## Case Study of Online Flipped Learning in Higher Education

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#### Abstract

Due to a world-wide health emergency, higher education instructors were compelled to adapt their courses from traditional in-person classes to remote learning. In this case study, we investigated the use of flipped learning for this adaptation process from diverse higher education instructors' perspectives. To mitigate social distancing requirements, instructors included synchronous and asynchronous components in using the flipped approach to their courses. The use of video conferencing synchronous sessions to replace the in-person class time showed a nuanced approach to flipped learning that required exploration. Instructors from distinct academic settings were interviewed on their experience in using the flipped approach in their courses adapted for maintaining social distancing protocol. Using case methodology, nine instructors from various locations and disciplines were interviewed on how they transformed their courses utilizing flipped approaches. Findings from the interview texts showed the distinction of asynchronous and synchronous elements, as key components of fully online flipped learning environments. Findings in this study highlights the importance of supporting student engagement for autonomous learning in courses using online flipped learning approaches. Implications for the support of student self-determined learning through the implementation of synchronous and asynchronous learning through the implementation of synchronous and asynchronous hearning through the implementation of synchronous and asynchronous learning through the implementation of synchronous and asynchronous and asynchronous hearning through the implementation of synchronous and asynchronous learning through the implementation of synchronous and asynchronous learning components are discussed.

#### Keywords

flipped learning; higher education; case study; course adaptation; self-determination

The flipped classroom learning approach has gathered interest from educators for its capacity to promote greater learner engagement and course participation by eschewing teacher- centered lecture-

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based instructional approaches. With its inherent capacity to use online resources, such as videos, in implementing the flipped classroom learning approach, content instruction is "flipped" by having students learn content before attending class and replacing the teacher-centered direct instruction with student-centered learning supported by the teacher (Fulton, 2012). For this case study of course transformation, the flipped learning approach is defined as the asynchronous presentation of course content to students in preparation for further learning during a synchronous online learning session in which students engage in deep-level discussions or application of learned concepts (Beason-Abmayr et al., 2021; Fulton, 2012). The flipped approach is suggested to support students in deep-level engagement and more active learning during the "in-class" synchronous sessions. This approach has been implemented in fully online learning environments in higher education in extending its use beyond traditional in-person classes (Beason-Abmayr et al., 2021; Lindeiner-Stráský, et al. 2022).

Therefore, when the emergence of a global pandemic presented educational institutions with the need to mitigate transmission with social distancing protocols, higher education instructors were required to adapt in-person learning to online formats (Picciano, 2021). The flipped learning approach was found to be useful in adapting traditional in-person courses to fully online with synchronous components in the form of video conferencing tools by replacing the in-person component (Beason-Abmayr et al. 2021). Higher education instructors with minimal experience in online instructional design, leveraged the synchronous component of online learning through the use of reliable video conferencing systems (Jia et al. 2021). In this movement to online environments, asynchronous and synchronous learning were identified as the critical components of teaching and learning opportunities in fully online environments (Adedoyin & Soykan, 2020).

In the process of adapting courses to remote learning for social distancing protocol, the course design was argued to be critical for engaging students in content learning. Leveraging synchronous and asynchronous instructional components in the design of a course was posited to provide improved student engagement through flipped learning (Greener, 2020). However, further research was needed for insight on how higher education instructors can integrate synchronous and asynchronous components in designing flipped online courses.

### Literature Review

The emergency conditions caused by the global pandemic required the adaptation the in- person learning environment to a fully online learning environment (Beason-Abmayr et al., 2021; Karalis & Raikou, 2021; Rehman & Fatima, 2021; Tang et al., 2020). The adaptation of in-person courses to flipped online learning courses was an evident trend in a variety of countries including Hong Kong and China (Mok et al. 2021), South Korea (Choi, 2020); India (Jena, 2020); Pakistan( Karalis & Raikou, 2021); Greece (Rehman & Fatima, 2021); and the US (Beason-Abmayr, et al., 2021). The use of online flipped learning in a variety of settings world- wide suggests that the approach has potential for improving online learning in general when transforming in-person courses to the online format.

## Flipped Approach

The flipped approach involves introducing students to a specific content topic in a compelling way in preparation for the formal class session rather than waiting until the class session to relate the information to the students. By 'flipping' the instructional content, that might typically be through a

presentation, such as a lecture, the formal in-class time can be used more effectively to discuss the topic of interest further for more cognitive engagement from students (Greener, 2020). The flipped approach supports interactive pedagogical dimensions of personalization, higher-order thinking, self-direction, and collaboration (Koh, 2019). While flipped learning approach originated with in-person courses in using asynchronous course elements as a "pre-class" activity, in the fully online course, the flipped learning approach includes both the asynchronous component as the "pre-class" activity and a synchronous session that replaces the in-person session.

Essentially, flipped learning is a more current adaptation of traditional approaches in which some of the course content's declarative knowledge is shifted to pre-class work in preparation for higher-order skills development needed in the interactive sessions of the class (Greener, 2020; Hwang, Yin, & Chu, 2019). The interactive sessions are supported in online courses through synchronous meetings using a video conferencing system as opposed to the in- person class in face-to-face courses. Moreover, in flipped learning, learner-content interactions and learner-instructor interactions have been identified as critical components of learner satisfaction (Lin et al., 2022). This suggests the clear distinction between the asynchronous access to specific content by the learner in the flipped segment as opposed to synchronous segment in the interactive session with the instructor.

Studies on online flipped learning courses suggest improvement of student learning outcomes and engagement in course content (Humrickhouse, 2021; Marina & Ridlo, 2021). Important to the online learning environments, intrinsic motivation is a key factor in course design for improved learning outcomes (Salikhova, et al., 2020). Intrinsic motivation is defined as an individual's psychological propensity to self-regulate their learning activities and are internally "empowered to master the information they want to master," (Khodaei et al. 2022, p. 2). Essential to online course design, flipped online courses were perceived as more satisfactory to students than online courses with just synchronous course meetings (Tang et. al., 2022).

Therefore, providing students with flipped content supported students with more effective learning. Research suggests that by flipping online courses, learners could make better use of synchronous learning sessions for improved learning (Humrickhouse, 2021; Tang et. al., 2022). In essence, flipped learning allows students more time on the analysis, application and synthesis of concepts related to learning objectives in the interactive segment of the online course supported by video conferencing tools. By introducing declarative knowledge information in advance, students learn the foundational content prior to the interactive learning session provides more time in-class for deeper learning and comprehension of the topic's complexities in self-directed learning (Humrickhouse, 2021).

With the inherent access to a myriad of online resources, applications, and tools, online flipped learning can be used in transforming in-person courses to online courses. By connecting students to course topics with related videos, readings, interactive software, etc., in advance of the synchronous meeting, students can subsequently engage in the application of learned concepts in problem-solving and group discussions. However, asynchronous learning implicitly requires student intrinsic motivation for learning in an autonomous environment. Thus, educators interested in online course design and transformation from typical in-person courses might benefit from understanding how to use flipped learning components to improve learner engagement.

### Course Components

Important to flipped learning implementation, emerging research revealed the importance of

synchronous sessions that are supported by the flipped, asynchronous sessions, for more extensive student engagement, and synchronous learning was identified as a key component of effective learner engagement for improved learning by complementing the asynchronous sessions of the course (Hew et. al., 2020; Jia et. al, 2021; Rehman & Fatima, 2021). Studies have identified social, cognitive, and teaching presence; as well gaining and keeping student attention using synchronous and asynchronous components as important to designing online flipped learning (Jia, et. al., 2021). For instance, medical students found the combination of asynchronous and synchronous components as important to learner satisfaction in online flipped learning (Rehman & Fatima, 2021).

However, prolonged screen time sessions have been found to potentially cause learner discomfort through "Zoom fatigue" (Ofgang, 2021). In other words, synchronous learning time via video conferencing tools might not provide the same experience for learners as in-person meeting time. Diminished learners' attention and interest might lead to diminished mindfulness in learning during prolonged synchronous sessions (Bailenson, 2021). Prolonged attention in viewing the self and others, with minimal physical movement and staring at the screen, along with the decreased non-verbal messaging in the video conferencing sessions, might be detrimental to learner cognitive engagement in course content (Bailenson, 2021; Ofgang, 2021). Thus, balancing the synchronous and asynchronous components in terms of the amount of course content and time might be important to the design of online flipped learning. However, empirical research is needed to understand how students can be held accountable for asynchronous, flipped components, and how learner discomfort and attention loss in synchronous learning environments can be mitigated using the flipped learning approach.

Self-directed learning has been posited to be important in supporting student engagement in the course work in asynchronous learning environments (Khodaei et al., 2022; Pugh, 2019; Salikhova et al., 2020). Self-directed learning involves the students' capacity to decide what information needs to be learned and feeling empowered in cognitive acquisition of specific content (Khodaei et al., 2022). Learner motivation is specifically essential for engaging learners in asynchronous learning components that is core to online learning for autonomous content learning (Pugh, 2019). In online learning environments, such as online flipped learning, students will need to feel a sense of autonomy in deciding when to learn and how to use the different learning assets as well as use their own approach to learning course content (Salikhova et al., 2020).

Learning management systems (LMS) were found to be important to flipped learning and is defined as a computer application, providing an instructional infrastructure, that allows for the management and delivery of instructional content (Watson & Watson, 2007). LMS were suggested to provide support for the use of multiple course components.

Synchronous session use and duration appears to be important to online flipped learning design. How to best balance synchronous and asynchronous learning components that are essential for flipped online course design calls for investigation. The paucity of research on online flipped course design in higher education flipped learning and how to use the different components by instructors warrants further exploration. This case study focuses on how higher education instructors from diverse institutions, locations, and disciplines, re-design fully in-person courses to adapt them to fully online courses using the flipped approach.

#### Study Purpose

The purpose of this case study was to explore how instructors design their course when adapting and

transforming the in-person course to fully online flipped learning for improved learner engagement during the pandemic. Design implications for transforming to the online flipped learning environment calls for further insight. The question guiding this study is: How do instructors adapt in-person courses to fully online using the flipped approach with the use of synchronous and asynchronous components? This case study explores course design implications for adapting in-person to fully online courses using the flipped learning approach in higher education. How instructors design their course and effectively use synchronous and asynchronous components was explored in this study.

## Methodology

Case study methodology provided the lens for this investigation of the event of using flipped online learning design to adapt in-person courses. Case study methodology is useful for educational research in answering how or why questions in a case in which researchers have minimal control over the participant behaviors and explores a contemporary phenomenon (Yin, 2018). This case study explored qualitative data of instructor online flipped learning design for theoretical understanding of design implications in a real-world context. In this case, qualitative data was collected through in-depth interviews with higher education instructors reflecting on their course adaptation and experiences with their own students in response to the pandemic mitigation efforts. The case offered insights on higher education online flipped learning theoretical concepts involved in the case. In using case methodology, transferability of the findings are not generalizable. However, case methodology allows for the reader to generalize from these findings that might be highly dependent on environmental context.

## The Case

This case study specifically included higher education instructors who taught fully online flipped courses during the 2020-2021 school year. Instructors at an academic international conference as well as colleagues who taught fully online courses using flipped learning were invited to participate in this study. A snowball approach was used to expand the subject pool. Study participants were asked if they could recommend other higher education instructors who taught online flipped courses. This case study included nine higher education instructors who had adapted their in-person courses to fully online using the flipped learning approach. This study was approved by the institutional review board (IRB).

## Participants

In this case, the instructors adapted typical in-person courses to fully online courses using the flipped approach in their design. Participants included in this study were from various institutions, disciplines, and locations. All the study participants taught fully online courses in diverse subject areas that included game design and programming, medical science, foreign language, instructional design, and teacher education. Additionally, participants in this study provided a more global view that included perspectives on online flipped learning approach use in institutions from Europe as well as South and North America. Pseudonyms were used to protect the privacy and identity of the participants. See Table 1 for demographic information of the participants.

## Data Collection and Analysis

The video conference interviews were recorded, and field notes were taken. Interview questions were open-ended and broad such as, "How did you use the flipped approach in your courses?" and "How is your online course structured?" Probing follow-up questions provided further insight on nuances in designing online flipped courses. The interview recordings were transcribed for text analysis. During the semi-structured interviews, participants detailed their experience on course design and use with their students. Additionally, the participants were able to show their LMS along with details of actual use with learners. In detailing their flipped learning design, participants included details and insights about their students' course experiences as well as their own.

#### Table 1

Participants	Location	Level Taught	Instructional Content
Brad	Northeastern US	Undergraduate	Exercise Science; Physiology
Alma	South America: Columbia	Undergraduate	Language Instruction TESOL
Jean	Midwest US	Undergraduate	Media Computation; Interactive Media; Game Programming
Elizabeth	South-Central US	Graduate	Emergency Management
Ariel	Northeastern US	Undergraduate	Exercise Science; Physiology
Sofia	Midwest US	Graduate	Social Computing; Instructional Technology: Web Design
Aaron	Southwestern US	Graduate	Learning Technology; Teacher Education
Beatrice	South America; Columbia	Undergraduate; Graduate	Teacher Education; Educational Technology; TESOL
Tania	Europe; Bulgaria	Undergraduate; Graduate; Inservice Teachers	Teacher Education; Instructional Technology

## Participant Demographic Information

*Note.* Pseudonyms were used for anonymity of the participants.

Each interview text was analyzed and coded by each researcher in examining the data, looking for patterns connected to flipped learning, and distinct insights on flipped learning by using the constant comparative method (Merriam, 2009). The text analysis included highlighting relevant quotes, followed by copying and pasting the participant comments into a table of related topics. The emergent themes and codes were further analyzed by the researchers in identifying key themes that informed the case study. Subsequent analysis revealed 13 relevant themes that were iteratively revised to seven themes and then, to the resulting five themes in this case.

Iterative analysis of the interview texts revealed emerging themes. Analysis of the interviews showed insight on the design of online courses in adapting their in-person course to a flipped online

course during the emergency conditions imposed by the COVID-19 pandemic. The participants provided critical insight on their course design and their experience in using the flipped learning approach in a variety of ways.

## Results

Emergent themes of interest in this case included the similarities and differences in instructors' perspectives based on their specific instructional goals, institutions, and settings. Flipped approach was implemented in fully online courses in various ways by providing students with a more focused activities and discussion on synchronous and asynchronous platforms. Final analysis revealed five major themes in this case. The themes and descriptions are supported with brief quotes from the study participants.

## Themes

Primary themes emerged from the analysis:

- 1. LMS provided the platform for both synchronous and asynchronous learning.
- 2. Asynchronous activities provided self-regulated learning before the in-class synchronous session for engaging in course content.
- 3. Synchronous learning sessions provided for in-class components.
- 4. Additional effort and time was needed by both instructors and learners in flipped online learning.
- 5. Institutional support is needed for adapting in-person courses and validating online learning.

## Theme 1: LMS provided the platform for both synchronous and asynchronous learning

The course LMSs in this study included Canvas, Blackboard, Moodle and Google classroom. The LMS provided the center of instruction in supporting student access to learning resources. Asynchronous sessions were enabled via text or video-based tools such as LMS discussion forums or external tools such as Flipgrid. A key element along with the flipped content, was the discussions, that were conducted synchronously via diverse conferencing tools such as Zoom or Google or asynchronously using LMS discussion forums. Course instructors included a variety of communication and collaboration technology tools outside of the LMS as well.

Tania shared her screen while showing and describing her use of the LMS in teaching, "For example you can do folders here ... labels ... pages. You can put your URLs. You can create books...there are many activities." Teaching a course on emergency management, Elizabeth described her LMS use, "I put everything that I can, whether it's the textbooks, readings, whether it's the PowerPoints that I use in my courses, I put all of that on this tool [LMS]. So, I find that to be very effective." The LMS provided a centralized location of online resources and synchronous learning resources for flipped learning were easy for the students to access in support of their online learning as well as readily reviewing recorded synchronous sessions.

# Theme 2: Asynchronous activities provided self-regulated learning before the in-class synchronous session for engaging in course content

Flipped courses included assignments of reading and watching videos in preparation for responding to discussions, prompts and activities in asynchronous or synchronous formats. Students in these courses were expected to engage in the flipped content prior to the synchronous meetings or discussions. The learning objects that were flipped depended on the course and topic. For example, language course instructors used audio files for listening activities prior to synchronous language learning activities.

Tania described her flipped video content, "Basically, you do any recordings and probably post them ahead of time." Aaron elaborated on his use of online flipped learning, "And actually for the asynchronous class the structure is the same, in that I've basically recorded lectures and then I assign readings ... They have the video."

The course content objects included instructional activities as asynchronous activities that students engaged in collaboration with other classmates or individually on their own time. A range of collaboration and communication tools were used throughout the courses along with the LMS that supported the asynchronous learning.

Ariel related her use of online flipped learning for asynchronous engagement:

Class is synchronous at least one time per week for an hour and a half, usually two times. The only reason why it wouldn't be two times is if we have an asynchronous activity. Sometimes, I will record a YouTube video that they can follow along. Sometimes it's a video that you can't really do when you're kind of sitting back in class. So I'll let them do that asynchronously.

Jean commented on her use of online flipped learning for self-directed engagement:

All depends on students, their willingness to do it or not. If they just play it in the background, they still watch it. But they might not know what's going on in the class. So that's highly dependent on them. However ... the majority of them do watch them and they do follow along and practice. So I can see in the class they would follow a little bit faster.

She elaborated further on the learner advantages of online flipped learning:

The benefit ... is for students who are a little bit advanced [information]. They are prepared for the class... they know what's going on, and then they can use the class to expand a little bit more, ask a little bit more questions or they could learn something more, if they chose to. For students who are not as invested as those students, I think they get some flavor of the content, which makes it not too foreign to them. When they come to the class, they have a taste of it, and in the class they may participate more which helps them learn a little bit better.

The benefits to flipped learning in fully online courses included the capacity for learners to engage with course topics on their own time, at their own pace. The flipped approach allows for students to be better prepared for synchronous class sessions in allowing for more discussion, questions, and increased learning engagement. This approach also supports repeated engagement in course concepts so that learners are exposed to learning multiple times. By supporting students' cognitive engagement before class, during synchronous class, and follow-up asynchronous homework, the students are more likely to progress in their learning.

Benefits can include the ability for the instructor to understand the students' learning capacity and determine interest, understanding and engagement with the course content. This allowed for the instructor to differentiate for student understanding of concepts. Instructors were able to monitor student progress for instructional differentiation with students.

Beatrice offered the advantages of online flipped learning for self-directed, motivated learning with, "Anyone can watch them, and if you are going to watch it seven times, you're going to watch it seven times to get the concept." She further reflected on the benefit to her students:

To see their progression to see how they grow...that is something that I definitely give to the flipping of the class...since I'm not at the front of the classroom explaining concepts, I can sit down with each one of them and really get to know them and ... help them at a personal level in in terms of what they need for the learning to be the best. Another benefit will be the motivation.

#### She further added on the benefits to the learners:

I realize that doing all these things might take time to prepare ... but it's worth it. It helps students feel more connected. It increases motivation. They actually want to do things ... actually want to ask you questions... want to tell you that they're not understanding.

#### Similarly, Elizabeth described:

I feel that with the Flipped approach, you were expected in my class to come prepared. I don't know if lecturing and either in person, or online ... would be as effective as the collaboration that they experience. I feel that that provides a better learning experience ... like the master subject mastery was better.

Online flipped learning supported self-regulated learning via the pre-work, flipped learning as a distinct asynchronous activity. Asynchronous learning benefits learners in allowing repeated and ubiquitous access to learning objects via the course LMS.

#### Theme 3: Synchronous learning sessions provided for in-class components

In fully online courses, synchronous learning using video-conferencing tools, replaced the follow-up classroom sessions. Synchronous sessions were described as an in-class component that provides an opportunity to clarify misunderstandings, deliver follow-up instruction, discussions, and application of learning into practice, after the flipped content was first introduced. Video-conferencing tools provided for breakout small-group sessions with the capacity to support discussions and other real-time collaborative activities.

Alma elaborated on her use of synchronous sessions in her language learning course:

For example, working on the creation of the new Institute [website project]. It has taken them more time ... I try to organize my classes in the way that they can socialize... they can see what their classmates are doing. They are paying attention to class... they are working on the activities that I'm asking them for that class to do.

In teaching an exercise science course, Brad describe his use of the synchronous learning component:

After reading through the slide answer this question or I like to do a lot of when there's...

four or five tools that I just taught them about, I'll ask a question ... pick the tool that does this job and I'll give him a list of like ten and they have to recognize the four or five that we just went over ... Recalling, "Oh yeah, that was body comp" ... "Uh no, that's not body comp."

Using questioning strategies to connect the students' knowledge from the flipped learning presentation to the synchronous learning session was important for student learning. Directly connecting asynchronous components to synchronous sessions supported student understanding of the relatedness of the content in their learning. Synchronous sessions were found to support student-to-student connectivity as well as student-to-teacher engagement.

## Theme 4: Additional effort and time was needed by both instructors and learners in flipped online learning

As a disadvantage, the flipped approach demanded extra effort and time from the instructor in creating the flipped content as well as reviewing students' interactions and assessment. Similarly, additional work and interaction were required from the students and could be detrimental to student satisfaction with the extra course work required of them.

Aaron observed of his students' perceptions of online flipped learning, "People are getting a little tired of them just because there's quite a bit of work to do right at the upfront start of the week." He detailed:

It's a lot of work to get them to do the readings and to get them to engage multiple times throughout the week and results of ... the course survey are pretty consistent in that because some a lot of these people are teachers ... find it difficult to, you know to continue, like repeatedly throughout the week. I think it takes away some of that autonomy in terms of, "I can do this class whenever I want, right?"

Ariel added on the disadvantages of online flipped learning, "I think that it's helpful, but I can see a disadvantage. Maybe students might not be prepared or really understood.... maybe they aren't prepared for a non-traditional type of class in that way." While beneficial to student learning, the added work required by the instructors and students was found to be potentially detrimental to student motivation. Thus, balancing synchronous and asynchronous work might be important to instructional design of flipped online learning.

## *Theme 5: Institutional support is needed for adapting in-person courses and validating online learning*

Fully online flipped courses were identified as needing institutional support in adapting from in-person courses. Instructors identified the need for support in understanding how to intentionally design and adapt in-person course activities to online learning for effective learning. Instructors noted that both colleagues and students did not value the fully online courses as equal to in-person courses. The pandemic had forced a great number of faculty and students to change typical face-to-face courses to online learning without regard to appropriate online design of activities. The instructors' colleagues disregarded appropriate design of online learning environments. Instructors without experience in

online learning design amplified the amount of content learning in their courses with the intent to increase rigor with regard for pedagogical principles.

Aaron offered that, "Faculty need to be incentivized ... university faculty need to be incentivized to rethink how it is that they're teaching." He further added, "If I were a faculty member in a non-education discipline, I would want the time to sit down ... Take a look at case studies ... to be able to digest well: what do I do now? What do I do with this?" He elaborated that institutional colleagues were remiss in appropriate course adaptations, "Some instructors, that when they approached online learning, they didn't reduce the amount of work. They increased it, right? .... it went the opposite direction." He further observed:

Online learning has been devalued by both students and faculty alike, typically, and in a large part, it's because [they] don't really understand how to best make use of the medium ... and how to restructure the teaching in a way that it helps students be more engaged.

Along a similar vein, Beatrice critiques her colleagues' adaptation to online courses:

[It is] unsustainable to have students listen to us just talking while we are showing our slides on an online environment which is so different from our face-to-face environment ... most of the people in my institution, they're doing just synchronous classes ... what they're doing is just replicating that model ... I have experience with online learning ... it's not humane to keep them sitting down for eight hours in front of our computer listening to people. That's just not human. It's not pedagogical either.

Hours long synchronous sessions were found to be potentially counterproductive in supporting students in learning.

Brad provided insight on the challenges of adapting courses, "So one of the biggest things that made virtual learning hard for me is the practical lab component. So, showing students how different tests would work or different machines that we might have access to in person." The absence of practical application learning provides a challenge to learners in virtual environments and offers a potential for the use of virtual laboratories.

Tania worked on research on virtual learning tools and described the tool, "It is called eonXR ... In this [a virtual environment], let's say,[a] virtual lab you enter here." Tania showed her eonXR displayed on her computer:

I took a simple example, this is a network switch and I put annotations in Bulgarian [language] ... the students are also able to move the device itself [in the eonXR virtual environment]. And they can click on the different elements and the teacher can also talk about this ... you have a library with categories you see K-12 and higher because they're not only oriented for education but they're also oriented for professionals.

Virtual learning tools needs emerged as a useful addition to online flipped learning for the inherent use for visualizing complex concepts and virtual manipulatives. Virtual environment applications might support further and deeper learning in an exercise science course. Similarly, education courses might have more opportunities for applying learned concepts via virtual applications. There was a distinct need for virtual learning tools in online flipped learning environments.

#### Discussion

In a seismic shift in education, higher education instructors had to adapt to remote instructional approaches. This case study on higher education instructors' use of flipped learning illustrates the benefits and challenges of flipped learning in fully online learning environments. Consistent with prior theoretical propositions, a transformation during emergency conditions imposed by a global pandemic, the adaptation process was immediate and limited in time and effort for design and development necessary for providing learners effective learning environments (Adedoyin, & Soykan, 2020). This case study provides evidence in understanding the design components of course adaptation using the flipped approach from an instructional perspective.

Similar to traditional use in in-person classroom environments, this instructional approach positions compelling declarative knowledge before "class," the learners can then be poised to engage with course content more intensely through asynchronous elements of flipped learning during the "class" component. In the fully online course, "class" time is posited as synchronous learning via video conferencing tools. Synchronous elements of the flipped course can support more in-depth learning in further application of content learned in the flipped/asynchronous components during "class." However, fully online courses might not typically require or support synchronous sessions as "class" time suggesting a blended version of online learning. Having mandatory synchronous meetings might work against the notion of ubiquitous learning affordances of online learning and thus providing tension with the notion of student autonomy in self-directed learning anywhere, anytime.

Educators needing to transform a course might deliberate on the pedagogical limitations and benefits of the asynchronous and synchronous elements of online instruction with specific design elements. The vast array of digital resources can be used for improved online learning through careful pedagogical consideration and theory-based design of courses (Greener, 2020). Consistent with prior studies, the design of online courses might benefit from using a centralized system such as an LMS in online flipped learning (Khodaei et al., 2022). The centralized availability of course content components such as learning videos and many other online assets can support online learners in selecting how they access and learn the course content. The LMS can provide learners secure access to online course material for maintaining internet safety and security. Moreover, the LMS can support the key functionality and systems for both the asynchronous and synchronous components of the course in a seamless interactive course.

Online flipped learning inherently has follow-up activities after the initial exposure to content that initiates the students in the learning process through exposure to specific declarative knowledge of the specified topic in the online course. The asynchronous, flipped learning components of the course, provide students with the learner-to-content interactivity that is congruous with the importance of self-directed learning. Thus, as a core component of the flipped learning approach, students can find the initial pre-class resources empowering through autonomous self-directed learning.

While fully online courses might not have any synchronous learning components, synchronous sessions offer learners with important student-to-teacher interactivity (Lin et al., 2022). Designing effective online flipped learning can provide important connectivity with the instructor despite the lack of in-person classes. Remote video-conferences might support a space for extended learning as well as deeper-level learning. However, when the synchronous meetings are scheduled, the duration, and the types of activities performed during the meetings remain an open question (Ofgang, 2021). Moreover, understanding how to monitor and manage student engagement in the synchronous session requires

further exploration.

Related to the immediacy of the adaptation of the courses to online flipped learning, additional effort and time might be needed by instructors in designing and developing the course structure and components (Picciano, 2021). The workload on instructors can be significant in switching content to an online environment. Thus, institutional support can help in provisioning instructors with additional time and resources to ameliorate the heavy workload incurred in the course adaptation process. Additionally, institutional support is needed to identify and validate online courses, as an effective means of teaching remotely.

Consistent with findings in prior studies, not all courses can be readily transformed to the online environments since disciplines that include physical laboratory sessions might be limited to physical, inperson environments (Adedoyin & Soykan, 2020). In some cases, virtual laboratories might be helpful. However, disciplines such as health and medical professions may continue to limit course transformation due to the deficit of necessary laboratory activities. Substantial institutional support might be essential in effective transformation of these types of courses. Thus, more research is needed in the area of virtual laboratories in alignment with the necessary practical application of learning in online courses for deep-level learning and procedural learning of the course content.

Study limitations include the limited number of participants and the self-reported nature of the interview data. The data sources from the participants were limited to the interview text and screen recordings of their course LMS. A greater number of participants might benefit future studies. Additionally, the qualitative analysis might benefit from using software such as CAQDAS or NVivo for a more systematic analysis. Therefore, caution needs to be taken in interpreting the findings of this case and transferability beyond the current context of this case study.

## Conclusions

In course adaptation to online flipped learning, supporting learner self-determination is suggested to be critical to inclusive and engaging design of instruction in higher education courses. Flipped online learning is posited to provide distinct advantages for improving learner engagement in higher education courses. However, the use of synchronous video conference meetings as equivalent to in-person "class" time requires further study. Further investigation is needed in understanding how specific designs of synchronous and asynchronous components can be empowering and supportive of student motivation in content acquisition.

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