiences with HyFlex course delivery format.

THE STUDY

This research was a collaborative self-study among one instructor and seven students regarding their teaching and learning experiences in a HyFlex graduate course. The research questions that guided this study were:

- What are the benefits and challenges of HyFlex learning and instruction?
- How is HyFlex learning and instruction different from other course deliveries such as asynchronous online learning and in-person instruction?

The research took place in a graduate course at a mid-Atlantic university in the United States. As part of the transition back to in-person learning in the fall of 2021, the instructor taught a class where one student attended in-person, one student watched recorded videos, and ten students participated via Zoom. This delivery method was offered as a requirement of the doctoral program so that students from both the online program and the on-campus program could enroll in this class. The classroom was a computer lab with one teacher station, one whiteboard, and one projecting screen. The room was equipped with an OWL camera that allowed the instructor to move around the room without affecting the audio and video quality. The instructor projected the online participants in Zoom on the whiteboard so that both the instructor and the student in the classroom could see the faces of online students on the whiteboard. The presentation slides were shown on the teacher station's computer screen. The student in the classroom opened the presentation slides on her laptop so that she could follow along with the instruction.

THE PARTICIPANTS

The participants came from a core course in a doctoral program on digital learning environment design at a mid-Atlantic university in the United States. The instructor had taught the same course eight times. The conversations about HyFlex learning and instruction started as part of the class discussion since this was a new experience for both the instructor and the students. We hoped to be able to share our experiences with a larger audience and therefore formed a self-study group with voluntary participation from anyone in the class to continue this conversation. Possible benefits to participating in the research included reflecting on their own experiences, making sense of their learning experiences, and improving themselves as a learner in such a learning environment. Part of the self-study included a review of the literature on HyFlex learning and instruction so that the participants were engaged in additional learning outside of the class about this type of delivery modality. Participation in manuscript preparation for conference presentations and journal publication was another benefit to the participants.

Eight doctoral students initially volunteered to participate in the collaborative self-study research; one student withdrew from the study due to time constraints. Among the seven remaining participants, one was male and six were female. The students were at different stages of their doctoral program of study, ranging from being in their first semester of study to completing their final courses. The student participants had different levels of online learning experiences. Five of the student participants were experiencing the HyFlex learning modality for the first time, one participant had experience supporting faculty with HyFlex teaching as an instructional support personnel, and another participant had taught a multimodal class to high school students.

THE METHODOLOGY

The instructor and the students formed a self-study group voluntarily to share experiences with the HyFlex course delivery format. Self-study is defined as “the study of one’s self, one’s actions, one’s ideas, as well as the other” (Pinnegar & Hamilton, 2009, p. 266). Self-study focuses on improving professional development and practices in the field and aims at identifying and reframing problems of practice encountered by practitioner-researchers in the hope of improving their practices (LaBoskey, 2004). There has been a tremendous growth of self-study research among teacher educators since the 1990s (Lunenberg, Korthagen et al., 2011). Not only can educators improve their practice through self-study, but they can also help develop formal knowledge on teacher education through research dissemination (Korthagen & Lunenberg, 2004). Aligned with action research, self-study examines researchers’ practices in action within their educational contexts, aiming to improve their professional practices (Hamilton & Pinnegar, 1998).

This study was a collaborative self-study where researchers collaborated as “insiders” and conducted research within the natural learning environment as is done in action research (Kemmis et al., 2014). Collaboration is an “unavoidable consequence of research” and effective research often involves partnership and group work (Clausen, 2021, p.1). Also described as “self-study action research” or as “living theory”, this methodology provides an opportunity for improving educational practices through reflection, analysis, and study of work alongside students, colleagues, and peers (Glenn et al., 2017). This work features teacher and student critical self-reflection toward improving learning and practices within the classroom. In this process, researchers take an empirical, reflective self-study approach as an extension of action research (Feldman et al., 2004).

Bullock and Ritter (2011) stated that collaborative self-study research may present vulnerabilities with each other given the focus on problematic features of practices. The participants in this study approached collaborative self-study with a focus on their experiences with the course delivery rather than the course content. Specifically, the participants individually shared their reflections after each class session on their experiences with the HyFlex learning regarding the benefits and challenges of the technologies used in the HyFlex class. Those shared reflections served as one source of data for this study. The group then met monthly to collaboratively reflect on their experiences with the HyFlex course delivery format, and the collaboration reflections during those

monthly meetings were collected as data sources for the study as well. The data collection lasted one semester (i.e., until the end of the course). Each participant completed a reflection journal after each class session. The journal reflection focused on the participant's experiences with what worked well and what did not work well during that class session. Additionally, the group met three times via Zoom to collaboratively share and compare their experiences. The group Zoom meeting provided an opportunity for the participants to elaborate on their experiences that were recorded in their individual journals and add to each other's experiences with their own reflections. The Zoom meetings gathered all participants including the in-person participant, the online participants, and the participant who watched the recorded videos. This allowed them to share and compare their experiences with different delivery modalities. The group Zoom meetings were recorded. Both individual journal reflections and the Zoom meetings took place outside of class time. All reflection journals and Zoom meeting notes were shared through the institution's Office 365 OneDrive.

All participants were engaged in the data analysis process. Through the "joint collection, coding and analysis of data" (Glaser & Strauss, 1967, p. 43), the participants developed categories and identified themes from the data. Specifically, each participant coded their own reflection data through open coding (Saldafia, 2009). The participants then reviewed each other's coding along with their original reflection data to compare, create, and refine categories through constant comparison (Strauss, 1998). By reviewing each other's codes, the researchers were able to achieve a certain level of inter-rater reliability (O'Connor & Joffe, 2020). In other words, each participant's journal was coded twice; once by themselves and once by a different participant. The group Zoom meetings served as both a data collection and data analysis venue. In earlier group meetings, participants shared and compared their experiences, which became part of the data sources for the study. Toward the end, the participants compared the codes from their own reflections to what was shared during the group meetings to generate categories and themes from the data. Those were recorded as part of the group meeting notes.

FINDINGS

Although all participants had already experienced fully asynchronous online classes, they found the HyFlex learning quite unique in many ways. They reported both the benefits and challenges of online learning and in-person learning in their reflections. The online student participants chose the online option due to its convenience (e.g., saving the commute time) and the in-person student participant appreciated the convenience of talking to the instructor before, during, and after class.

All participants reported similar and different experiences when comparing HyFlex environments to traditional face-to-face environments. The instructor reported having a sense of traditional classroom teaching when teaching in a physical classroom: "Teaching in the classroom is different from teaching in front of the computer. I have the same feeling of teaching it in-person. Teaching while standing makes me feel more like "teaching." For the students, in a HyFlex class "seeing the classroom makes it feel like 'in class'" (Tina), and it is

“similar to face-to-face class” (Betty). Other similar elements in both types of learning environments include: 1) all students had the opportunity to participate and engage in class activities; 2) both environments allowed the integration of various technologies; 3) group work was possible in both environments although it was more challenging in the HyFlex environment. The following sections present the themes that emerged from the data analyses in various areas.

Connection

There are many differences that the instructor and the students reported when comparing the interactions in the HyFlex class to a face-to-face class. The online students felt they were missing the connection with the instructor and the students in the classroom, and the instructor perceived that the connection with the in-person student was much closer compared to the online students. There was a lack of opportunities for informal check-ins between the online students and the in-person students/instructor, although the instructor offered to stay after class for questions and answers. The participants felt they were missing non-verbal cues and the opportunity to greet classmates as they would do in a face-to-face class. Seeing the physical classroom in a HyFlex class was a bonus compared to a fully online class. Tina, a student who completed her master's degree at the same university, was very excited to attend the doctoral program. “I did not realize how much I miss attending in-person classes until I spent a little more time looking at the classroom in today's class. Although this is more of a nostalgic moment than a commentary on the class format, I think this experience speaks to the way physical learning spaces influence our experiences. I spent a lot of time in those rooms, and it is exciting to regain some of that connection.”

Unlike the online students who felt somewhat distant from the people in the classroom, the in-person student (Lily) felt more connected with the instructor. Lily appreciated the opportunity to talk to the instructor during class and have discussions right after the virtual class with the instructor: “I really liked talking to the professor after class. I felt like it made me feel more comfortable to ask what feels like stupid questions.” Having limited online learning experiences, Lily felt that she worked better in a face-to-face environment. However, being the only in-person student, Lily felt strange and lonely: “I felt like being in class was burdensome for the professor” and “felt like I was the only learner even though there were multiple faces on screen. In a way, it did not feel like they were real students.”

It was helpful to the instructor to “have all the students on the screen all the time” as she felt like she could see them as she would normally do in a face-to-face class. However, the instructor felt more connected with the in-person student: “having a student in the classroom with me makes me feel more connected to the student.” Additionally, the instructor shared: “the small and casual talks before and after class with the in-person student is helpful as it is easy to answer her questions and check her understanding.” The instructor believed those informal conversations were opportunities for the students to get connected with each other and get their questions answered right at the moment. “Lily and I walked to the garage together after class and we had conversations about the topics that

we discussed in class. Those conversations that I have had with Lily before and after class are something that the online students do not have.” This view was shared from a student’s perspective as well as evidenced in Eileen’s reflection journal: “I am still missing the in-person interaction before and after class and during breaks. Those are great opportunities to informally ask for feedback/clarification and brainstorm with classmates in a way that is tough when some students are in the classroom with the professor and some are not.”

Betty, a student who watched video recordings after class, found that the interaction between the professor and the online students helped clarify the lesson content. For example, any time she paused the video to write down a question about the lesson material or marked her notes that she needed clarification, an online student asked a question, and the interaction between the instructor and the student asking the question clarified the content. However, when the professor was interacting with the in-person student, it was difficult to hear what they were saying. The audio did not always capture the in-person student clearly. It was very difficult to see the instructor and the online student, especially when the instructor shared her presentation. The Zoom recording displayed the presentation clearly but only provided a small icon for the speaker. If the speaker was an online student, it was easy to see them in the small icon because they sat in front of their camera. However, if the instructor or the in-person student were speaking they showed up very small within the small icon. When playing the recording, Betty could not enlarge the icon to see the instructor or the in-person student.

When this study was conducted, wearing a face mask was still mandatory and was considered a barrier to community building by some participants. As Eileen reflected, “yesterday’s consideration of classroom communities made me more aware of how detached I feel from Lily and the professor in our HyFlex format. Their need for masks vs. the virtual learners being able to see one another makes this more pronounced.”

Participation

The HyFlex class certainly allows both in-person students and online students to participate and engage in class activities. As Tina noted in her reflection, I thought being online meant that we would mostly watch an in-person class... However, I quickly realized that this would be very interactive for both in-person and virtual learners....The virtual learners were called upon to share as much as a typical class.”

The online students shared many concerns about online participation in a HyFlex class. Some were curious how they looked on the screen to the in-person people; Eileen wrote in her reflection: “I found myself wondering how big our faces were on the classroom screen.” They were more conscious of their behaviors such as getting up, reading notes, and turning off the camera, and they were concerned that such behaviors might be interpreted as not paying attention in class. Online students shared that it was difficult to stay focused in a Zoom room as they could get distracted easily; John shared, “the newness of having a screen that displayed the instructor and the student in the classroom was slightly distracting because I kept toggling the views in Zoom to determine which view I liked best.

I ultimately wound up maximizing the video displays of the class and pulling up the slides on a different screen.” Other students found it difficult to “feel engaged online” and “challenging at times to sense when it was best to jump into the conversation” (Eileen). The online students were concerned about cutting off others when joining the discussions. In addition, the online students reported that it was difficult to see the in-person student sometimes due to the limitations of the video technologies. For example, Betty reported that it was difficult to see the professor at times and hear the in-person student during teacher lectures and whole group discussions. As the instructor moved around the room, the technology did not always keep up with her. When the instructor shared the screen, not all students were seen on the screen, so it was challenging to determine when it was appropriate to join the conversation.

Lily, the in-person student, shared that she had more urgency to respond when the instructor raised a question for discussion, especially when no one spoke from the online group. She felt that she needed to respond when the instructor looked her way, but at the same time was concerned that she might “cut someone else off from getting to speak.” Lily had no issue with staying focused in class. In fact, she felt “more focused when coming in early on campus” (Lily). While Lily felt pressure to respond to discussion questions in class, she always waited “for the virtual students to sign off to ask questions even though other students may have benefited from hearing the answers.”

The instructor noted that online students were hesitant to jump into the discussion. She wondered if it was because they were waiting for the best moment to join as Eileen shared in her reflection. The instructor sometimes called on the online students to share their thoughts related to the discussion topic, which was considered to be a helpful way to encourage their participation (Tammy). The instructor noticed that the in-person student typically waited until the online students left to ask questions. She wondered, “If the online students felt the same way. In fact, I received an email from a student after class asking to meet with me one-on-one regarding some questions. I wonder if this is one of the disadvantages of online classes. The student could have easily stayed after class to ask me those questions if she were in a face-to-face class.”

Group Work

Both the instructor and the students found that group work could be challenging especially when using breakout rooms in Zoom. The breakout rooms are not “private” in that the in-person students can see and hear the breakout room’s discussions whenever the instructor visits there. Once in the breakout room, the students can no longer see the shared screen in the main Zoom room. The instructor expressed the challenge of using breakout room for group work in her reflection: “I realized there was one challenge for me as an instructor to monitor the breakout room discussions. I had one student in the classroom. So I put the student in the classroom along with her group members in the main room. The other group was in a breakout room. However, I couldn’t visit the breakout room as it would have impacted the student in the classroom (she would be able to see and hear what the other group is doing).” While the in-person student felt “the breakout room implementation went

well," she could see how the professor "not being able to enter the room as an instructor for the all-virtual group could be an issue" as she had similar experience teaching hybrid class at her own school: "there is really no way around this unless she takes the device into another location." Tina, an online student, shared a similar challenge with breakout room: "I was in the group that broke away from the professor and the student within the classroom. This meant that the teacher was never able to pop in and visit our team because she would have brought a member from the opposing debate team with her."

In a later session toward the end of the semester, the instructor assigned the in-person student to work in the room across the hallway from the classroom, which helped resolve the issue with the breakout rooms. Though challenging, all students reported that they enjoyed the breakout room activities: "I really appreciated the group discussion and breakout room/debate activity as a way to talk through real-world applications of our conceptual change theories with classmates. We have a nice mix of diverse backgrounds...so I find these moments to be very helpful for contextualizing theories and to learn more about applications in contexts outside of my own."

Getting a group consensus online can be a challenge. Betty reported that her group had a difficult time deciding on the topic for their group's online design project. They were asked to choose a topic to teach the other group of students asynchronously online. During the planning session, there were connection issues with the in-person student. It was difficult to hear the in-person student talk. There was also feedback noise from other groups who were speaking with the instructor in the classroom.

Another technology that was used for group work in the class was Padlet, which the students found to be helpful for collaboration. In the Padlet activity, students were asked to share and discuss their opinions about what makes a successful distance learner; the students could anonymously post their ideas to the Padlet board. As Lily shared in her reflection: "we tried the Padlet in class and it worked very well. I thought it was interesting how different students used this technology in different ways. I also liked that it was a shared collaborative area where we could share our reflections."

Technology Challenges

Instructor's Challenges

Teaching a HyFlex class was challenging to the instructor: "Managing multiple screens can be a challenge." In a typical Zoom meeting, the instructor can see the presentation slide and the participants' window on the same screen. However, in a HyFlex class, "I have to use the 'extend' feature to drag the participants' window to another screen so that the in-person student can see them, and I can see them on a bigger screen." The teacher station showed presentation slides. The drawback of doing so was that the in-person student could not see the slides and she had to use her personal laptop to access them. A challenge for the instructor was that she had to "monitor the projector's screen and the teacher station's computer screen at the same time so that I can see both the slides and the students." She said, "I do have to pay attention to the projector's screen as sometimes a student might

leave the room due to internet issues and I have to allow them to come back in.” Because of this, the instructor reported sometimes missing questions from the online students especially when the students posted the questions in the chat.

Another technology challenge the instructor experienced was the use of breakout rooms. The instructor felt it was difficult to manage the breakout rooms with in-person students in the same room as her. “I couldn’t visit the breakout room as it would have impacted the student in the classroom as she would be able to see and hear what the breakout room group is doing.” Additionally, the instructor found that she couldn’t do private chats with the online students. With the Zoom window shown on the projector’s screen, the in-person student can see everything on the screen including the private chats. The instructor noticed this when an online student had to move to her basement in the middle of the class due to a severe storm. The student messaged the instructor through private chat, but it was not ‘private’ as the in-person student could see their messages.

Students’ Challenges

The online students reported many challenges with technology in the HyFlex class. They had to wait to get admitted to the room and sometimes experienced internet issues such as poor Wi-Fi connection. John shared in his reflection about a technical issue he had experienced: “When I was called [on to participate] this week, my internet connection was poor, and the class couldn’t hear what I was saying. I tried turning my camera off to save broadband, but it didn’t work so I was ultimately unable to participate during that portion of the discussion.” When the internet doesn’t work properly, students will experience delayed reactions (Eileen). The online students also reported that it was difficult to see and hear the in-person student. Sometimes the OWL camera used to capture the video and audio did not follow or capture the video of the classroom people in a timely manner (the video is often delayed), which resulted in online students not seeing the person who was speaking in the classroom.

Asynchronous Recording-based Learning

It is worth noting that one participant in the study engaged in learning through watching class recordings for the first few sessions of the class due to a unique situation in that she was unable to attend those live sessions either in-person or online. The instructor recorded the class sessions, and she watched them in order to learn about the course content. Both the instructor and this student shared that she attained the same learning goals as the in-person student and the distance learners participating in the classes via Zoom. The assignments that the students turned in for the topics covered in those sessions were of the same quality as the majority of the other students in the class. The ability to pause and replay the video allowed this student to have extended time to cognitively process the course content. The downside of this type of learning is the lack of interaction between the student and other members of the class in real-time. She would not get her questions answered right away.

Ideal HyFlex Learning Environment

In addition to reflecting on the benefits and challenges of HyFlex learning and instruction, the participants shared their suggestions for an ideal HyFlex learning environment. Those suggestions focus on technology infrastructure in the classroom, classroom norms, and community building.

Technology Infrastructure

Many of the challenges the participants experienced in their HyFlex class were related to technology. For example, it was difficult for the student to see both the presentation and the other students at the same time, and grouping the in-person students with the online students using breakout rooms was challenging. The audio and video technology did not work smoothly sometimes during class. An ideal HyFlex learning environment would require that the classroom be equipped with appropriate technologies to allow the students to participate in various class activities without barriers. Multiple screens for both presentation slides and distance learners would be helpful. Technologies that allow the instructor to monitor small group discussions are in demand for HyFlex classes.

Classroom Norms

The online students in this study expressed their concerns about their behaviors during the class. Would it be appropriate to get up and get water, turn off the video when a family member enters the room or if they need to leave their desk for a moment, or look at the notes/textbook without it being interpreted as not paying attention? The students suggested that it would be helpful to establish some classroom norms at the beginning of a HyFlex class to avoid misinterpretation of online behaviors.

Community Building

Having a sense of community was noted as important to the participants in the study. The participants recommended devoting intentional time during class to help build community. Additionally, the students suggested building connections with other students outside the live class sessions through technologies such as texting, slack, or other instant messaging mobile applications. The student participants in the study enjoyed the Padlet activity in the class and shared that asynchronous discussions through technologies such as Padlet could help enhance community building in a HyFlex class.

DISCUSSION

As HyFlex learning becomes an increasingly popular instructional approach in higher education, this research highlights the experiences of both students and an instructor engaged in a HyFlex learning environment. The findings of this study yield perspectives that can be used to inform evidence-based best practices and recommendations for using HyFlex models in higher education institutions. These findings highlight the need for continued research on the HyFlex learning approach. In this section, we discussed how institutions should become better equipped with high quality audio and visual equipment that can be used to improve the HyFlex learning approach. Training for faculty and

students is necessary to make HyFlex learning successful. In the end, we present the limitations of the study and call for more research in this area to develop a better understanding of instructors' and students' perceptions of HyFlex learning and identify strategies to improve teaching and learning in HyFlex environments.

Based on the findings, institutions that offer HyFlex course delivery need to provide high quality audio equipment that captures the instructor's voice as they move around the room. The voices of in-person students also need to be clearly captured throughout classes, especially when they are working in a group setting. Increasing the number of audio captures and providing instructors with a microphone that captures the voice in a synchronous way may alleviate the confusion about who is speaking during instruction. The institution where the authors work and study has recently transformed one classroom into a multimodal classroom integrated with teleconference technologies. This multimodal classroom enables the instructor to project the presentation slides and the videos of online participants on separate screens. The room is equipped with high-level audio and video technologies that seamlessly capture the instructor and in-person students' voices and videos. Such technologies would be good examples to be adopted in HyFlex classrooms.

Students can quickly adapt to a new learning environment. As Tina noted in her reflection, "I felt that understanding the rhythms of class, participation, and discussion was easier this time. There was never a lull in figuring out who wanted to speak next and we, as a class, have started adapting to the learning model." Therefore, instructors or instructional designers of HyFlex learning environments should not be concerned about what the students are comfortable or familiar with at the moment but rather focus on providing appropriate scaffolding to the students for them to achieve optimal learning (Vygotsky, 1978). The amount of scaffold provided to the learners needs to fall into the Zone of Proximal Development space (Vygotsky, 1978), which offers the necessary guidance and collaboration for the learner to succeed in the learning environment. If the students feel uncertain about when and how to participate in class discussions in the HyFlex learning environment, then the instructor can demonstrate or model this type of behavior through examples.

Faculty training on innovative pedagogical approaches for HyFlex instruction needs to be prioritized. Not only do faculty need to be trained to use multimodal classroom technologies, but they should also develop expertise in facilitating classroom discussions and engaging students from all modalities in class activities. Self-study or action research on instructors' own experiences could be one way to help them develop such expertise. Engaging in collaborative self-study can offer the opportunity for faculty to learn collectively about best practices in HyFlex instruction.

The study reported in this article has a few limitations. It was based on one course's experience with a small sample of participants. Being a doctoral-level course within the College of Education made this case unique where the participants were intrinsically motivated to become better learners in this type of learning environment. More studies

with larger sample sizes, in different subject areas, and with different target populations such as undergraduate students would help develop a more comprehensive understanding of what makes a HyFlex learning environment successful.

Despite the limitations of the study, the findings from the research suggest that Action Research is a viable methodology to help examine the success and challenges of HyFlex learning environments from both the instructor's and the students' perspectives. Action research is most appropriate when it comes to the examination of teaching and learning practices in the classroom because it is "a distinctive approach to inquiry that is directly relevant to classroom instruction and learning and provides the means for teachers to enhance their teaching and improve student learning" (Stringer, 2007, p. 1). Aligned with the emphasis on reflection in action research, the instructor and students in the course systematically and critically considered teaching and learning in the HyFlex format. This was followed by a discussion about individual experiences of HyFlex, with recommendations for improving future practices. Student participants were empowered to have a significant voice in these conversations to support problem-solving. Similar action research approaches can be applied to examine the success of innovative instructional strategies in the classroom, especially in undergraduate courses or classes with large populations (e.g., lecture halls). ■

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