Online Flipped Learning Approach: Design Implications

Minaz Fazal, New York Institute of Technology, NY
Cesar C. Navarrete, St. Francis College, NY
Saniya Ratnani, New York Institute of Technology, NY

Fazal, Ph.D., is assistant professor in the Teacher Education department at New York Institute of Technology. Navarrete is assistant professor in the Education department at St. Francis College. Ratnani is a graduate student in the M.B.A. Marketing program at New York Institute of Technology.

Abstract
Online learning adoption has increased globally with institutions planning to grow these offerings beyond the COVID-19 pandemic period. However, quality concerns persist, and institutions are looking at research-based approaches for improving online courses. Flipped learning has gained attention in this context. This study focused on one major research question: How can flipped learning approaches be implemented in fully online courses? Ten faculty implementing flipped online learning were interviewed. Findings include a description of the key strategies used, and a discussion of their successes and challenges.

Introduction
Online learning in higher education has been surging in recent years. The COVID-19 pandemic has accelerated the rate at which institutions globally have adopted online learning and are considering this option as a more permanent part of their institutional footprint. Current trends indicate that enrollment in online programs has increased by 6.2% in Spring 2021 ("Online Education Statistics", 2021). Recently, MIT and Harvard universities have invested heavily, and dedicated extensive resources for expanding online learning (Korn, 2021). However, unequal outcomes and success rates for different groups of students in online courses have prompted concerns regarding quality of online education (Jia et al., 2021; Protopsaltis, & Baum, 2019). Institutions are therefore looking at innovative research-based quality online teaching and learning approaches. Flipped learning is one such approach that has gained attention.

Studies on flipped learning have focused on typical in-class and out-of-class strategies (Barshay, 2000). However, in fully online courses, this distinction referring to space and time does not exist. This paper explores the different ways in which flipped learning is implemented in online courses and presents findings from a qualitative study that investigated the application of flipped methods in the online context.

Literature Review

Traditional flipped learning involves switching out-of-class homework and in-class activities — students watch videos and/or engage with instructional material before class for an introductory understanding of the topic. This frees up in-class time for the instructor to design active learning strategies that can promote deeper learning. Empirical evidence for flipped classroom has been promising not only for learning outcomes but also for academic satisfaction (Hew et al., 2021; Polat & Karabatak, 2021). In traditional brick-and-mortar higher education courses, flipped learning approaches have been adopted for learner-centered pedagogy and improved learner performance (Koh, 2019). However, in online courses, there is no traditional in-class and out-of-class demarcation, hence making it essential to identify effective key strategies that are at the heart of the flipped approach and can be adaptable to remote online courses (Fazal, & Navarrete, 2019). While synchronous online video conferences provide for virtual person-to-person (or screen-to-screen) discursive capacity, asynchronous, text or video-based discussions can provide engagement in critical thinking and collaborative discourse in meaning-making.

As in traditional courses, flipping alone does not lead to improved engagement and learning (Barshay, 2020). In the online teaching context, flipped learning can take place by carefully designing the synchronous and asynchronous learning activities using effective online pedagogical principles that increase student motivation and comprehension of content (Gering et al., 2018; Humrickhouse, 2021). Prior studies have posited synchronous sessions via web-conferencing as the in-class component of the flipped online course and asynchronous interactions as the out-of-class component (Marshall, & Kostka, 2020). In designing effective synchronous learning, Marshall and Rodriguez Buitrago (2017) have developed the Synchronous Online Flipped Learning Approach (SOFLA). This model offers a framework for synchronous lesson design emphasizing frequent and regular synchronous meetings for activities that require guidance and feedback from the instructor to facilitate deeper learning. Courses have to intentionally implement active learning strategies involving student interactions with peers and instructor(s), and building rapport among students, between students and instructor, and building a community that encourages exchange of ideas (Khan et al., 2017). But what comes first? Should the topic introduction take place in asynchronous settings to prepare students for deeper learning and interactions during synchronous meetings? Or is it better to introduce topics during synchronous sessions where the instructor can provide the necessary scaffolding and prepare students for the asynchronous learning tasks? The paucity of studies exploring online flipped approaches calls for systematic research on successful strategies.

Purpose of the Study

The purpose of this study was to gain insights into how the flipped learning approach and strategies can be implemented in online courses. This study focused on instructors experienced in teaching fully online courses and well-versed in the flipped learning method. It was important

that the study focused on experiences of a diverse group of faculty and hence participation was sought from experienced instructors regardless of country or content area(s) they taught in. The study focused on understanding how these instructors structured their online courses to incorporate the flipped approaches.

Research Questions

The study primarily focused on one major exploratory research question: How can the flipped learning approaches be implemented in a fully online course? Related questions were: (a) how do instructors use their asynchronous and synchronous time in a flipped online course? (b) what institutional support can help instructors optimally design online flipped courses?

Method

Research Design

In-depth interview method was used to collect data for this qualitative research study. Semi structured, or part-structured interview (Hobson & Townsend, 2010) method was used for a free-flowing format of conversation. A series of open-ended questions allowed maximum opportunity for the respondent to provide in-depth information, while keeping the focus on the research questions. The researchers prepared a sequence of questions, however, there was no fixed order — the interviewers took their cue from the participant's response to ask follow-up questions. This part-structured iterative method of conducting interviews is often used in qualitative research as a versatile way of gathering insightful data.

This study was carried out in Fall 2020 and Spring 2021. Interviews were conducted over Zoom were particularly effective in allowing the researchers to include participants from around the globe. Another key advantage was the ability to record and securely save the recordings using Zoom's security features, with participant consent. These recordings were later used to transcribe the interview conversations which was an essential step for data analysis.

Population and sample selection

The study criteria required participation from faculty who,
- have taught at least one fully online course at either the undergraduate or the graduate level at an institution of higher education
- have used the flipped learning approach in their online course

A two-pronged approach was used to solicit participants for this study. First, the researchers conducted online searches to identify faculty who have used the flipped approach while teaching fully online courses at either the graduate or undergraduate levels. Participants were identified based on their blog entries, or information published on their institutional website. An email was sent to these individuals with a description of the study soliciting their participation.

The second approach was using the snowball sampling method, also known as chain-referral method, to identify a pool of participants based on recommendations from existing study subjects. This non-probability sampling technique is often used in qualitative research where the researchers start with a few potential participants (Parker et al., 2019). The existing subjects then provide referrals to recruit other participants who fit the study criteria. These new participants in turn recommend other sources. This method was particularly useful to recruit subjects for this research since not all instructors who teach online or use the flipped method, publish their strategies in the public domain.

Using a combination of these approaches, the researchers invited a total of 19 potential participants, of which 10 consented to participate and were interviewed for the study. Participants were from three countries across three continents. Four instructors taught undergraduate level courses, four taught graduate courses, and two taught at both the graduate and undergraduate levels. Their course disciplines covered a wide range including TESOL, teacher education, exercise science, emergency management, media computation, and computer science.

Instrumentation and sources of data
A set of key open-ended questions were developed based on a comprehensive literature search on flipped learning. Sufficient flexibility was built on how and when the questions were presented to ensure a conversational exchange. The interview started with questions where the participants were asked to describe their online course in which they used the flipped approaches, with specific focus on how they designed their asynchronous and synchronous strategies. The interviewers explored advantages and disadvantages of these approaches, both for their students as well as for themselves as the instructor. The final set of questions were designed to elicit information on how they would improve their course(s) and how their institutions can support them in designing and implementing best practices of the flipped approaches.

During the interview process, several active listening techniques were used to help get the most depth and clarity of responses (Hannan, & McKenzie, 2007). These techniques included,
- asking for opinions: do you think students were engaged?
- asking for clarification: what do you mean by actively involved?
- Rephrasing: in other words the LMS is central for you?
- asking for further information: how long are your videos?
- summarizing periodically and asking for corroboration: it sounds to me like [the media] is a pivotal point for you.

Results
Data Analysis
The interview notes, transcripts, and video recordings were iteratively reviewed using the constant comparative analysis method (Miles et al., 2014). The inductive method of data coding

was used to identify emerging themes in order to find trends. This method is frequently used in qualitative data analysis to allow for a systematic and transparent approach to the analysis and reporting.

Themes
From the qualitative analysis, researchers iteratively analyzed each participant's discourse for key words and insights on flipped learning. Themes emerged from researchers' iterative analysis and discussions on the field notes, recordings and transcribed text. An initial 10 concepts were refined to the following five major themes:

1. To flip, begin with two components: design meaningful pre-work and organize course material in a Learning Management System (LMS).
2. In-class and out-of-class strategies were blended into synchronous and asynchronous activities in the online environment.
3. Students and instructors found the flipped approach to be more work as compared to the traditional approaches; however, there were distinct advantages and challenges.
4. Institutional support for online flipped has increased but gaps remain.
5. Intentional redesign was needed for improved learning in flipped online courses.

The following sections present a discussion on the themes that emerged during the interviews along with participant quotes that support the analysis. Technology tools discussed in the interviews with participants are provided in Table 1.

1. To flip, begin with two components: design meaningful pre-work and organize course material in a Learning Management System (LMS).
For a flipped course, one has to begin with developing meaningful pre-work — something the students can work on independently. Students in these courses were expected to engage in the content prior to their synchronous meetings or discussions. The purpose for flipping a course was to enable the students to cognitively engage in content for understanding prior to a discussion, synchronous session, or other learning activities. For example, language course instructors used audio files for listening activities prior to in-class language learning activities.

Participant quotes:
Participant 2: "[students] watch the video and create a question... to be discussed with...classmates in class."
Participant 6: "Before my class on Tuesdays, ...I either assign readings like textbook or the LinkedIn videos for them to watch. For the grading, they need to write reflections before coming to class."

The second critical piece to get started, as identified by the participants, was organizing learning material and tasks in a LMS. Participants reported using various LMSs such as Canvas, Blackboard, Moodle and Google classroom. The LMS provided an anchor for the course, allowing students easy access to pre-work as well as learning resources. The key was designing follow-up discussions and other engagement activities that were either conducted synchronously via conferencing tools such as Zoom, Google, Adobe, etc., or asynchronously using the discussion forums feature of the LMS, or tools such as Flipgrid. Study participants included a

variety of communication and collaboration technology tools outside of the LMS as well (see Table 1).

Table 1

Technology Tools Used by Instructors (listed alphabetically)

Tool	Use
Adobe Connect	Video conferencing and screencasting
BigBlueButton	Video conferencing and screencasting
BrainLang	English language learning
Camtasia	Screencasting and video production
Coursera	Skill building courses
EON-XR	Virtual reality learning
Flipgrid	Video enabled asynchronous learning
Google Classroom	Learning management system
Google Sites	Web creation
Jamboard	Collaboration
Kahoot	Game based learning
Loom	Video communication and recording
Microsoft Teams	Communication platform
MindMap	Brainstorming visualization
Miro	Whiteboard collaboration
Moodle	Course management system
Discord	Voice, video and text communication
Padlet	Collaborative virtual bulletin board
Screencast-O-Matic	Screencasting
Skype	Video conferencing and screencasting
Vimeo	Video platform
VoiceThread	Interactive video, image and text
Weebly	Web creation
WhatsApp	Social networking and communication
Wix	Web creation
WordPress	Web and blog creation
Youtube	Video platform

Participant quotes:
Participant 6: "... in Canvas...each week I have a module and ...reading reflections".
Participant 2: "structure is very useful. And it helps a lot because students can see that the courses are very well organized… it's very important that students can see all that information ...they can see their grades ...give students feedback about how they were ...performing on their activities".

Participant 7: "I put everything ... textbooks, readings, ...PowerPoints that I use in my courses... on this tool. I find that to be very effective."

2. In-class and out-of-class strategies were blended into synchronous and asynchronous activities in the online environment.

In-Class vis-a-vis Synchronous learning

In online courses participants meet "face-to-face" (or "screen-to-screen") synchronously via video-conferencing tools. Majority of the participants used Zoom and few used other platforms such as MS Teams, Google Classroom, or Adobe Connect. Synchronous sessions were described as an opportunity to clarify misunderstandings, deliver follow-up instruction, discussions, and application of learning into practice, after the content was first introduced as pre-work. Video-conferencing tools provided for breakout small-groups with capacity to support discussions and other real-time collaborative activities. Engaging learners in the course content after pre-work offered opportunities for extended and deeper understanding of the content.

Participant quotes:
Participant 1: "Produce and create together with your fellow students with the teacher as a guide...to clarify misconceptions. It's good for collaboration."
Participant 8: "We also do anything practical…. and we'll kind of be collaborating, listening to what other people are going to add to their action plan that they might have learned from the textbook."
Participant 3: "I do the whole group application and go to the breakout rooms…[for] discovery assignments...and reflection."
Participant 2: "I try to have my students work during the class time...I try to organize my classes in the way that they can socialize. And they can see what their classmates are doing."

Out-of-Class vis-a-vis Asynchronous Learning

Out-of-class strategies were almost always used asynchronously using the LMS tools. A wide range of collaboration and communication tools were used throughout the courses along with the LMS that supported the interactive asynchronous learning. Instructors suggested that asynchronous components including pre-work, allowed learners to engage in course content components on their own time. The learners could review and re-read assignments on multiple occasions for extended learning opportunities. However, unlike flipped learning in traditional classrooms, the out-of-class asynchronous activities are not always done in isolation. More often than not, participants reported that many asynchronous activities were collaborative in nature and required peer interaction.

Participant quotes:
Participant 5: "I want them to engage initially through Flipgrid so that they can connect with me and with the rest of the class."
Participant 7: "I make them do [prepare] a conference, so ...they all have to do a paper presentation..., they get together ...collaboratively with me.…that gives them some real-world experience... they discuss ...outside of class to coordinate and then come together."

Participant 6: "This week we are talking about how to troubleshoot debugging in the programming, so they read a web page about the different tools.... students write a paragraph about what they learned from it and what questions they may have in the class."

3. Students and instructors found the flipped approach to be more work as compared to the traditional approaches; however, there were distinct advantages and challenges.
The advantages of online flipped included the capacity for learners to engage with course topics on their own time and at their own pace. By supporting students' cognitive engagement before class, during synchronous class, and follow-up asynchronous collaborative work, the students are more likely to progress in their learning.

Conversely, challenges included the extra time instructors need to prepare and engage learners. Participating instructors conveyed that their students had expressed similar sentiments with regards to the increased time it takes to fully participate in the online flipped learning experience. At times, instructors found it difficult to know and measure the extent of their students' engagement with the flipped component(s).

Advantages
Advantages included the ability for the instructor to be aware of the students' learning capacity and determine level of interest in the course content. When pre-work activities were carefully designed the instructor could gauge individual student progress, differentiate learning during synchronous meetings, and adapt the follow-up activities for clarification and deeper learning. By providing the learning resources via the LMS, instructors were able to monitor student access to content, and could provide reminders and feedback when necessary. Discussions and activities for applying concepts or skills were supported via both asynchronous and synchronous learning. Moreover, video-based activities were recorded for future referencing by the learners providing for autonomy in their learning.

Participant quotes:
Participant 3: "Anyone can watch them [videos], and if you are going to watch it seven times, you're going to watch it seven times to get the concept."
Participant 4: "This is my personal biggest benefit is how much more time we can focus on application and discussion of the content when they're with me"
Participant 5: "I realize that doing all these things might take time to prepare. It does, but it's worth it. It helps students feel more connected. It increases motivation. They actually want to do things. They actually want to ask you questions. They want to tell you that they're not understanding."

Challenges
More time is needed from the instructor and students in flipped online courses. This approach demands extra time from the instructor in creating the flipped content as well as reviewing students' interactions and assessments. Similarly, the added work and interaction required from students might be detrimental to student satisfaction. Additionally, instructors cannot accurately determine the extent of learner engagement in the flipped content in preparation for synchronous activities.

Participant 5: "People are getting a little tired ...It's a lot of work to get them to do the readings and to get them to engage multiple times throughout the week…. They find it difficult to continue...I think it takes away some of that autonomy."
Participant 8: "Maybe students might not be prepared or really understood...maybe they aren't prepared for a non-traditional type of class in that way...A challenge can definitely be knowing where the students are struggling."
Participant 1: "So the biggest challenge is will they do the pre-work...do they really learn the pre-work? ...will they really be ready to go into it deeper in class and take ownership when they get there? So, it's a huge change for students."
Participant 6: "...it's actually a lot of work for me."

4. Institutional support for online flipped has increased but gaps remain.
Institutional support was identified as important in validating the effectiveness and benefits of online learning. While a number of participants suggested they had sufficient institutional support for their efforts on course design and development, others found some distinct areas for improvement. Participants suggested that both colleagues and students did not value the fully online courses as much as face-to-face courses. Participants in this study noted that some faculty, unfamiliar with online learning design, amplified the amount of content learning in their courses with the intent to increase rigor, creating further resistance to online learning. Participants identified the need for colleagues and students to be trained in how intentional design of online courses can be effective for learning.

Participant quotes:
Participant 5: "the truth is, that online learning has been devalued by both students and faculty alike, typically, and in a large part, it's because people don't really understand how to best make use of the medium ... how to ...restructure the teaching in a way that it helps students be more engaged."
Participant 1: "why are people resisting? Because people resist change.… So how do you manage major change? ... so how do you ...change the way you teach."
Participant 3: "An online environment which is so different from our face-to-face environment…What I mean, most of the people in my institution, they're doing just synchronous classes ... So, what they're doing is just, you know, replicating that model...I know that's not sustainable for students and it's not humane to keep them sitting down for eight hours in front of our computer listening to people. That's just not humane. It's not pedagogical either."

5. Intentional redesign was needed for improved learning in flipped online courses.
Due to the pandemic, health protocols inhibited social interaction required as practice. Some disciplines required face-to-face experiences that were adapted to virtual learning activities. There was a need for more virtual learning environments that support laboratory type of course work. Similarly, educational pedagogy courses needed more opportunities for applying concepts via virtual applications.

Participant quotes:
Participant 8: "I could really tie into what other resources the students have at the actual campus, whether it's online or in person."

Participant 4: "Obviously funding is key and having the equipment in the lab. ... I do sometimes need certain equipment…[need] funding to make sure I have the right tools for teaching."
Participant 9: "For me, a dream course would also involve a co-teacher, preferably someone who ... has hands-on experience of doing the stuff that I don't do."

Discussion of Results and Implications
The range of content areas represented by the study participants suggested that the flipped approach can be useful in online courses in different disciplines as well as at both the undergraduate and graduate levels. Using a 'pre-work,' flipped component in their courses allowed their students to access instructional information in the form of videos and readings for learning the new content at their own pace and time. Subsequently, the students were able to engage in further synchronous and asynchronous learning activities.

Participants suggested that in-class and out-of-class strategies, typical in traditional in-person settings, were blended in the online environment using synchronous and asynchronous learning activities. That is, participants varied in their approaches in using flipped learning. For example, online course instructors could choose to follow up the pre-work with a synchronous activity for real-time lectures or discussions or have asynchronous activities such as Flipgrid or text discussions to build on the pre-work content. Benefits of asynchronous content allows students to review materials repeatedly for self-efficacy in their learning and enabling individualized learning.

Synchronous learning provided a distinct opportunity to replicate in-person types of activity within certain limits. Using online conferencing tools provide a mode of learning that allows students and instructors to interact in whole group and small group activities. Participants suggested that synchronous activities provided learners with opportunities to build on the flipped content for further understanding and clarification of concepts that were introduced in the course. However, the limitations of synchronous learning suggested that duration of synchronous session needed to be considered, since 'screen time,' and in-person time in a classroom, might not be equal. That is, lengthy synchronous sessions might fatigue learners with limited and uncertain learning potential and may be detrimental to student motivation and engagement.

Overall, instructors relatively new to online learning relied on synchronous sessions as the primary teaching mode and viewed asynchronous as supplemental to the synchronous learning in an attempt to replicate the in-person learning environment. Conversely, more experienced instructors found opportunities for engaging learners in both synchronous and asynchronous settings based on sound pedagogical principles, including collaborative activities, and cognitively engaging active learning strategies.

Flipped approaches provided benefits to learners but were also found to be time-intensive for both instructors and students. The additional work challenged the instructors in preparing flipped content and reviewing student access and assignments. Similarly, students were required to engage in flipped content on their own time as out-of-class work which were typically separate from other course-related activities.

Institutional support was an important consideration in course transformation from in-person to fully online courses. Intentional and purposeful redesign of course content necessitated professional development on the inclusion of pedagogically sound features to support learner engagement. Course transformation requires substantial institutional support in terms of reallocation of time and providing the necessary technology support. Institutions also need to create a culture of discoursing about online learning with the same valuation as traditional in-person courses. Online courses are at times seen as being of lesser quality or impact than traditional courses. Poorly designed courses further exacerbate this notion of depreciation of online learning. There needs to be an intentional paradigm shift in the way institutions discourse about, invest in, and support faculty teaching online courses.

Conclusion
Flipped learning pedagogy has stressed the importance of designing effective learning environments by shifting the time and space for direct instruction and in-dept learning activities. This study has highlighted that in fully online cources there is no clear distinction of space and time for in-class, out-of-class, before-class, or after-class learning activities. These space and time concepts are replaced by asynchronous and synchronous learning modalities. Many salient features of the flipped pedagogy can be applied to online courses by intentionally designing asynchronous and synchronous activities with skillfull deployment of video-based lectures, peer interactions, and meaningful activities along with real time meetings via videoconferencing tools.

The question remains whether asynchronous work should be followed by synchronous class meetings or vice-versa and additional studies can shed light on the efficacy of each approach. The present study could not address this question as the participant sample size included 10 instructors from three countries which limited a more global understanding of flipped online learning. Further, the study relied on interviews which limits the findings to self-reported perspectives and requires further triangulation with additional evidence, primarily from the students of flipped courses.

Future research should include the learners' perspectives for better understanding of the impact of the flipped approach when compared to traditional approaches. If possible, outcome measures such as assessment data and/or student products should be included. Inclusion of participants from additional countries would further shed light on the use of flipped approach for a global context. A broader inclusion of diverse disciplines will offer a clearer understanding of the applications and benefits of this approach.

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