The Impact of the Remote Flipped Learning Approach on Perceptions of Learning and Students' Engagement during COVID-19:

A Mixed Method Case Study Research of an Undergraduate Pharmacy Course in a private UAE university

تأثير التعلم عن بعد باستخدام استراتيجية الصف المعكوس على التصورات عن التعلم ومشاركة الطلبة خلال كوفيد-19:

دراسة حالة باتباع منهج البحث مختلط الأساليب لمساق بكالوريوس في تخصص الصيدلة في جامعة خاصة في دولة الإمارات العربية المتحدة

by

ZAINAB ALI MIR

Dissertation submitted in fulfilment

of the requirements for the degree of

MASTER OF EDUCATION

at

The British University in Dubai

May 2021

DECLARATION

I warrant that the content of this research is the direct result of my own work and that any use made in it of published or unpublished copyright material falls within the limits permitted by international copyright conventions.

I understand that a copy of my research will be deposited in the University Library for permanent retention.

I hereby agree that the material mentioned above for which I am author and copyright holder may be copied and distributed by The British University in Dubai for the purposes of research, private study or education and that The British University in Dubai may recover from purchasers the costs incurred in such copying and distribution, where appropriate.

I understand that The British University in Dubai may make a digital copy available in the institutional repository.

I understand that I may apply to the University to retain the right to withhold or to restrict access to my thesis for a period which shall not normally exceed four calendar years from the congregation at which the degree is conferred, the length of the period to be specified in the application, together with the precise reasons for making that application.

Signature of the Student

COPYRIGHT AND INFORMATION TO USERS

Abstract

The objective of this Mixed-Method Case Study Research (MMCSR) was to investigate and analyze student's engagement, and the perception of the learning experience in the Remote Flipped Classroom (RFC), from the perspectives of the students and the instructor. The study was focused on an undergraduate pharmacy course taught through the RFC approach in a private UAE university. The study utilized Reeve's Learning Engagement Scale (LES) Questionnaire as the quantitative tool to analyze the student's overall engagement across Behavioral, Emotional, Cognitive, and Agentic constructs. The students' and the instructor's perceptions of learning in the RFC were collected through semi-structured interviews. The data was collected from 18 participants in total. For the quantitative results, descriptive statistics were employed, while analysis of the qualitative data was completed through Thematic Analysis. The findings of this study revealed an overall positive learning engagement for the identified engagement constructs, and positive student perception of the RFC approach, with Flexibility, Deep Learning, Autonomy, and Agency as the major themes emerging from the qualitative analysis. Findings from the instructor also indicated a positive perception of the RFC approach, with Interaction and Feedback, Assessment of Learner Understanding, Class Preparedness and Experience with Educational Technology resources as the themes emerging from the qualitative analysis.

الملخص

إن الهدف من دراسة الحالة هذه والتي اتبعت منهج البحث المختلط الأساليب هو دراسة وتحليل مشاركة الطلبة وتصورات الطلبة والمدرسين لتجربة التعلم عن بعد باستخدام استراتيجية الصف المعكوس (المقلوب). تمت الدراسة على مساق بكالوريوس اتبع استراتيجية الصف المعكوس لتخصص الصيدلة في إحدى الجامعات الخاصة في دولة الإمارات العربية المتحدة. اعتمدت الدراسة على استخدام استبانة ريف لمقياس المشاركة في التعلم :

(Reeve's Learning Engagement Scale (LES) Questionnaire) كأداة قياس كمية لتحليل مشاركة الطلبة الكلية فيما يتعلق بالجوانب السلوكية والعاطفية والمعرفية و ووجود دور فاعِل للطلبة في الصف. تم جمع تصورات المعلمين والمتعلمين للتعلم في الصف المعكوس عن طريق مقابلات شبه منظمة. جُمعت البيانات من ثمانية عشر مشاركاً، وتم استخدام الإحصاء الوصفي فيما يتعلق بالنتائج الكمية، أما البيانات النوعية فقد تمّ تحليلها عن طريق التحليل الموضوعي (Thematic Analysis).

كشفت نتائج هذه الدراسة عن وجود مشاركة تعليمية إيجابية عامة لجوانب المشاركة التي تم تحديدها، كما كشفت عن وجود تصور إيجابي من قِبَل الطلبة تجاه تجربة التعلم عن بعد باستخدام استراتيجية الصف المعكوس، فيما أظهر التحليل النوعي أن المحاور الأساسية للطلبة هي المرونة والتعلم العميق والتعلم الذاتي ووجود دور فاعل لهم في الصف. أظهرت نتائج تحليل بيانات المعلمين عن وجود تصور إيجابي تجاه تجربة التعلم عن بعد باستخدام استراتيجية الصف المعكوس، فيما أظهر التحليل النوعي أن المحاور الأساسية للمعلمين هي التفاعل والتغذية الراجعة وتقييم فهم المتعلم والاستعداد للصف والخبرة في استخدام مصادر تكنولوجيا التعليم.

Dedication

To my wonderful parents, Mir Mazhar Ali and Hamida Mazhar, and my siblings, Asif and Saleha, for their unconditional love, support and precious prayers. Thank you for always encouraging me to do my best, and for being my strongest cheerleaders.

To my little miracles, Khizar and Imaan. You have made me a stronger mother and a better person than I could have ever imagined.

Acknowledgement

In the name of Allah, the Most Gracious and the Most Merciful

I am eternally grateful to the Almighty Allah for giving me the opportunity, patience, and strength to pursue a Master's degree, and to complete my dissertation. I have also been very blessed to receive kind support and encouragement from many people during my Master's journey, and I am extremely grateful to them.

My deepest gratitude would be to my Dissertation Supervisor, Dr. Tendai Charles. His kind words and unparalleled support were the driving force for increasing my motivation, every time I felt that I might not be able to go forward. His insightful advice, proofreading and feedback helped me out not only during the dissertation process itself, but also on various other occasions, throughout the time I have spent at BUiD. I think I would speak for the majority of students who have worked with him, that we have been very fortunate to have him as our mentor. I am also deeply indebted to my dear friend, Hera for her relentless efforts. From carefully proofreading my work, to giving me practical suggestions based on her own experience, and to her unwavering support, which I could always count on at any time. In fact, I think my experience at BUiD has been particularly delightful, because I was lucky to meet both, Hera and Dr. Tendai here.

I am also very grateful for my husband, Rizwan's support throughout my education, who encouraged me to go forward with pursuing this journey. He has also been a great father and a best friend to our children, especially when their Mommy was busy with her studies, and could not give them enough time. I do not think I could have completed this work without his moral support.

I would also like to express my sincere gratitude to my colleagues at work, Prof. Esam Agamy, Dr. Ismail Ben Douissa, Hiba Jadallah and Hussain Agha. Thank you so much for inspiring me to continue my education, and for supporting and motivating me throughout the process. I am also very grateful to Dr. Mohamed Aly Haidar who facilitated this journey for me. Thank you very

much Dr. Mohamed for answering my numerous questions, and for giving me your valuable insight and feedback.

I would also like to thank all the participants who took part in this study. Last, but definitely not the last, an extra shout out to my wonderful friends, Maira and Uzma for their continuous encouragement. Thank you for being an amazing support system!

Table of Contents

List of Figures

List of Tables

List of Abbreviations

FL - Flipped Learning

F2F - Face-to-Face

FC - Flipped Classrooms

RFC - Remote Flipped Classrooms

HEI - Higher Education Institution

LES - Learning Engagement Scale

MMCSR - Mixed Method Case Study Research

MKO - More Knowledgeable Other

ZPD - Zone of Proximal Development

Chapter 1: Introduction

1.1 Overview

Following the COVID-19 pandemic and the sudden shift to online learning as an "Emergency Remote teaching" (ERT) measure (Bozkurt and Sharma, 2020), academics and researchers in higher education institutions (HEIs) have questioned the variables that enhance student's online engagement (Knudson, 2020), and contribute to the efficacy of remote learning environments (Johnson et al., 2020; Affouneh et al., 2020). While the students' sense of isolation and lack of physical interaction has been identified as some of the key disengagement factors (Brown et al., 2015), structural variables, such as the course's instructional model in an online environment also plays a significant role (Farrell and Brunton, 2020). As student engagement is a prerequisite for online learning (Guo et al., 2014), educators are experimenting with various teaching strategies that incorporate active learning and encourage learning engagement in online classes, through technological innovations (Farrell and Brunton, 2020). One such strategy includes the "Remote Flipped Classroom" (RFC) approach, where the principles of the flipped classroom course design are embedded with remote delivery pedagogy (Baskara, 2020; Fogg and Maki, 2020). The approach allows instructors to embed teaching materials during the pre-class time as asynchronous learning, and make use of the online synchronous in-class time, to integrate discussion and activities (Baskara, 2020).

Within the pharmacy curricula, the flipped learning (FL) approach has been appreciated as one of the various learning strategies in the debates of "pedagogical correctness" measures (Poirier, 2017, p.1). Educators are tasked with challenges related to the most appropriate pedagogical approach for learning that would not only be meaningful and engaging to students with different learning styles (Farland et al. 2013; Romaneli et al., 2009), but would also contribute to their

cognitive and practical skills in the real clinical world (Poirier, 2017). Although several research studies have shown FL to contribute to learner satisfaction and engagement, the examination of learning engagement itself in blended and FL contexts is a debatable subject, as "assessing engagement is characterized by variability" (Veiga et al., 2014, p.40). This is due to the multi-faceted nature of engagement which incorporates several constructs, and its analysis across a single dimension may not be sufficient (Reeve, 2013; Bond et al., 2020). Amongst several models, a comprehensive examination of the learning engagement constructs can be conceptualized through Reeve's Engagement Model (2013), which delves into the students' behavioral, cognitive, emotional, and agentic constructs of engagement - the analysis of which can contribute to longitudinal changes in classroom motivation (Reeve and Lee, 2014). Although the RFC approach allows the transition from traditional teacher paradigm to a more meaningful and learner-centered, technology-integrated learning (Baskara, 2020), its feasibility in assessing various conceptual elements of engagement, such as behavioral, cognitive, emotional, and agentic constructs, in a pharmacy education curriculum in United Arab Emirates (UAE) is yet to be determined. Additionally, the efficacy of the RFC approach to assessing the perceptions of the learning experience is an unexplored domain.

This research paper utilizes a case study research design with a mixed-method design to focus on an undergraduate pharmacy course taught through the RFC approach in a private UAE university. This study aims to investigate and analyze students' engagement and the perception of the learning experience in the RFC, from the perspectives of the students and the instructor. This study serves a deeper understanding of the conceptual elements contributing to student engagement and provides a detailed analysis of the diversity of the learning perceptions, where the results will be triangulated. It is proposed that the results of the study will provide a

meaningful pathway and effective guidelines for the potential implementation of the RFC approach.

1.2 Rationale of the Research Study

While the efficacy of Flipped Classroom has been studied on many occasions to discover factors that can impact the learning process, the analysis of student engagement in face-to-face (F2F) instruction, blended and FL environments have primarily concentrated on quantitative data such as, “attendance, standardized test scores, and truancy or graduation rates" (Parsons and Taylor, 2011, p.5). Studies that have utilized qualitative measures to analyze engagement in flipped classrooms (FC) have revealed deeper definitions of student engagement, by highlighting the gap between what educators perceive engagement in learning, to what students experience when learning (Parsons and Taylor, 2011; Bond et al., 2020), and how educators can improve that experience within their instructional settings (Zepke, 2018). This signifies the need for the integration and measurement of student engagement at a level where engagement variables can be modeled (Subramaniam and Muniandy, 2019), as demonstrated in Reeve’s Learning Engagement Scale (LES) (Reeve, 2013).

However, there are limited studies that show the utilization of Reeve’s LES to comprehensively assess learning engagement in flipped classrooms in HEIs (Subramaniam and Muniandy, 2019; Jamaluddin and Osama, 2014). Additionally, the asynchronous online learning in the pre-class time is mainly supported with face-to-face sessions during class time, within these studies (Wong et al, 2014). With the complete shift to online learning, the implementation of the RFC approach is still a relatively recent subject. Within the context of remote learning and the utilization of RFC in the UAE, studies that have analyzed student engagement are scarce. Moreover, the efficacy of the RFC approach to assessing the conceptual elements of engagement, such as behavioral,

emotional, cognitive, and agentic constructs of learning engagement, including perceptions of the remote FL experience is an unexplored domain within UAE pharmacy curriculum. Therefore a study of the RFC approach is important as the learning engagement can significantly influence students' degree of satisfaction, and consequently contribute to the achievement of educational objectives and overall motivation (Abeysekera & Dawson, 2015).

1.3 Significance of the Research Study

The pharmacy curriculum is increasingly being improved by educators to provide practical learning experiences that carefully combine foundational knowledge development with the implementation of real-world clinical scenarios (Poirer, 2017). The significance of student engagement in pharmacy education is highly emphasized, as it overlaps with practices aimed at improving critical reasoning and problem-solving skills, as well as communication proficiency (Flaherty, 2011).

Given the current level of student disengagement in online synchronous learning with a lecture-based approach (Farrell and Brunton, 2020), the research study may strengthen the factors contributing to the successful adoption of the remote FL pedagogy, which addresses the perceived difficulties of learner disengagement in pharmacy courses. Furthermore, a research study observing intrinsic engagement factors in the context of UAE's pharmacy curriculum has not been conducted before. The four constructs of evaluating engagement levels, according to Reeve and Lee (2014), provide a consistent and holistic understanding of the underlying factors of engagement in classrooms, with the findings serving the greater goal of translating students' motivational states, which itself can lead to initiatives to encourage students' academic skills, and improve the attainment of learning objectives. In addition, in this research study, the perceptions of students and the instructor are taken into account to provide a wholesome picture of the RFC,

allowing all participants to reflect on their teaching and learning, with recommendations to improve the experience for future FL opportunities in the pharmacy curriculum.

1.4 Context of the Study

The study is focused on an undergraduate pharmacy course, "Cosmetics and Para-Pharmaceuticals", taught through the RFC approach in a private HEI in UAE. The participants of this MMCSR include the pharmacy students enrolled in the course and the course instructor. The student participants enter their responses indicating their levels of agreement for various learning engagement factors in an online questionnaire, which is then followed up with a semi-structured focus-group interview to analyze their perceptions with the RFC approach. There is also a semi-structured interview with the instructor of the course to gain their insights on the RFC approach experience.

1.4.1 Aim of the Study

The MMCSR aims to investigate student engagement and obtain a cohesive understanding and analysis of the several factors that contribute to it in the RFC, from the perspectives of the students and the instructor. The study utilizes Reeve's LES (Reeve, 2013) to analyze the behavioral, cognitive, emotional, and agentic constructs of learning engagement. The study's aim is also to gain a comprehensive understanding of the overall perception with the remote FL approach, from the students' and instructor's standpoints.

1.4.2 Research Objectives

The objectives of this research study are the following:

1. Examine the effect of a RFC on students' behavioral, emotional, cognitive and agentic engagement constructs.

2. Examine the students' perceptions towards the RFC approach.

3. Examine the instructor's perceptions towards the RFC approach.

Chapter 2: Literature Review

2.1 Flipped Learning

The concept of inverted/reverse classroom was first described by Lage et al. (2000) as an approach that allows the traditional instructional approach to be reversed (or flipped) with the teaching time occurring before class, and the in-class time utilized to do "homework" as in-class activities. However, high school chemistry teachers, Bergmann and Sams, more formally introduced the term "flipped classrooms" (FC) when they began flipping their classrooms - by assigning students to view recorded videos online at home and allocating the classroom time to group activities and completion of projects, in the presence of the instructor who gave immediate feedback (2012). This is in contrast to the traditional classroom approach, where students receive the information passively from the instructor and rely on notetaking to retain information, and while the homework activities that are assigned outside of class time may be individual or include group work, it is usually completed without the presence of the instructor (Talbert, 2017).

However, as argued by Bishop and Verleger (2013), the FL approach is not simply a re-sequencing of classroom and homework tasks. Bishop and Verleger (2013) define the FL approach to encapsulate a technology-mediated pedagogical framework where the principle is comprised of two parts;

1. To enable instructors to present the didactic course content, and the learning objectives to students as online asynchronous self-directed study before meeting in class, and
2. To utilize the in-class time to support and develop students' learning by integrating active and collaborative learning strategies

Figure 1 and Figure 2 illustrate the graphical representation of the FC .

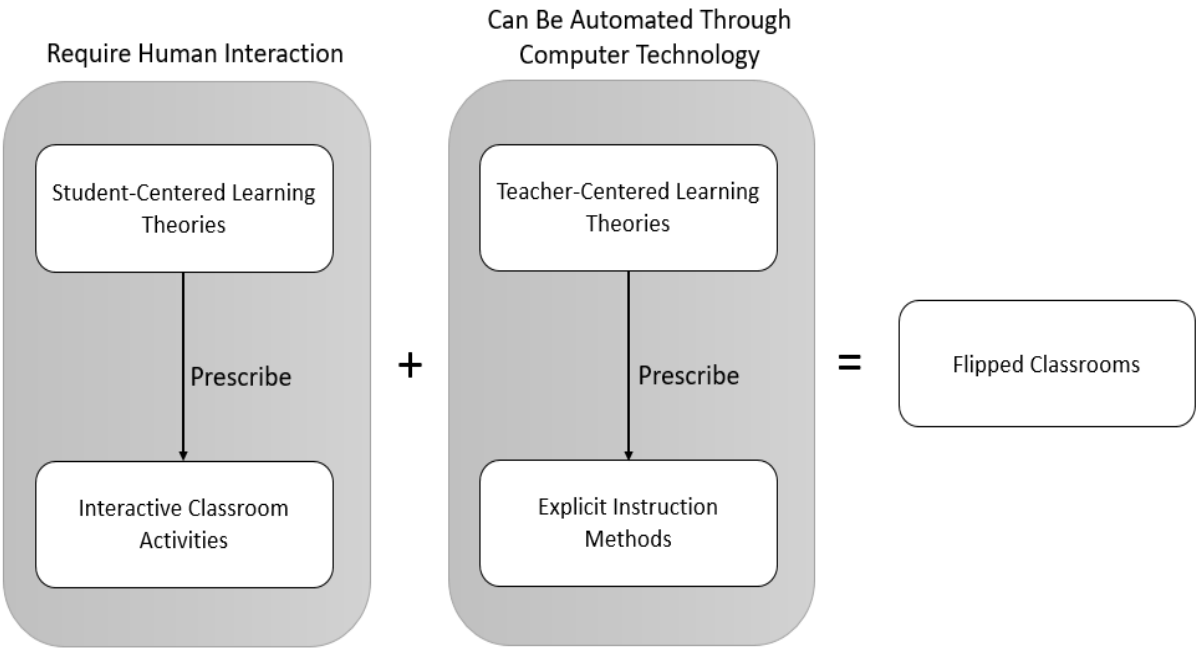


Figure 1: Flipped Classrooms (Bishop and Verleger, 2013)

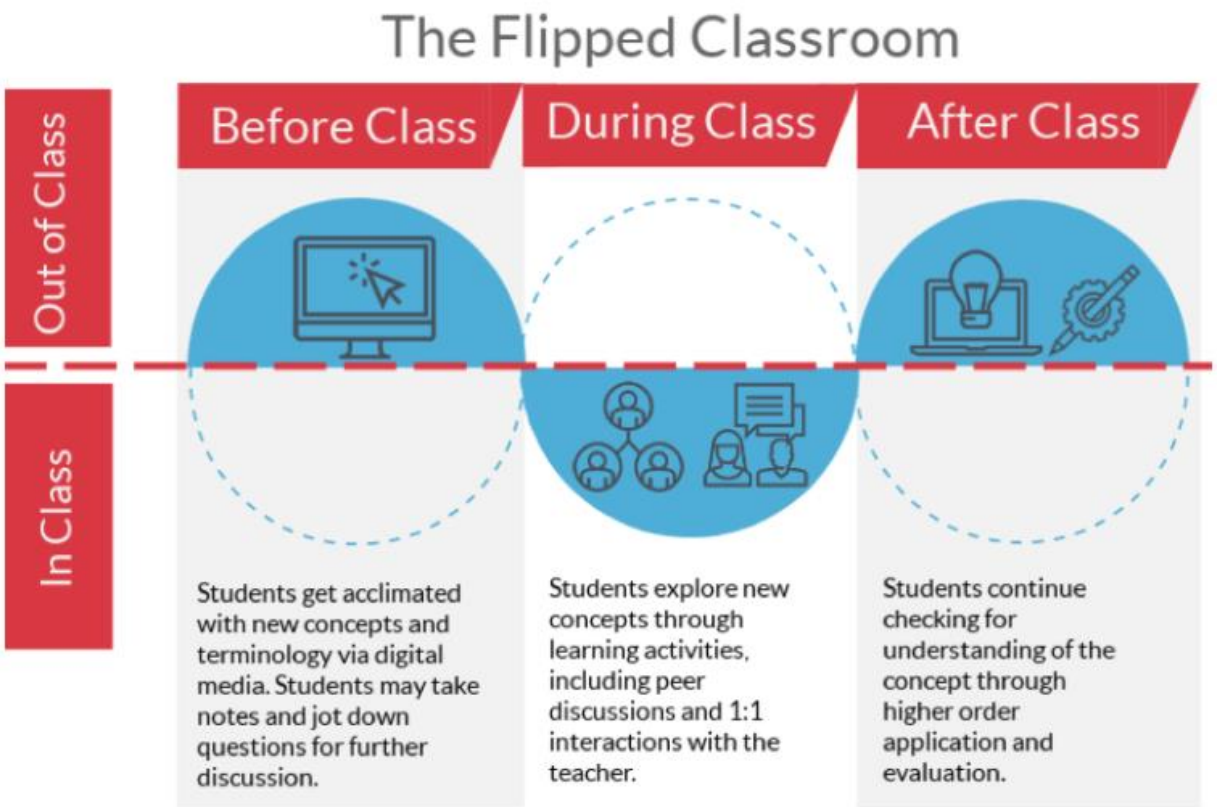


Figure 2: The Flipped Classroom (Odysseyware, 2018)

The FL approach has evolved to form several different versions (Bates et al., 2017), where the teacher can employ a variety of instructional tools and methods within the context of this learning approach (FLN, 2014). A variation in which online/distance learning classrooms can utilize FL and support the in-class sessions with remote delivery pedagogy, can be referred to as the "Remote Flipped Classroom" (RFC) approach (Baskara, 2020; Fogg and Maki, 2020) and also as the "online flipped classroom" (Hew et al., 2020). Identified as a promising strategy to integrate active online learning (Hew et al., 2020), the RFC approach allows instructors to assign students online learning materials to be viewed as asynchronous learning, outside of class time (Bergeman and Sam, 2012), and integrate active class discussions and group assignments during the online synchronous session. In addition, like conventional FC, it also allows instructors to provide immediate feedback to students while evaluating their learning during the online class time (Baskara, 2020).

Consequently, a key requirement of this student-centered approach to become meaningful is to incorporate instructional design practices that foster learner engagement and provide an opportunity for learners to reflect on the learning materials with the enhanced instructional resources (Jatau et al., 2018; Dziuban et al., 2018; Bishop and Verleger, 2013). This is irrespective of whether the instructor conducts the in-class session via face-to-face (F2F) instruction or synchronous/ asynchronous online learning. As such, it is necessary to describe the theoretical framework for FL and key characteristics and methodologies of the FL approach.

2.2 Flipped Learning Characteristics and Methodologies

Within research literature, there are numerous versions and perspectives to explain the nuanced characteristics of the FC approach, and while there may not be a strictly structured "how-to" list

to successfully implement a FC (Hamdan et al., 2013), there are certain centralized themes which can successfully encapsulate its pedagogical nature.

According to the educators in the Flipped Learning Network (FLN), an FL environment consists of four pillars which are identified as Flexible environment (F), Learning culture (L), Intentional content (I), and Professional educator (P) which are combined to be the F-L-I-P model (FLN, 2014). However, within the context of higher education, Chen et al. (2014) proposed an improved model, which includes the four pillars of the F-L-I-P model and includes three additional pillars; Progressive Activities (P), Engaging Learning Experiences (E), and Diversified platforms (D). Together this forms the FLIPPED model, which incorporates seven pillars, as explained in Figure 3. The comprehensiveness of the FLIPPED model targets the instructors and learners expectations as well as outlines the necessary guidelines that facilitate the creation of a holistic FC environment (Chen et al., 2014; Akçayır and Akçayır, 2018).

Flexible Environment	It contains the possibility of different teachers implementing different methods or techniques. Flipped learning makes it possible for students to learn anywhere and whenever they would like to learn.
Learning Culture	It expresses the active status of students in flipped learning, who are passive in traditional method and their interactive participation in structuring information.
Intentional Content	It entails teachers considering what information students should attain whilst learning. The content should be targeted for a purpose and should allocate more time for active learning activities and be student-centered.
Professional Educator	This individual is defined as someone that improves themselves using self-regulation in the teaching-learning process, provides a healthy learning environment and immediate feedback to students on course videos and activities.
Progressive Activities	Individual instruction, group discussions, lab studies are social interaction activities that could be achieved both in school and/or outside of school, resulting in the student becoming a planner, problem solver and an active participator.
Engaging Learning Experiences	The instructional design could be good, but if the educator does not take students' experiences into consideration, negative results could be achieved for students of the flipped learning process.
Diversified Platforms	It contains individualized, differentiated, personalized design of platforms in flipped learning. These diversified platforms provide a seamless learning experience that expresses the integration of student experiences with formal and informal learning environment and context.

Figure 3: The 7 Pillars of the FLIPPED Learning Model (Chen et al., 2014)

In addition, a key criterion of success within FC is related to the instructional design of the course. This can include several aspects, such as:

- The role of instructor and students (Çakıroğlu and Öztürk, 2017),
- The quality of the instructional materials which includes the content and duration of the videos used as the pre-class material (Akçayır and Akçayır, 2018; Slemmons et al., 2018),
- The quality of other instructional and assessment materials (Karabulut-Ilgu et al., 2018), and

- The standard implementation of active-learning strategies, which incorporate interactive and collaborative learning activities during the in-class session (Bishop and Verleger, 2013).

Çakıroğlu and Öztürk (2017) have illustrated the typical flow of actions required by instructors and students in the FC model as shown in Figure 4:

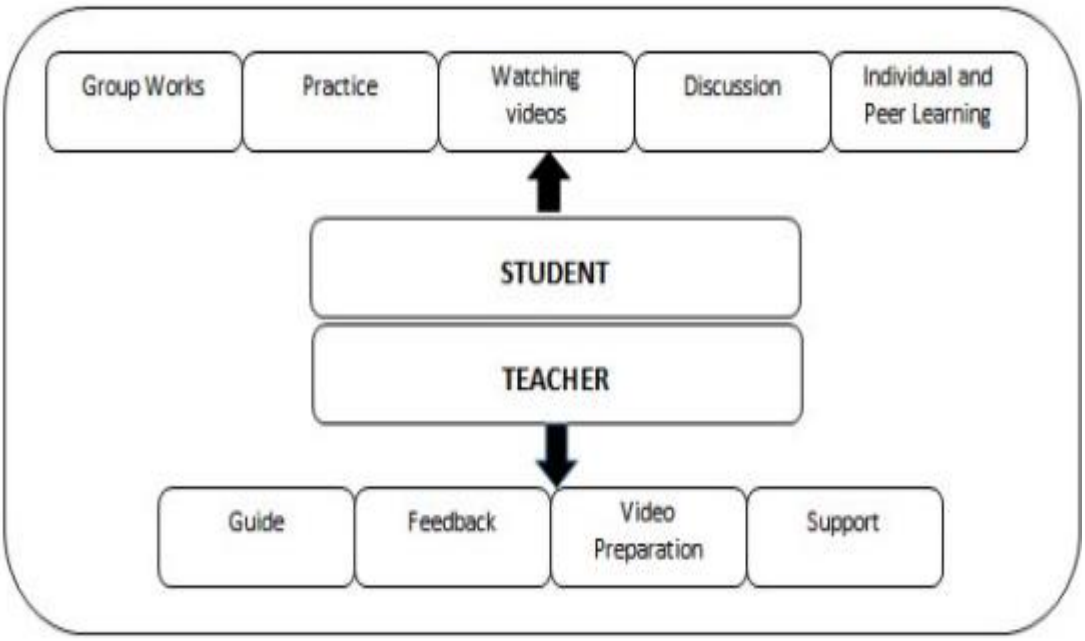


Figure 4: The Roles of Instructor and Student in a FC Model (Çakıroğlu and Öztürk, 2017)

While the characteristics of the FL model presents a detailed understanding of its core principles, the FL approach is also underpinned by several pedagogical frameworks, as described in the next section.

2.3 Theoretical Frameworks of Flipped Learning

Research literature has identified numerous learning theories that explain the theoretical underpinnings of the FC approach. Bishop and Verleger (2013) stated that FL "represents a unique combination of learning theories once thought to be incompatible - active, problem-based

learning activities founded upon a constructivist ideology and instructional lectures derived from direct instruction methods founded upon behaviorist principle" (p.2). To illustrate their point, Bishop and Verleger (2013) described the combination of multiple student-centered active-learning theories, as shown in the Venn Diagram below in Figure 5:

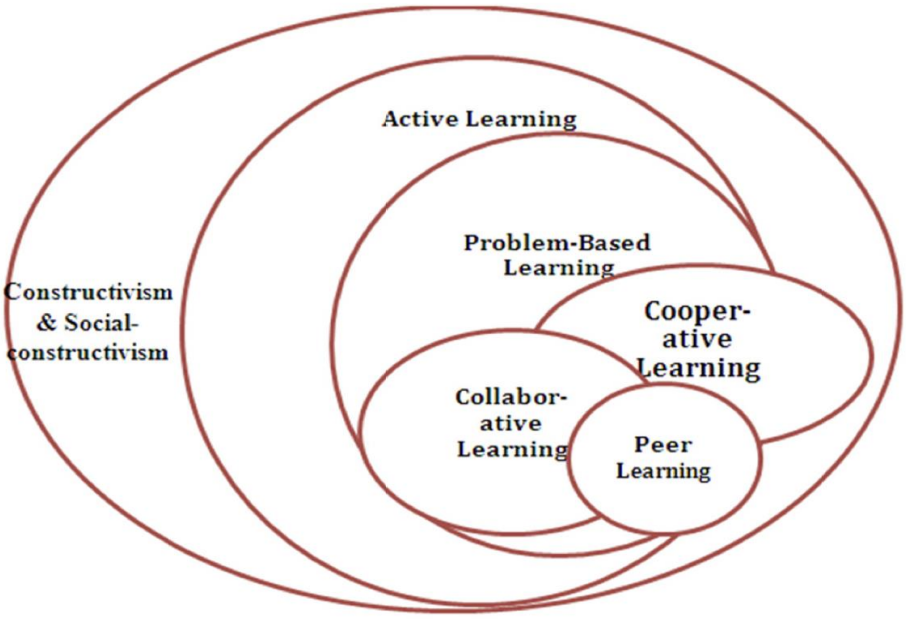


Figure 5: Compendium of Multiple Learning Theories in Flipped Learning (Bishop and Verleger, 2013)

From a pedagogical perspective, FL is primarily underpinned by constructivism, social-constructivism, and active learning theories. In FL, the constructivist learning process is applied during the pre-class learning time where the learner engages with the videos and other learning materials given by the instructor (MKO) to dynamically constructs knowledge by combining new information with prior knowledge (Vygotsky, 1978), before attending class (Steen-Utheim and Foldnes, 2018; Zheng et al., 2020). Moreover, a key principle for the constructivist and social-constructivist pedagogies emphasizes the inclusion of meaningful activities within cooperative and collaborative learning environments, that enable learners to not only engage in the learning process but also construct knowledge based on the teacher's and more capable peers' interaction

and feedback through scaffolding (Palincsar 1998; Jonassen and Murphy, 1999). The inclusion of meaningful activities within FL implies the adoption of student-centered active learning mechanisms (Khanova et al., 2015; Pierce and Fox, 2012), which can be defined as "a method of learning in which students are actively or experientially involved in the learning process" (Bonwell and Eison, 1991, p.1). Active Learning also postulates that activities are collaborative and cooperative in nature, where students are encouraged to provide reflections, and feedback (Gleason et al., 2011).

As shown in Figure 6, the social-constructivist and active learning pedagogies are applied during the in-class session in the FC, where the instructor (the MKO) facilitates the teaching session by incorporating interactive classroom activities, such as group discussions, debates, case studies, and other team-based and/or problem-based learning opportunities. These activities are supported with peer-assisted learning, including the provision of immediate feedback (Gilboy et al., 2015; Chen et al., 2014; Bishop and Verleger, 2013). These efforts not only scaffold learners but also foster critical thinking skills, aligning with the ZPD (Mok, 2014), which is defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p.86).

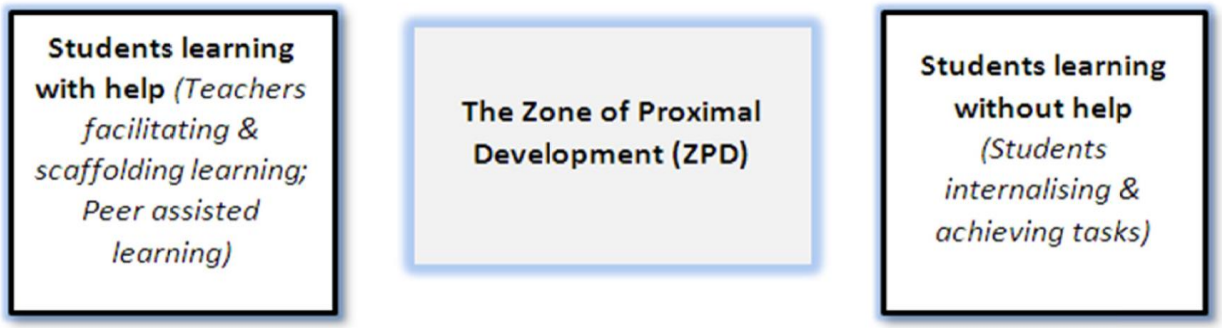


Figure 6: Constructivism and Social Constructivism Learning Theory in Flipped Classrooms

The FL pedagogy can also be associated with Adult Learning theory (also referred to as *Andragogy*) which was outlined by Knowles (1984). According to Knowles, there are "four principles that are applied to adult learning:

1. Adults need to be *involved* in the planning and evaluation of their instruction.
2. *Experience* (including mistakes) provides the basis for the learning activities.
3. Adults are most interested in learning subjects that have *immediate relevance* and impact to their job or personal life.
4. Adult learning is *problem-centered* rather than content-oriented. (Kearsley, 2010)" (Pappas, 2013, para 9)

Within the FL environment, the student's independent learning time is spent by engaging with the instructional videos and other learning materials before the class session, allowing them to plan and pace their learning time, and adapt according to their knowledge gain (Palis and Quiros, 2014). Additionally, adult learning has also highlighted the significance of learner engagement, motivation, and participation in problem-solving exercises, by offering students the possibility and flexibility to choose how they present their learning, and empowering them to be more self-directed, autonomous, and accountable towards their learning (Leslie, 2020).

Furthermore, the FL pedagogy can also apply to the *Mastery Mode* (Bloom, 1968), which indicates the significance of achieving higher-order cognitive skills, as enumerated in the revised Bloom's Taxonomy (Krathwohl, 2002) shown in Figure 7. According to Bransford et al. (2000), deep learning can occur when a student undergoes the following phases:

1. First, students build a solid foundation of fact-based knowledge.
2. Then, students comprehend how their knowledge relates to the overall concept; and

3. And then, students can recall and apply their gained knowledge and skills in a variety of contexts

Stemming from the social-constructivist pedagogical perspective discussed earlier, these phases are supported in the FL approach as learners transition from the surface-level (low-level) cognitive learning (*remember* and *understand*) during their knowledge construction phase in the pre-class time, to general comprehension and analysis (*apply* and *analyze*) (Krathwohl, 2002) during the in-class session, to deep learning (*evaluate* and *create*) post-class. Feedback during the in-class session and post-class discussion are where the learning is scaffolded through social interactions, which in turn impacts the learners' self-regulation (Steen-Utheim and Foldnes, 2018; Zheng et al., 2020) and also affect their behavioral and psychological aspects of engagement (Kahu, 2013).

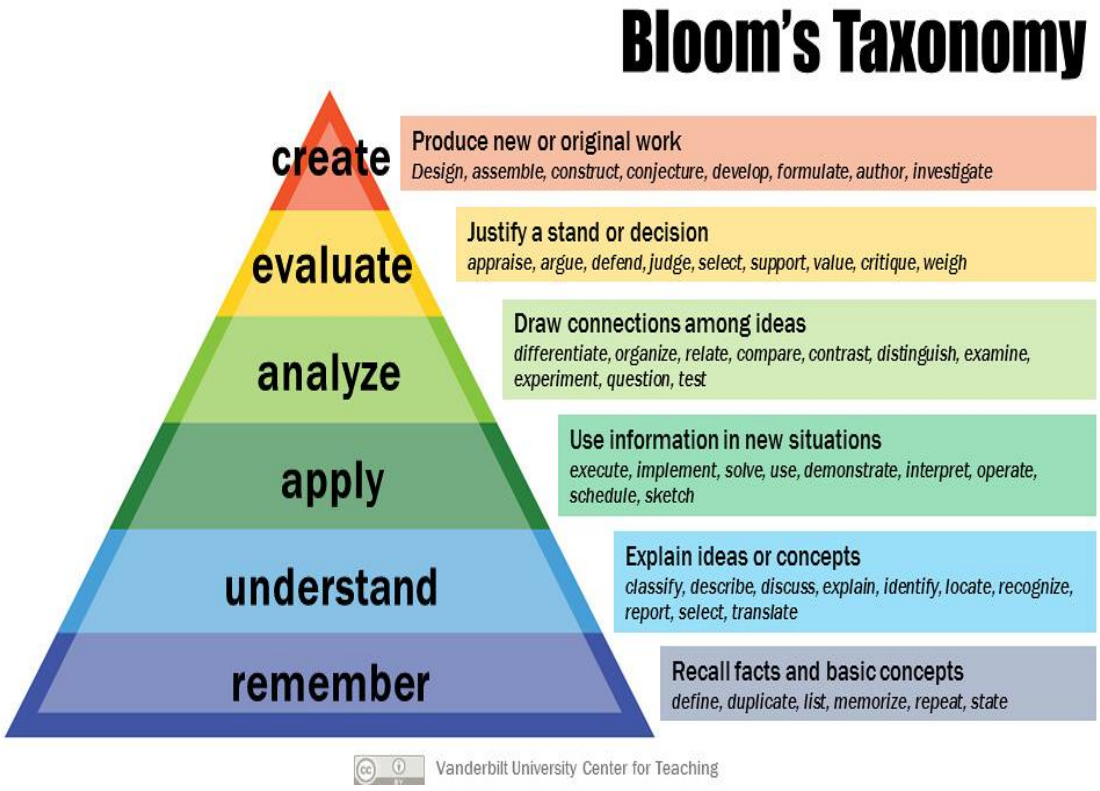


Figure 7: Bloom's Taxonomy (Armstrong, 2010)

As illustrated in Figure 8, within the traditional classroom model learners are introduced to the instructional material in the classroom time and are responsible to achieve higher-order thinking skills outside of class time and often individually through homework activities (Ahmed, 2016). In contrast, the FL approach empowers students to understand the topic before they attend the class session, where the learned concepts are then reinforced through collaborative and cooperative active-learning strategies together with the encouragement and feedback from peers and the instructor. Furthermore, formative feedback offered throughout flipped class time facilitates instructors in further describing any complex concepts and also clarifying any inconsistency, so that learners "organize their new knowledge in a way that is more accessible for future use" (Brame, 2013, p. 3). This navigates the pathway for attaining higher order thinking skills and allows learners to achieve the Mastery Mode.

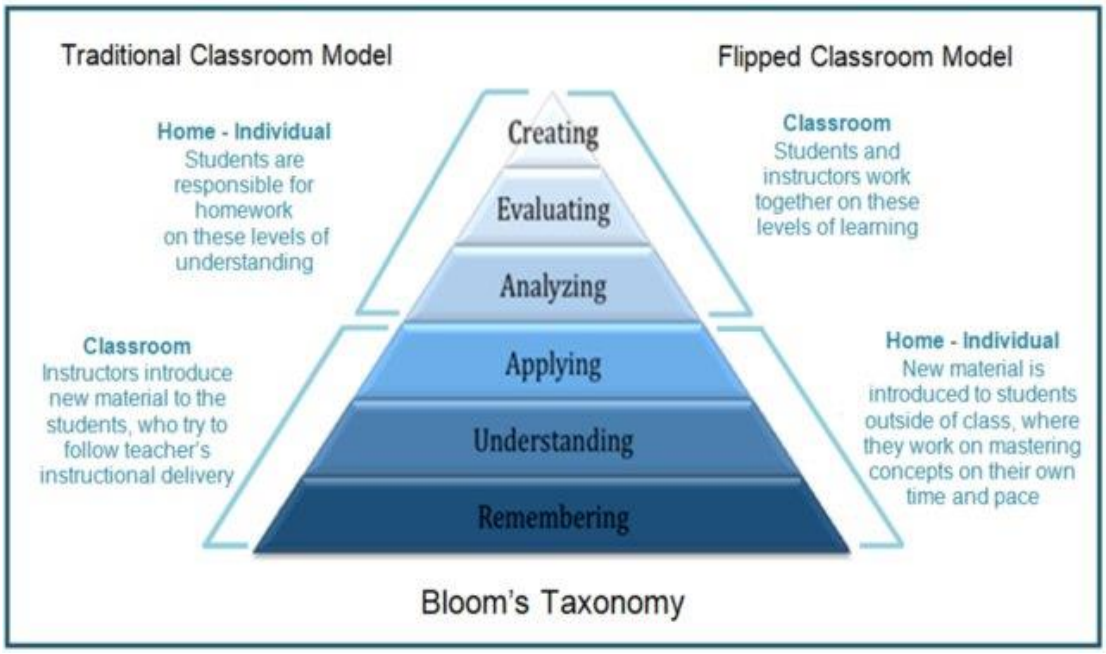


Figure 8: Bloom's Taxonomy in Traditional and Flipped Learning (Ahmed, 2016)

2.4 Flipped Learning Benefits, Misunderstandings and Challenges

2.4.1 Benefits of the Flipped Learning approach

Research studies conducted on the effectiveness of the conventional FC and the RFC approach, have commonly described flexibility as the biggest advantage for students and instructors (Ho et al., 2020; Hew et al., 2020; Bond and Bedenlier, 2019; Karabulut-Ilgu et al., 2018; Dziuban et al., 2018; Mok, 2014). The advantage of flexibility in a FL environment also allows this student-centered pedagogical approach to empower students with control and accountability over their learning (Tang et.al., 2020; van Alten et al., 2020; Maheshwari and Seth, 2019; Bergmann and Sams, 2012) and autonomy (Muir, 2020; Zainuddin and Perera, 2019).

Furthermore, the FL approach is also successful in targeting students with different learning styles (Kim, 2018), as the provision for a variety of instructional resources allows the FL approach to provide learner personalization (Farland et al., 2013; Bergmann and Sams, 2012). Studies have shown that the use of videos as a pedagogical tool has particularly shown a positive influence (Bond and Bedenlier, 2019; Akçayır and Akçayır, 2018; Khanova et al., 2015) on learners' verbal memory and visual-spatial intelligence (Gardner, 2000). Moreover, students can review the course materials in the video lectures by pausing and replaying certain parts of the video for better understanding (Hew et al., 2020; Kim et al., 2018), with continuous access to the material which can be reviewed at any time.

In addition, improvements in academic achievement are also associated with FC, as illustrated in several research studies (Kennedy, 2019; Karabulut-Ilgu et al., 2018; Chen et al., 2017). Goh and Ong (2019) demonstrated the performance of Malaysian students in the final examination where the FC experimental group demonstrated significantly greater achievement than the students who

experienced teaching through the traditional lecture-based classroom. The FC students also commented that they felt more comfortable, engaged, and confident in their tests and exams (Goh and Ong, 2019). In terms of RFC, Hew et al. (2020) observed the difference between the RFC and conventional FC (that is supported with F2F in-class sessions) for two courses in the College of Education and discovered that there was a significant difference in the student academic achievement, compared to the conventional FC for the same two courses.

Additionally, the FL approach enables educators to reconsider and transform their teacher-centric roles to that of a guide or facilitator (Gilboy et al., 2015), with the provision of immediate feedback during the in-class sessions (Means et al., 2014). The reversal in teaching time, with the advantage of meaningful enhanced learning (Herreid and Schiller, 2013), is indeed one of the key rationales of implementing a FL environment. As highlighted in several research studies, students have appreciated the opportunity to collaborate with their peers (Bond and Bedenlier, 2019; Goh and Ong, 2019; McLaughlin, 2013), with the presence of the instructor who guided their thinking and their conversations, and aided in problem solving (Radder-Renter, 2020; Karabulut-Ilgu et al., 2018; Chen et al., 2014).

With these advantages, several authors have advocated that FL aids in the development of the learners' interpersonal and professional skills, such as life-long learning (Karabulut-Ilgu et al., 2018; Dziuban et al., 2018), learner autonomy (Khanova et.al., 2015; Mok, 2014; Zainuddin and Perrera, 2018) and critical thinking as well as achievement of higher-order thinking skills (Lee and Lai, 2017).

2.4.2 Misunderstandings in the Flipped Learning Approach

While the FL approach brings a unique perspective of merging the best practices of active learning strategies with technological practices, there are also a few common misconceptions

within this pedagogical approach. Within the FL environment, it is often perceived that the role of instructors would be substituted only with online videos (Filiz and Kurt, 2015) and that it is mandatory for instructors to record videos of themselves, lecturing and explaining the course's concepts in the FL approach.

However, from a wider view, the literature on FC approach outlines several different perspectives that can adequately address the misunderstandings. Although, a recorded lecture that is customized with the instructor explaining the concept allows students to resonate with a certain degree of familiarity (Talbert, 2017; Filiz and Kurt, 2015), popular video-based platforms such as Youtube, TED-Ed, Khan Academy can also be utilized by instructors, to use videos created by other instructors as the pre-class teaching material (Bergmann and Sams, 2012). Additionally, the role of instructors cannot replaced with the online-recorded video. Rather the approach allows allow the instructor to take the role of a facilitator and allow the class time to be re-conceptualized in to an active learning environment where learning can be enhanced.

2.4.3 Challenges of the Flipped Learning Approach

While the FL approach allows the class time to be re-purposed, it has been found to inadvertently contribute to significant instructor workload, before and after the in-class session (Ghadiri et al., 2014). This is especially relevant during the transition phase of transforming the typical lecture-based instructional pedagogy to the FL approach (Karabulut-Ilgu et al., 2018). Additionally, while technological resources and innovations are widespread in today's era, it can also be a challenge for both instructors and students in FL situations where there is a lack of adequate technical support (Tague and Baker, 2014; Davies et al., 2013). Additionally, the FL approach caters to multiple learning styles (Bergeman and Sam, 2012) and allows efficient class differentiation, it also puts more pressure on instructors to ensure that the content in the FC is

effectively designed to meet the needs of multiple learners, who may need additional assistance (Fauzi and Hussain, 2016; Marlowe, 2012).

Although the primary essence of the FC is to empower students with control and accountability for their own learning, it can be a disadvantage for students who are comfortable with the traditional didactic lecture-based approach. Studies have revealed that students who struggled with organizational skills, time management, and metacognition have feet overwhelmed with the autonomous responsibility of online learning in FC (Farrell and Brunton, 2020; Lo and Hew, 2017; Khanova et al.,2015). Consequently, some students opined that the self-preparation in FC is demanding (Akçayır and Akçayır, 2018; Lai and Hwang, 2016; Rotellar and Cain, 2016; Khanova et al., 2015; Rahman et al., 2015), causing them to resist this unconventional approach.

2.5 Student Engagement

2.5.1 Overview

The vast literature on student learning engagement has identified it as a complex and inherent aspect of the learning process (Boekaerts, 2016), where student engagement refers to the "student's willingness, need, desire and compulsion to participate in, and be successful in the learning process promoting higher level thinking for enduring understanding" (Bomia et al., 1997, p.294). Engagement can also be defined as the students or instructor's active involvement in the learning (Christenson et al., 2012) and "the time and energy students devote to educationally sound activities inside and outside the classroom" (Kuh, 2003, p.5).

Within the research literature, student engagement has portrayed strong correlations to the students' satisfaction with the instructional approach and the course-learning environment, as well as the overall motivation of students to participate in the course (Abeysekera & Dawson, 2015). In the higher educational domain, student engagement is largely positioned as a powerful

predictor of students' learning progress, academic performance, and achievement of educational objectives (Trowler, 2010). Consequently, it is the direct outcome of integrating superior and efficient pedagogical practices (Ashwin and Mcvitty, 2015). However, in the research literature, the assessment and even definition of learning engagement are subjected to variability (Veiga et al., 2014), "as several instruments fall under a variety of perspectives and serve a diversity of purposes" (p.40). A primary reason for this difference is due to the multifaceted nature of student engagement, where it incorporates a diverse set of perspectives or constructs (Ben-Eliyahu et al., 2018), thereby allowing educational researchers to describe and define engagement through a number of nuanced approaches (Gasiewski et al., 2011). Therefore, the analysis of engagement requires a cohesive understanding of its conceptualization and the various elements that contribute to the overall engagement in learning (Bond et al., 2020).

2.5.2 Conceptualization of Student Engagement Constructs

Halverson (2016) demonstrated the multi-dimensional conceptualization of student engagement by comparing severe engagement models and their indicators of engagement to provide a comprehensive understanding. This can be seen in Figure 9:

Source	No. of types	Indicators of engagement
Appleton & colleagues[a]	4	*Academic*: Time on task, credit accrual, homework completion *Behavioral:* Attendance, in-class and extracurricular participation *Cognitive:* Value/relevance, self-regulation, goal setting, strategizing *Affective/psychological:* Belonging, identification, school membership
Bangert-Drowns & Pyke (2001)	7	*Disengagement*: Avoidance or premature discontinued use *Unsystematic engagement:* Unclear goals *Frustrated engagement*: Inability to accomplish goals *Structure-dependent engagement*: Pursuit of goals communicated by software *Self-regulated interest:* Creates personal goals, makes interesting to self *Critical engagement:* Tests personal understandings, limits of the software *Literate thinking:* Interprets software from multiple, personally meaningful perspectives
Finn (1989)	2	*Participation:* Task-oriented interaction; on-task behaviors; responding to requirements, expenditure of extra time on work *Identification:* Belonging and valuing success in school-relevant goals
Fredricks, Blumenfeld, Friedel, & Paris (2005)	3	*Behavioral:* Participation, positive conduct; involvement in academic, social, or extracurricular activities *Cognitive:* Investment, thoughtfulness, and willingness to exert effort *Emotional:* Appeal; affective reactions to teachers and classmates, academics and school (boredom, interest, anxiety, etc.); belonging; valuing
Handelsman, Briggs, Sullivan, & Towler (2005)	4	*Skills engagement*: Skills practice, general learning strategies *Emotional engagement*: Emotional involvement with the class material *Participation/ interaction engagement*: Participation in class, interactions with instructors and classmates *Performance engagement*: Levels of performance in class, including confidence, performance goals, and extrinsic motivation
High School Survey of Student Engagement[b]	3	*Cognitive/intellectual/academic engagement*: "Engagement of the mind"—effort, investment in work, and strategies for learning *Emotional engagement*: "Engagement of the heart"—students' feelings of connection to (or disconnection from) their school *Social/behavioral/participatory engagement*: "Engagement in life of the school" —actions, interactions, and participation within school community
Martin (2007)	4 higher order factors, 11 subconstructs	*Adaptive cognition:* Valuing, mastery orientation, self-efficacy *Adaptive behavior:* Persistence, planning, study management *Maladaptive behavior:* Disengagement, self-handicapping *Impeding/maladaptive cognition:* Uncertain control, failure avoidance, anxiety
Miller, Greene, Montalvo, Ravindran, & Nichols (1996)	1 higher order factor with 4 subconstructs	*Cognitive engagement:* Self-regulation, cognitive strategy use (deep vs shallow), effort, and persistence
National Survey of Student Engagement[c]	4 "themes" with 10 "engagement indicators"	*Academic Challenge:* Higher-order learning, reflective & integrative learning, learning strategies, quantitative reasoning *Learning with Peers:* Collaborative learning, discussions with diverse others *Experiences with Faculty:* Student-faculty interaction, effective teaching practices *Campus Environment:* Quality of interactions, supportive environment
Pekrun & Linnenbrink-Garcia (2012)	1 + 5	*Emotional:* Considered the antecedent of other components of engagement *Cognitive:* Attention, memory processes *Motivational:* Intrinsic and extrinsic motivation, achievement goals *Behavioral:* Effort, persistence *Cognitive-behavioral:* Strategy use and self-regulation *Social-behavioral:* Social on-task behavior

Source	No. of types	Indicators of engagement
Reeve & colleagues[d]	4	*Agentic:* Constructive contribution into flow of instruction *Behavioral:* Task involvement, effort, attention *Cognitive:* Metacognitive strategy use, self-regulation, personal application and relevance *Emotional:* Enjoyment, interest, curiosity
Skinner & colleagues[e]	4	*Engagement* • *Behavioral:* Action initiation, effort, hard work, persistence, intensity, attention, absorption, involvement • *Emotional:* Enthusiasm, interest, enjoyment, satisfaction, pride, vitality, zest *Disaffection* • *Behavioral:* Passivity, giving up, withdrawal, restlessness, inattentiveness, distraction, mental disengagement, burn-out, lack of preparation • *Emotional:* Boredom, disinterest, frustration/anger, sadness, worry/anxiety, shame, self-blame

Figure 9: Comparison of Engagement Models on Key Dimensions (Halverson, 2016)

In her review article, Boekaerts highlighted that "engagement research is characterized presently by specialization, fragmentation, and proliferation" (2016, p.7) of engagement constructs, where there is more emphasis required for the synthesis of the key constructs that can allow conceptual frameworks to accurately reflect the dynamics between the constructs and the overall impact on student engagement. Although there may still not be a single interpretation of student engagement that meets the requirements of all stakeholders (Solomonides, 2013; Bond et al., 2020), it is widely recognized that the study of learning engagement does require assessment of different variables to analyze the overall contribution to engagement (Bond et al., 2020).

Therefore, while the examination of each dimension of student engagement would be beyond the scope of this research study, the four-aspect learning engagement model described by Reeve (2012) is seen as a feasible and optimal indicator to assess and measure student engagement in this research. The following section describes the details of Reeve's Engagement Model (2012).

2.6 Reeve's Engagement Model

According to Reeve (2012) the assessment of engagement can be modeled around four distinct yet interrelated factors namely, *Behavioral engagement, Emotional engagement, Cognitive engagement,* and *Agentic engagement.*

Subramaniam and Muniandy's (2019) stated that the student's active participation in class may range "from attempt, consistency, and pro-social classroom conduct (Behavioral engagement) to utmost interest and eagerness with low nervousness and fatigue (Emotional engagement) to convergence, critical thinking, refined learning strategies and self-regulation (Cognitive engagement) to deliberate steps of agency to develop one's understanding with the learning activity or subject matter (Agentic engagement)". Figure 10 explains these interrelated features of Reeve's (2012) learning engagement model.

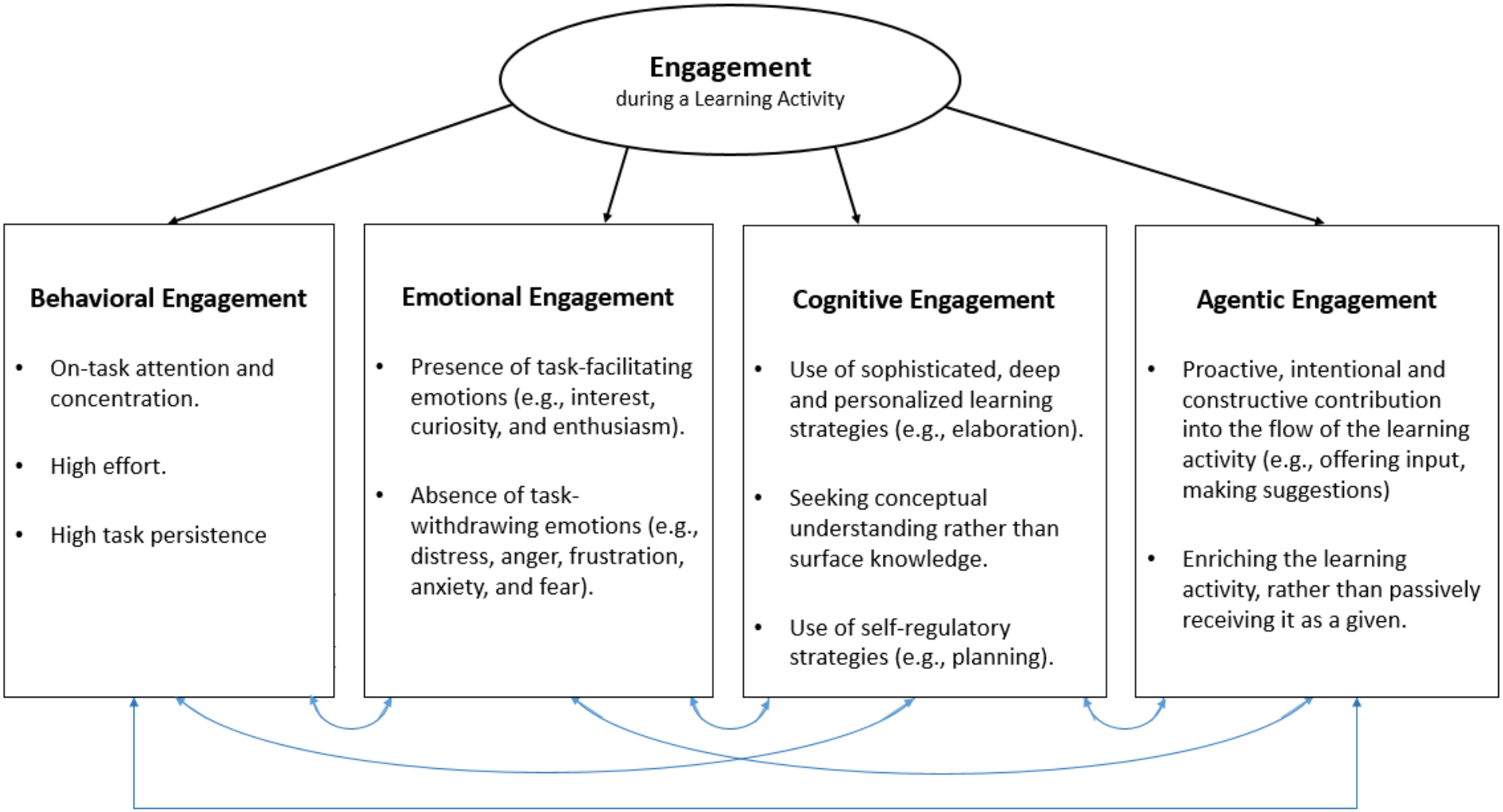


Figure 10: Four Interrelated Aspects of Students engagement during a Learning Activity (Reeve 2012)

2.6.1 Behavioral Engagement

Behavioral engagement can be defined as the degree to which a student displays attention and sustains a commitment to the task, making a strong and persistent effort towards the learning activity (Reeve, 2013). It is enhanced by good communication, a positive disposition toward students' learning, active participation in-class activities, and the use of cooperative learning methods (Jamaludin and Osman, 2014; Kahu, 2013).

2.6.2 Emotional Engagement

Emotional engagement can be defined as the degree to which a student expresses their emotions when performing the task. Taylor and Statler (2013) have stated that student emotions and their learning are directly proportional to each other, and it encompasses the student feelings towards the learning environment, attitude of peers, and the instructor. Therefore, a positive emotional engagement allows students to become more passionate and responsible towards their learning (Kahu, 2013), motivating them to complete their tasks, unlike a disengaged student who will express emotions such as irritation and frustration towards learning or completing any tasks (O'Donnell et al., 2011).

2.6.3 Cognitive Engagement

Cognitive engagement can be defined as the degree to which an individual seeks to apply sophisticated, deep-learning strategies to gain conceptual understanding, rather than surface knowledge, “such as the use of elaboration rather than memorization” (Reeve, 2013, p.579). A cognitively engaged student will employ self-regulatory strategies as they will be more invested and motivated to go farther in their education (O'Donnell et al., 2011), whereas a student cognitively disengaged would accept knowledge passively, concentrating mainly on the assessment requirements of the course.

2.6.4 Agentic Engagement

The term "agentic" refers to a person's ability to direct and transform their objectives, actions, and future (Bjerede and Gielniak, 2017). While behavioral, emotional, and cognitive engagement are “empirically validated pathways to engagement” (Reeve, 2013, p.581), the three pathway conceptualizations of student engagement are based on a lateral process initiated by the instructor, and therefore falls well short of representing the degree to which students assert agency and contribute constructively to the flow of teaching (Reeve, 2012). Hence, as the fourth dimension of student engagement, “Agentic engagement” is defined as “the process in which students proactively try to create, enhance, and personalize the conditions and circumstances under which they learn" (Reeve, 2012, p. 161).

The activities where engaged learners would contribute their agency (for example raise questions, give suggestions, and requests for clarity) will allow learners to exercise their initiative, which can modify and even enhance the instructional process. This will allow learners to build a more motivating and inclusive learning environment for themselves, with the encouragement of educators who endorse students' attempts to engage (Reeve, 2013).

According to Reeve and Lee (2014), the four constructs of evaluating engagement levels, result in a consistent and holistic understanding of the underlying factors of engagement in classrooms, with the findings serving the greater goal of translating students' motivational states, which can lead to initiatives to encourage and improve students' academic skills, and attainment of learning objectives.

2.7 Flipped Classrooms and Engagement

Within blended learning environments, the examination of student engagement and its multifaceted constructs takes on an interesting dimension. While numerous studies across different educational domains have researched on the efficacy of the blended and FL environments, the

focus has been primarily on the achievement of learning outcomes (Isti'anah, 2017) and learner satisfaction with the blended and FL experience (Venkatesh et al., 2020; Ateş Çobanoğlu, 2018; Sajid et al., 2016). Additionally, there have been debates on the instructional model of the FL environment which allows the interaction between the educators and learners to be enhanced (Szeto and Cheng, 2016; Kim, 2018; Means et al., 2014). Studies have primarily used quantitative measures such as outcome achievement and final test scores to imply greater satisfaction and higher levels of learning engagement in flipped classrooms (Parsons and Taylor, 2011; Ho et al.,2020). However, studies that have used qualitative measures have highlighted more depth in to learning engagement (DeLozier and Rhodes, 2017; McLaughlin et al., 2013), by indicating differences between what instructors deemed as learning engagement to what students experienced (Parsons and Taylor, 2011; Bond et al., 2020). This raised key insights on even further definitions of engagement in learning and its assessment (DeLozier and Rhodes, 2017).

Moreover, research studies conducted on the effectiveness of FL have popularly shown that the approach contributes to learning engagement and motivation (Bond and Bedenlier, 2019; DeLozier and Rhodes, 2017; McLaughlin et al., 2013), and positive learning perceptions and satisfactions. In their research study, McLaughlin et al. (2013) analyzed the student perception, academic performance and engagement of a satellite flipped classroom for pharmacy students, and it discovered that the FL pedagogical approach allowed learners active engagement, as well as achievement of the course outcomes. An interesting result of the comparative study carried out by Findlay-Thompson and Mombourquette (2013) to measure learning perception and engagement between F2F lecture-based class and FC for undergraduate business students, showed that students who participated in the FC specifically requested to be enrolled in another FC as they had enjoyed the FL experience and found it very engaging. Concerning RFC, a recent study by Ho et al. (2020) examined the impact of RFC on the learning perception and satisfaction of Taiwanese Pharmacy students. Results reported highly positive leraner perceptions as well as enhanced understanding

of each topic by the FL approach compared to the traditional face-to-face (F2F) classrooms, with the reason that the courses' instructional design was adapted according to best practices in previous research studies which compared FC with the F2F sessions (Gillette et al., 2018).

Chapter Three: Methodology

3.1 Overview

This chapter describes the research design and methodology of this study. The research utilizes a mixed-method case study research design (MMCSR) to focus on an undergraduate pharmacy course, “Cosmetics and Para-Pharmaceuticals”, taught at a private UAE university, where it is taught using the RFC approach. This chapter describes details about the research design, sampling process, the research methodology and paradigm as well as details related to the data collection tools and data analysis. This chapter also discusses the ethical consideration and the validity and reliability of the study, including key assumptions and challenges related to the data collection and analysis.

3.2 Research Design and Methodology

Cohen et al. (2018) stated that for educational research, “fitness for purpose must be the guiding principle” (p.1) where many research paradigms can be defined for a variety of research purposes.

Simons (2009, p.21) has defined a case study as “an in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, program, or system in a ‘real-life’ context”. For this reason, a case study research is popularly identified as a naturalistic form of research where it provides a rich multi-faceted, contextual description about a specific subject in its natural environment (Hashimov, 2015), unlike an "experimental" design (such as a randomised controlled trial) in which the researcher seeks to influence and control the dependent variables of interest (Crowe et al., 2011). The philosophical underpinning in case-study research can be identified through both, realism/positivism and constructivism/interpretivism (Yazan, 2015; Bhatta, 2018). From a positivistic approach, the researcher assumes that there is a single truth that exists independently of the person and that can be understood, examined, and assessed (Harrison et al., 2017), however from the constructivist/interpretivist epistemology, there

are different perspectives and interpretations that are contingent on the researcher (Yin, 2014), and the case study approach is “underpinned by a strong motivation for discovering meaning and understanding of experiences in context” (Harrison et al., 2017, para. 25), and consequently, the selection of the methodological framework in a case-study research can be customized exclusively to the nature of the research study objective (Harrison et al., 2017; Yin, 2014; Yazan, 2015).

Cresswell (2014) has defined the mixed-method approach as, “a methodology for conducting research that involves collecting, analyzing, and integrating quantitative and qualitative research in a single study or a longitudinal program of inquiry” (p.9). The philosophical underpinning in a mixed method design is pragmatism. Unlike the two opposing and mutually exclusive extremes of positivism and interpretivism, pragmatists conclude that the mechanism of acquiring knowledge is a continuum instead of diametrically opposed and mutually exclusive poles of rationalism and empiricism (Goles and Hirschheim, 2000), which leads to a paradigm convergence thereby allowing mixed-method research to harmonize with quantitative and qualitative research philosophies (Johnson et al., 2007).

The methodology of this study uses a case study design with a mixed-method approach (MMCSR), since the essence of the research questions is exemplified by this design. A MMCSR can be defined as “as a type of mixed-methods study in which the quantitative and qualitative data collection, results, and integration are used to provide in-depth evidence for a case(s) or develop cases for comparative analysis” (Creswell and Clark, 2017, p.116). The assessment of the behavioral, emotional, cognitive and agentic constructs of engagement necessitates a quantitative analysis through the LES Questionnaire as prepared by Reeve (2013), while the evaluation of participants' perceptions with the RFC approach calls for a qualitative analysis through interviews. Consequently, the rationale to use a mixed-methods approach is that evaluating the quantitative data can provide a unified understanding for the assessment of the various engagement constructs, while qualitative data can provide a finer insight into participants' perceptions with the remote

RFC approach. Moreover, as the quantitative data needs to be positioned in the context of learning perception of the students, as well as the perception of the instructors to provide their viewpoints regarding the use of the RFC and its effectiveness, the MMCSR method therefore takes the route of an explanatory sequential design, where the quantitative data collection and analysis in Phase 1 would be explained by the qualitative data collection and analysis in Phase 2, to draw inferences (Ivankova et al., 2006), as shown in the figure below:

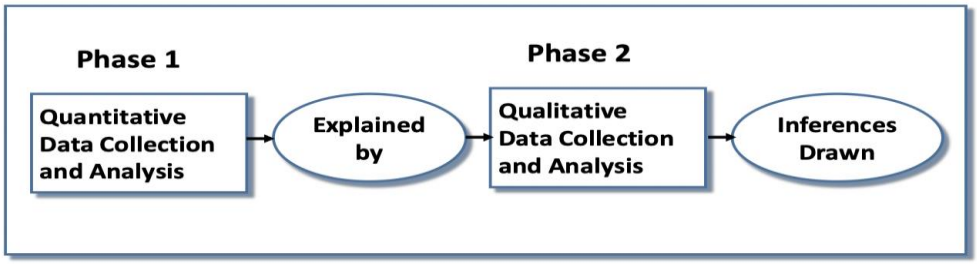


Figure 11: Explanatory Sequential Design in MMCSR (Cook and Kamalodeen, 2019)

Furthermore, Yin (2009) has emphasized the importance of obtaining evidence from multiple data sources in a case study design especially, "when the boundaries between phenomenon and context are not clearly evident" (p. 18). This is where triangulation helps, as findings of the multiple qualitative data sources can be explored from different viewpoints (Schoch, 2016) and converged together to construct a common reference link in the collection of evidence (Yazan, 2015). In this case study, due to the need to gather information from a diversity of perspectives which includes quantitative and qualitative data collection, method and data source triangulation was used.

3.3 Research Questions

In case study research, the research questions play a critical role to represent the parameters and concepts of the case (Schoch, 2016), narrowing the focus of the research. With the pragmatic philosophy underpinning mixed-method studies, the research questions also lead to the configuration of the research design, allocation of the sampling method, and even decision of the data collection tools, as well as data analysis and interpretation (Tashakkori and Creswell, 2007).

In this MMCSR study, the primary research questions are the following:

1. What is the impact of the implementation of RFC on students' behavioral, cognitive, emotional and agentic factors of engagement?
2. What is the students' perception of the RFC approach, in terms of learning and engagement?
3. What is the instructors' perception of the RFC approach, in terms of learning and engagement?

3.4 Sampling

According to Patton (2002), "Sample size depends on what you want to know, the purpose of the inquiry, what's at stake, what will be useful, what will have credibility, and what can be done with available time and resources" (pp. 242-243). However, depending on the research context, the sample size in a case-oriented study can also be small (Vasileiou et al., 2018), as the research design exclusively focuses on the uniqueness of a specific project or phenomenon in a 'real-life' context (Simmons, 2009). In this research study, the MMCSR is carried out in a private university in Sharjah, UAE, and due to the uniqueness of the RFC being adopted only in one undergraduate pharmacy course, the population size is limited only to the number of students enrolled in this course, who are 17 students in total, and the instructor teaching the course.

According to Sandelowski (1995), qualitative sample sizes should be broad enough to allow for the development of a "new and richly textured understanding" of the phenomenon under investigation, but small enough to allow for detailed analysis of the qualitative data in a case study (p. 183). For this reason, non-probability sampling is ideal as it does not entail random selection of participants, unlike probability sampling (Vasileiou et al., 2018), and allows the researcher to select participants based on their expertise or perspective into the research problem. For the LES questionnaire, convenience sampling fits the quantitative data collection purpose in this MMCSR design. While convenience sampling comes under the domain of non-probability sampling, it can also be utilized under quantitative data research, to be a reflection of the population of the study

(Etikan et al., 2016), where the participants are readily accessible and also agree to participate. In this MMCSR, all the seventeen participants submitted their responses for the LES questionnaire.

For the focus group interview, purposive sampling is used. This is an appropriate non-probability sampling method for qualitative data in mixed-method studies, as the prime objective of a purposive sample is to establish a sample that can be presumed to be representative of the majority while emphasizing on the characteristics of the population that are essential to the researcher's field of interest, thereby facilitating the pursuit of understanding and justifying the research questions (Lavrakas, 2008). Based on the research questions and case study design of this research study, participants were selected for the focus group interview based on their willingness to participate and express their thoughts. In this MMCSR study, seven students have participated in the focus group interview.

3.5 Data Collection Instruments

Although the research purpose, and more specifically the research question(s), are linked to both research design and method, it is critical to differentiate between the research design elements and the tools used to generate data. This section describes the research instruments used to provide answers to the research questions of the research study.

3.5.1 Questionnaire

The MMCSR design in this study used Reeve's (2013) LES questionnaire to measure students' engagement in the pharmacy course using the RFC approach. The LES questionnaire was made on Google Forms, and the web-link of the questionnaire was distributed by the course instructor in the chat box area on Blackboard, (the HEI’s online Learning Management System (LMS)), during the in-class online synchronous sessions. Additionally, a description of the research study including the web-link of the questionnaire was also sent by the course instructor to the entire class by email.

The LES questionnaire begins with the participants' consent form, which they can agree to by clicking on the “OK” button, and then proceed to answer the questionnaire. The questionnaire consists of 35 five-level Likert Scale criteria, which is divided according to four categories, to understand the depth and distinction of the four engagement constructs in Reeve’s (2013) model.. The questionnaire begins with the measurement of the levels of Behavioral engagement, which includes nine questions. It then follows with the measurement of the students’ level of Agentic engagement, which includes seven questions, and proceeds with the measurement of the levels of Cognitive engagement, which includes nine questions. The questionnaire ends with the measurement of students’ Emotional engagement, which includes 10 questions. The Appendix section contains details of the participants Consent form (Appendix 1) and details for the Reeve’s LES Questionnaire (Appendix 2).

3.5.2 Interviews

While the LES questionnaire allows participants to assess their engagement with the RFC learning, the likert scale questions are close ended in nature. Hence, this limits the extraction of qualitative data, which may include the participants' perceptions and experiences with the RFC. To address these concerns, and allow participants to engage directly with the researcher, Interviews were utilized. One of the most widely used qualitative research tool (Ryan et al., 2009), interviews allow the collection and generation of “deeply contextual accounts of participants' experiences and their interpretation of them” (Doody and Noonan, 2009, p. 28). Additionally, interviews also allow the researcher to moderate and facilitate the dynamics of the discussion and ask for clarity when needed (Nyumba et al., 2018), thereby providing detailed insight concerning the research questions.

In this MMCSR study, the qualitative data regarding the perceptions of the learning experience with the RFC approach was collected through a focus group semi-structured interview to gather student responses. Focus groups have some advantages over formal individual narratives through

interviews and even surveys, since they use social interactions to discuss topics and share opinions in context, complexity, and depth without establishing a conceptual framework, which may result in more insights (Nyumba et al., 2018). Moreover, utilizing a semi-structured interview plan, in contrast to a structured interview, allows the interview to be focused on the desired research objective, while also giving the freedom to participants to skew the discussion into unexplored conversations where a new insight can be generated (DiCicco-Bloom and Crabtree, 2006).

Prior to setting the date for the focus group interview, a Consent Form was sent to collect the student emails and their approval to be interviewed. The purpose of collecting the student email was to send an exclusive invitation to the online meeting. The focus group semi-structured interview incorporated five core interview questions, which sought to acquire the broad reflections of the students' perceptions with the RFC approach and their learning engagement. Some verbal probing techniques were also adopted, whereby the researcher reiterated the participants' answer and also asked each participant their agreement/disagreement with their peers' answers. This increased the group rapport and also gave the chance to some other participants to express their opinions, so that more authentic data can be generated. This prompted the researcher to include follow-up questioning based on the feedback of the students, and therefore three supplementary questions that were additionally asked. The Appendix section contains details of the participants Consent form (Appendix 3) and details of the Interview Questions (Appendix 5).

The semi-structured interview with the instructor of the pharmacy course consisted of seven core questions which aimed to generate insight into the RFC teaching strategies and instructional flow, as well as the instructor's perceptions and viewpoints on learning engagement within the RFC experience. A Consent Form to participate in the interview was sent to the instructor, prior to the interview. The Appendix section contains details of the Instructor's Consent form (Appendix 4) and details of the Interview Questions (Appendix 6).

The Interviews for both, the focus group with students and semi-structured interview with instructor were held online on Microsoft Teams, audio recorded and transcribed verbatim. The Appendix section contains verbatim transcripts of the semi-structured interview with the Instructor (Appendix 8) as well as the focus group interview with the students (Appendix 7).

3.6 Validity and Reliability

The *validity* of a research instrument can be defined, "as the extent to which the instrument actually measures "what it is designed to measure" or "what it purports to measure"" (Knapp and Mueller, 2010, p.337), and therefore the relevance of validity in research instruments is critical, as the research instruments are used to provide answers to the research questions of the study (Filed, 2005). Although the term *reliability* is closely related to validity, it refers "to the consistency, stability and repeatability of results" (Twycross and Shields, 2004, p.36), which ensures reliability, the results should be consistent in similar research situations on separate events. Additionally, although a research measurement can be reliable, it does not automatically ensure validity (Knapp and Mueller, 2010), and therefore it is important to assess the reliability and validity of the research instruments and results in terms of the specific characteristics of the research context (Twycross and Shields, 2004).

3.6.1 Quantitative Data Collection

For the quantitative data aspect of this study, the LES questionnaire has content validity which is defined as "the degree to which items in an instrument reflect the content universe to which the instrument will be generalized" (Straub et al., 2004, p.24). This is reflected in the LES questionnaire as it contains questions, which comprehensively cover the four engagement constructs that are being measured. Additionally, the LES questionnaire also has concurrent validity, which "refers to the extent to which the results of a particular test, or measurement,

correspond to those of a previously established measurement for the same construct" (Taherdoost, 2016, p.33). This is reflected as the measurement of engagement constructs in the LES questionnaire, which also correlates with validated surveys utilized in other studies that seek to understand the complex multi-faceted nature of learning engagement (Jamaluddin and Osman, 2014; Subramaniam and Muniandy, 2019).

The LES questionnaire also has internal consistency with several questions asked to measure a single engagement construct, which also contributes to the reliability of the study. Moreover with convenience sampling utilized and no exclusion criteria, there is no undercoverage bias in the responses.

3.6.2 Qualitative Data Collection

While interviews remain a popular tool for qualitative research, there exists "some challenges for researchers in terms of instrumentation rigor and bias management" (Chenail, 2011, p.256). According to Doody and Noonan (2009), interviews may contain "susceptible bias, which may include:

- The participant's desire to please the researcher.
- Saying what they think/feel the researcher wishes to hear, such as giving an official point of view rather than their personal view.
- The desire to create a good impression may lead to participants not answering honestly.
- There is a tendency to say something rather than nothing if the participant cannot answer a question or has nothing to say on a topic.
- The researcher's views can influence the participant's responses by expressing surprise or disapproval." (p. 29)

The issues were taken into account during the interviews, to reduce issues with the validity and reliability in the study. Additionally, using the textual data, thematic analysis offered structure and incorporated intersubjectivity, which increases the validity of the study.

Another way through which validity has been increased in this study, is that the results are triangulated through data source triangulation and method triangulation. According to the literature, integrating different qualitative data sources which are acquired through a structured and methodical process at different research phases, prepare a platform for making interpretations and arguments in the triangulation method (Mishra and Rasundram, 2017). Additionally, triangulation aids in corroborating the qualitative findings and reducing the potential bias implicit for any single data collection method (Cresswell, 1999), thereby validating the results.

3.7 Data Analysis

3.7.1 Quantitative Data Analysis

To analyze the quantitative data, the results obtained from the LES Questionnaire in Google forms were exported to Microsoft Excel. Additionally, to provide a detailed understanding of the dataset, descriptive statistics were used, where the means and standard deviations of the results were extracted to measure the engagement across each of the constructs.

3.7.2 Qualitative Data Analysis

To assimilate and distinguish the qualitative data viewpoints related to the students' and instructo's perceptions of the learning experience, thematic analysis with inductive coding was adapted (Braun and Clarke, 2006), which refers to the practice of a researcher reviewing and interpreting raw textual data to generate codes/concepts and themes (Chandra and Shang, 2019). To acquire a broad sense of the recorded data, there were two steps adapted in the process.

- In Step 1, the recorded interviews were listened to and transcribed, without allocating any themes to the data, so that the qualitative data collected can be viewed as a complete entity. This step also allowed the researcher to have a holistic understanding of the qualitative data.
- The second step was where the thematic analysis process began, with the researcher now allocating themes according to the commonality in phrases used by participants when responding to the interview questions, thereby allowing the data to generate meaning.

Moreover, to ensure reliability, method triangulation and data source triangulation were used to review the responses and justifications of the responses.

3.8 Ethical approval and Consent to Participate

The study was conducted after receiving the ethical approval from the private UAE university, and the research is conducted in compliance with the requirements provided in the Research Ethics Framework Economic and Social Research Council (2015)

Presentation of Intended Research and Consent Forms for all Participants

All participants were provided with an informed consent form to partake in the study prior to undertaking the survey or focus group, as described in section 3.6.2

Participant Withdrawal

In the case of participant withdrawal, the research had adopted the ethical standard of only using the data that had been retained and analyzed already, with no attempts for further interaction. However, in this research all students participated completely during the qualitative and quantitative data collection process.

Privacy and Confidentiality

The LES Questionnaire was distributed to the students in the classroom through a Google Form Link. There is no question within the Questionnaire that asks for the participants personal details.

With the Google Form being shared as a link, participants were encouraged only through the course instructor to enter their responses.

During the focus group interview, participants were asked to respect the privacy of other focus group members in the consent form and prior to the interview by not disclosing any content discussed. The researcher has used pseudonyms to ensure confidentiality, privacy and anonymity of data when the responses were discussed and analyzed for themes.

Chapter 4: Findings

4.1 Overview

This chapter provides the findings of the quantitative and qualitative data collection tools (LES questionnaire and interviews) utilized to answer the research objectives of the study. To adhere to the explanatory sequential design of this MMCSR, the first phase involved the collection of the quantitative data, which relates to the student responses in the LES questionnaire. Google forms were used to distribute the LES questionnaire, and the resulting dataset was exported to Microsoft Excel for detailed statistical analysis. The second phase involved the qualitative data collection related to the collection and transcription of the students' and instructor's responses in the semi-structured interviews. The responses were analyzed to extract the relevant themes, as per the principle of thematic analysis.

4.2 Quantitative Findings

Findings for RQ1. What is the impact of the implementation of RFC approach on students' behavioral, cognitive, emotional and agentic levels of engagement?

In this MMCSR, descriptive statistics were computed to examine the impact of the RFC approach on students' behavioral, emotional, agentic, and cognitive levels of engagement. Since all of the 17 students in the RFC course responded to the LES Questionnaire, the response rate was 100%. In the following sections, Tables 4.1(a), 4.1(b), 4.1(c), and 4.1(d), will describe the descriptive statistics for each engagement construct in the LES Questionnaire.

The sections also include stacked bar charts, to allow visual representation of the student responses for each criterion of the engagement constructs.

4.2.1 Behavioral Factors of Learning Engagement

As indicated in Table 1, a set of nine items (B1 to B9) measure the Behavioral factors of engagement, by allowing students to choose their level of agreement. The descriptive statistics for the behavioral factors of learning engagement show the highest scored means ($\underline{x}$ = 4.41), for three items.

- B1: "*When I am in this class, I listen very carefully to all the instructions" (SD 0.62)*,
- B2: *"I pay attention in this class" (SD 0.51)*, and
- B7: "*I am able to complete all the activities and exercises given in this class" (SD 0.80)*.

The lowest scoring mean ($\underline{x}$ = 1.35) is computed for Item B6: "*I become disruptive during this class (make noise or disturb friends")* with SD 0.79.

Item B5: "*If I do not understand what I read or hear, I go back and read or hear it all over again"* shares the next highest mean score ($\underline{x}$ = 4.35) and SD 0.49, where 10 out of 17 students (58.8%) agreed and 7 out of 17 students (41.2%) strongly agreed, as shown in Figure 12. The majority of the students also responded positively to Item B3: "*I try hard to do well in this class"* ($\underline{x}$ = 4.29 and SD 0.69), where only 2 students chose neutral, and the remaining students either agreed (47.1%) or strongly agreed (41.2%). For Item B8: "*I tried answering the difficult questions in this lesson without asking for much help"* ($\underline{x}$ = 3.76 and SD 0.83) there was slightly more variety in responses, where only 1 student (5.9%) disagreed, 5 students (29.4%) chose neutral, 8 students agreed (47.1%) and 3 students strongly agreed (17.6%). There were also two items that scored the same means ($\underline{x}$ = 4.24), which include B4: "*When I am in this class, I participate in class discussion"* (SD 0.66) and B9: "*I feel I am more confident in handling difficult topics after attending this class"* (SD 0.56).

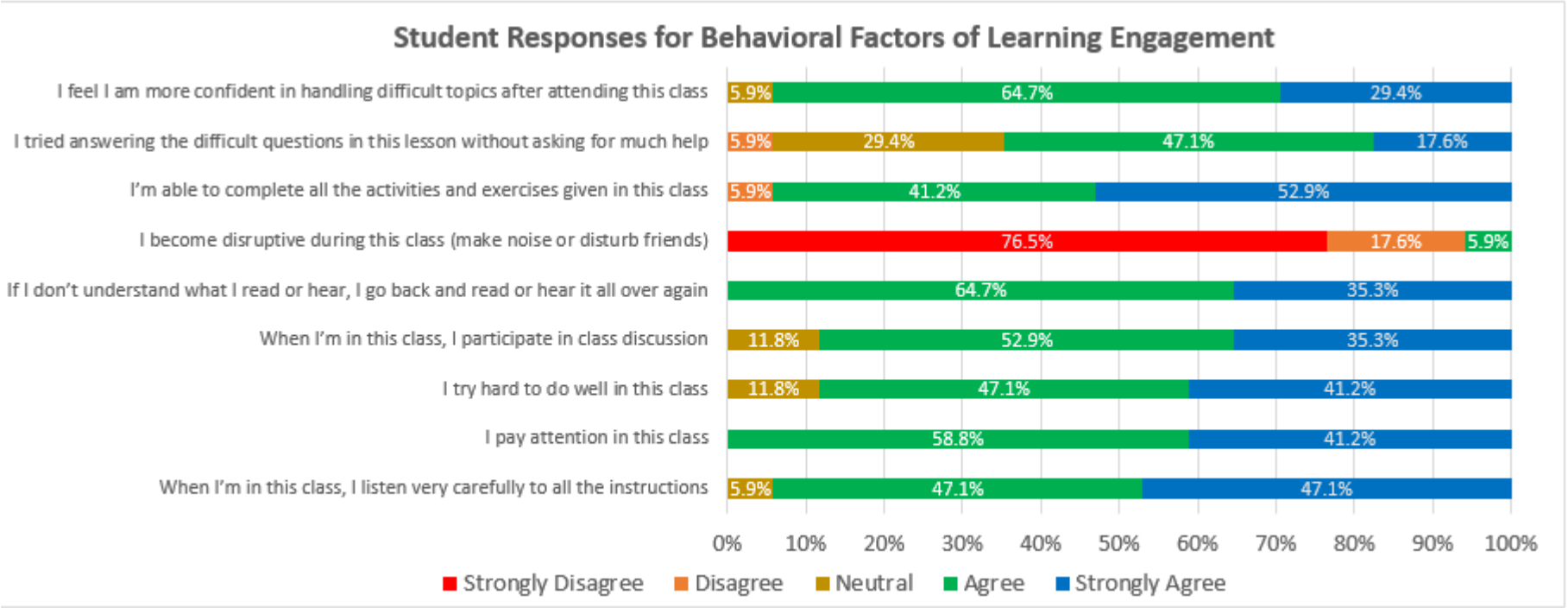
The cumulative mean score for Behavioral Engagement equivalent to 3.94.

Table 1: Descriptive Statistics for *Behavioral Factors of Learning Engagement*

Criteria		n	Mean ($\underline{x}$)	Standard Deviation (SD)
B1	When I am in this class, I listen very carefully to all the instructions	17	4.41	0.62
B2	I pay attention in this class	17	4.41	0.51
B3	I try hard to do well in this class	17	4.29	0.69
B4	When I am in this class, I participate in class discussion	17	4.24	0.66
B5	If I do not understand what I read or hear, I go back and read or hear it all over again	17	4.35	0.49
B6	I become disruptive during this class (make noise or disturb friends)	17	1.35	0.79
B7	I am able to complete all the activities and exercises given in this class	17	4.41	0.80
B8	I tried answering the difficult questions in this lesson without asking for much help	17	3.76	0.83
B9	I feel I am more confident in handling difficult topics after attending this class	17	4.24	0.56

Figure 12: Student Responses for Behavioral Factors of Learning Engagement

Criteria		n	Student Responses - Distribution Count and Percentage									
			Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
B1	When I'm in this class, I listen very carefully to all the instructions	17	0	0%	0	0%	1	5.88%	8	47.06%	8	47.06%
B2	I pay attention in this class	17	0	0%	0	0%	0	0%	10	58.82%	7	41.18%
B3	I try hard to do well in this class	17	0	0%	0	0%	2	11.76%	8	47.06%	7	41.18%
B4	When I'm in this class, I participate in class discussion	17	0	0%	0	0%	2	11.76%	9	52.94%	6	35.29%
B5	If I don't understand what I read or hear, I go back and read or hear it all over again	17	0	0%	0	0%	0	0%	11	64.71%	6	35.29%
B6	I become disruptive during this class (make noise or disturb friends)	17	13	76.47%	3	17.65%	0	0%	1	5.88%	0	0.00%
B7	I'm able to complete all the activities and exercises given in this class	17	0	0%	1	5.88%	0	0%	7	41.18%	9	52.94%
B8	I tried answering the difficult questions in this lesson without asking for much help	17	0	0.%	1	5.88%	5	29.41%	8	47.06%	3	17.65%
B9	I feel I am more confident in handling difficult topics after attending this class	17	0	0%	0	0%	1	5.88%	11	64.71%	5	29.41%



4.2.2 Emotional Factors of Learning Engagement

As shown in Table 2, there were ten items (E1 to E10) that measure the students' agreement with the Emotional factors of engagement. The descriptive statistics show the highest scored mean ($\underline{x}$ = 4.65), for two items, with identical responses:

- E3: "*I enjoy learning new things in this class"* (SD 0.49), and
- E7: "*I feel excited about the things that I learn in this class"* (SD 0.47)

The lowest scoring mean ($\underline{x}$ = 1.18) was found for Item E10: "*This lesson did not raise any interesting new ideas or insights"* with SD 0.39, where all students either disagreed (17.6%) or strongly disagreed (82.4%). Item E2: "*This class is fun"* and E6*: "I am happy to be in this class"*, share the next highest mean score (x= 4.59) and share identical responses with SD 0.62, as shown in Figure 4.1 (b). There were two more items with comparable means ($\underline{x}$= 4.47) and identical responses; E8: "*I find this class a fun place to be"* (SD 0.62) and E9: "*I enjoy the work that I do in this class"* (SD 0.62). The majority of the students also responded positively to Item E1: "*When we work on something in this class, I feel interested"* ($\underline{x}$ = 4.53 and SD 0.62*)*, E4: *"When I'm in this class, I feel good about myself"* ($\underline{x}$ = 4.47 and SD 0.72), and E5: *"When we work on something in this class, I get involved"* ($\underline{x}$ = 4.35 and SD 0.70).

The cumulative mean score for Emotional Engagement was equivalent to 4.19.

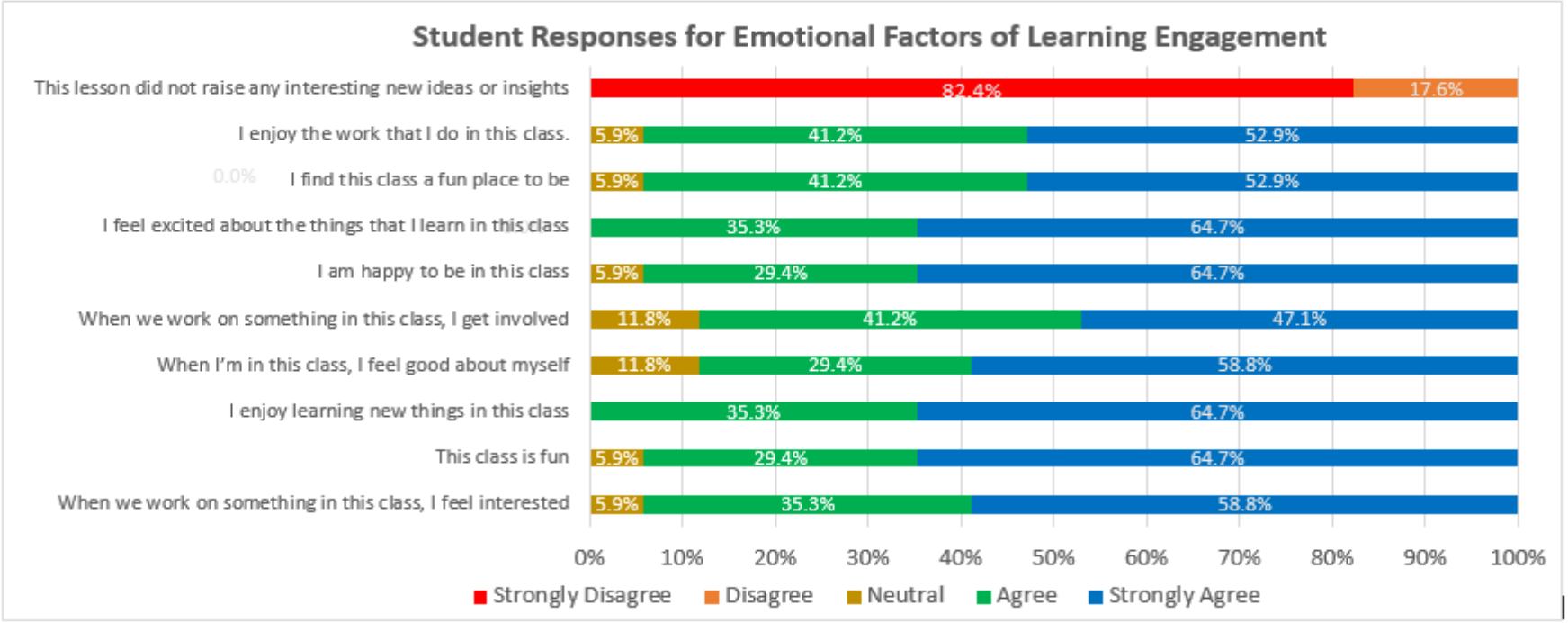
Table 2: Descriptive Statistics for *Emotional Factors of Learning Engagement*

Criteria		n	Mean ($\underline{x}$)	Standard Deviation (SD)
E1	When we work on something in this class, I feel interested	17	4.53	0.62
E2	This class is fun	17	4.59	0.62
E3	I enjoy learning new things in this class	17	4.65	0.49
E4	When I'm in this class, I feel good about myself	17	4.47	0.72

Criteria		n	Mean ($\underline{x}$)	Standard Deviation (SD)
E5	When we work on something in this class, I get involved	17	4.35	0.70
E6	I am happy to be in this class	17	4.59	0.62
E7	I feel excited about the things that I learn in this class	17	4.65	0.49
E8	I find this class a fun place to be	17	4.47	0.62
E9	I enjoy the work that I do in this class.	17	4.47	0.62
E10	This lesson did not raise any interesting new ideas or insights	17	1.18	0.39

Figure 13: Student Responses for Emotional Factors of Learning Engagement

Criteria		n	Student Responses - Distribution Count and Percentage									
			Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
E1	When we work on something in this class, I feel interested	17	0	0%	0	0%	1	5.88%	6	35.29%	10	58.82%
E2	This class is fun	17	0	0%	0	0%	1	5.88%	5	29.41%	11	64.71%
E3	I enjoy learning new things in this class	17	0	0%	0	0%	0	0%	6	35.29%	11	64.71%
E4	When I'm in this class, I feel good about myself	17	0	0%	0	0%	2	11.76%	5	29.41%	10	58.82%
E5	When we work on something in this class, I get involved	17	0	0%	0	0%	2	11.76%	7	41.18%	8	47.06%
E6	I am happy to be in this class	17	0	0%	0	0%	1	5.88%	5	29.41%	11	64.71%
E7	I feel excited about the things that I learn in this class	17	0	0%	0	0%	0	0%	6	35.29%	11	64.71%
E8	I find this class a fun place to be	17	0	0%	0	0%	1	5.88%	7	41.18%	9	52.94%
E9	I enjoy the work that I do in this class.	17	0	0%	0	0%	1	5.88%	7	41.18%	9	52.94%
E10	This lesson did not raise any interesting new ideas or insights	17	14	82.35%	3	17.65%	0	0%	0	0%	0	0%



4.2.3 Agentic Factors of Learning Engagement

For the Agentic factors of learning engagement, a set of seven items (A1 to A7) allow the students to indicate their level of agreement, as shown in Table 3. The descriptive statistics show the highest scored mean ($\underline{x}$ = 4.47) for A7: "*I try to make whatever we are learning as interesting as possible*" (SD 0.51).

The lowest scoring mean ($\underline{x}$ = 3.24) was found for Item A3: "*During this class, I express my likes and dislikes" (*SD 1.25*)*, where students gave a variety of responses, as indicated in Figure 4.1 (c). Items A5: "*When I need something in this class, I'll ask the instruct*or" and A6: "*I adjust with whatever we are learning so I can learn as much as possible"*, share the next highest mean score ($\underline{x}$ = 4.24) and share identical responses with SD 0.75, as shown in Figure 14. For item A1: "*I let my instructor know what I need "*($\underline{x}$ =4.00 SD 0.79), most students responded positively. However, for items A2: "*I let my instructor know what I am interested"* in ($\underline{x}$ =3.41 SD 1.12) and A4: *"During this class, I ask questions to help me learn"* ($\underline{x}$ = 3.71 SD 1.26), there is greater variety in the student responses

The cumulative mean score for Agentic Engagement was equivalent to 3.90.

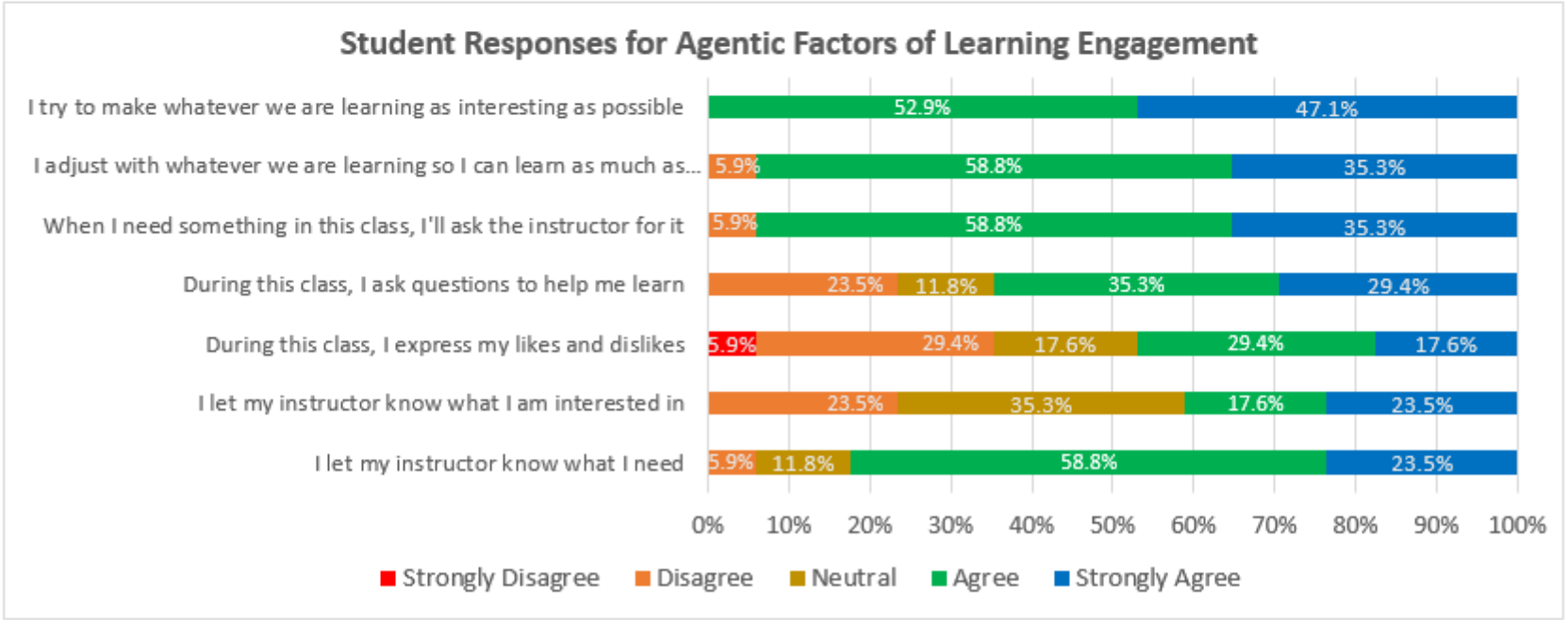
Table 3: Descriptive Statistics for *Agentic Factors of Learning Engagement*

Criteria		n	Mean ($\underline{x}$)	Standard Deviation (SD)
A1	I let my instructor know what I need	17	4.00	0.79
A2	I let my instructor know what I am interested in	17	3.41	1.12
A3	During this class, I express my likes and dislikes	17	3.24	1.25
A4	During this class, I ask questions to help me learn	17	3.71	1.16
A5	When I need something in this class, I'll ask the instructor for it	17	4.24	0.75
A6	I adjust with whatever we are learning so I can learn as much as possible	17	4.24	0.75

Criteria		n	Mean ($\underline{x}$)	Standard Deviation (SD)
A7	I try to make whatever we are learning as interesting as possible	17	4.47	0.51

Figure 14: Student Responses for Agentic Factors of Learning Engagement

Criteria		n	Student Responses - Distribution Count and Percentage									
			Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
A1	I let my instructor know what I need	17	0	0%	1	5.88%	2	11.76%	10	58.82%	4	23.53%
A2	I let my instructor know what I am interested in	17	0	0%	4	23.53%	6	35.29%	3	17.65%	4	23.53%
A3	During this class, I express my likes and dislikes	17	1	5.88%	5	29.41%	3	17.65%	5	29.41%	3	17.65%
A4	During this class, I ask questions to help me learn	17	0	0%	4	23.53%	2	11.76%	6	35.29%	5	29.41%
A5	When I need something in this class, I'll ask the instructor for it	17	0	0%	1	5.88%	0	0%	10	58.82%	6	35.29%
A6	I adjust with whatever we are learning so I can learn as much as possible	17	0	0%	1	5.88%	0	0%	10	58.82%	6	35.29%
A7	I try to make whatever we are learning as interesting as possible	17	0	0%	0	0%	0	0%	9	52.94%	8	47.06%



4.2.4 Cognitive Factors of Learning Engagement

For the Cognitive factors of learning engagement, a set of nine items (C1 to C9) allowed the students to indicate their level of agreement, as shown in Table 4. The descriptive statistics show highest scored mean ($\underline{x}$ = 4.94) for item C3: "*W*hen doing work for this class, I try to relate what I am learning to what I already know" (SD 0.24), which is also the highest mean compared to all the other items categorized within the four engagement constructs

The lowest scoring mean ($\underline{x}$ = 3.00) was found for Item C7: "*I am very concerned about the quality of my achievement in the exercise and activity session" (*SD 1.50*)*, where students also gave a wide variety of responses as indicated in Figure 15. There were two other items where the SD was found to be greater than one, and the students' responses showed more variability. This included item C8: *"I took more responsibility of my own learning in this class"*($\underline{x}$ = 3.65 SD 1.32) and C9: "*I realized that ICT is an option to enhance the understanding when solving problems or completing tasks in this class" (*$\underline{x}$ = 4.18 SD 1.07).

The next highest scored mean ($\underline{x}$ = 4.82) is shown for two items. This includes C2: "*I try to make all the different ideas fit together and make sense when I study for this class"* (SD 0.53) where a majority of students responded positively, and C5*:" I learnt new concepts and how to apply them in this class"* (SD 0.39), where all students either agreed (17.7%) or strongly agreed (82.4%). A majority of students also responded positively for C1: "*When I study for this class, I try to connect what I am learning with my own experiences"* ($\underline{x}$ = 4.65 and SD 0.79), where only one student either disagreed, while others agreed (17.7%) or strongly agreed (76.5%).

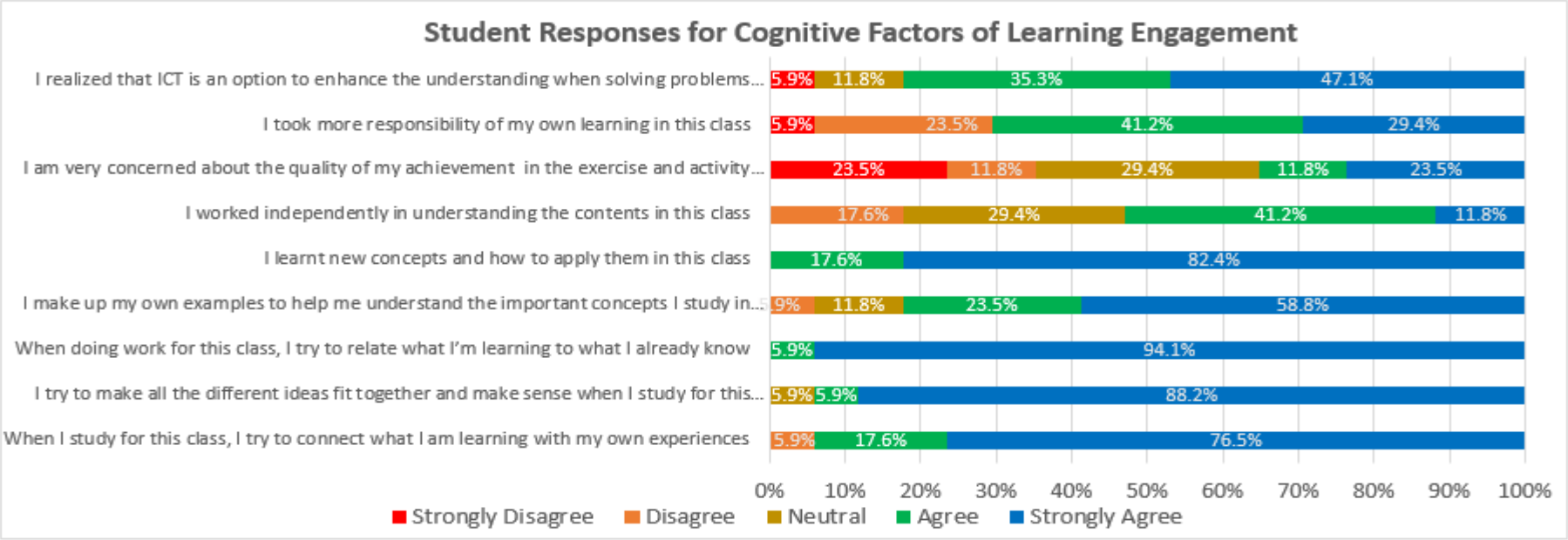
The cumulative mean score for Cognitive Engagement was equivalent to 4.21

Table 4: Descriptive Statistics for *Cognitive Factors of Learning Engagement*

Criteria		n	Mean ($\underline{x}$)	Standard Deviation (SD)
C1	When I study for this class, I try to connect what I am learning with my own experiences	17	4.65	0.79
C2	I try to make all the different ideas fit together and make sense when I study for this class	17	4.82	0.53
C3	When doing work for this class, I try to relate what I am learning to what I already know	17	4.94	0.24
C4	I make up my own examples to help me understand the important concepts I study in class	17	4.35	0.93
C5	I learnt new concepts and how to apply them in this class	17	4.82	0.39
C6	I worked independently in understanding the contents in this class	17	3.47	0.94
C7	I am very concerned about the quality of my achievement in the exercise and activity session in this class	17	3.00	1.50
C8	I took more responsibility of my own learning in this class	17	3.65	1.32
C9	I realized that ICT is an option to enhance the understanding when solving problems or completing tasks in this class	17	4.18	1.07

Figure 15: Student Responses for Cognitive Factors of Learning Engagement

Criteria		n	Student Responses - Distribution Count and Percentage									
			Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
C1	When I study for this class, I try to connect what I am learning with my own experiences	17	0	0%	1	5.88%	0	0%	3	17.65%	13	76.47%
C2	I try to make all the different ideas fit together and make sense when I study for this class	17	0	0%	0	0%	1	5.88%	1	5.88%	15	88.24%
C3	When doing work for this class, I try to relate what I am learning to what I already know	17	0	0%	0	0%	0	0%	1	5.88%	16	94.12%
C4	I make up my own examples to help me understand the important concepts I study in class	17	0	0%	1	5.88%	2	11.76%	4	23.53%	10	58.82%
C5	I learnt new concepts and how to apply them in this class	17	0	0%	0	0%	0	0%	3	17.65%	14	82.35%
C6	I worked independently in understanding the contents in this class	17	0	0%	3	17.65%	5	29.41%	7	41.18%	2	11.76%
C7	I am very concerned about the quality of my achievement in the exercise and activity session in this class	17	4	23.53%	2	11.76%	5	29.41%	2	11.76%	4	23.53%
C8	I took more responsibility of my own learning in this class	17	1	5.88%	4	23.53%	0	0%	7	41.18%	5	29.41%
C9	I realized that ICT is an option to enhance the understanding when solving problems or completing tasks in this class	17	1	5.88%	0	0%	2	11.76%	6	35.29%	8	47.06%



4.3 Qualitative Findings

The next phase in the explanatory sequential design of this MMCSR involved the collection and analysis of the qualitative findings, where the verbatim transcription of the students' and instructor's responses in the semi-structured interviews was analyzed as per the principle of thematic analysis.

The following sections presents the findings of the students' and the instructor responses, and describes the extracted codes and themes resulting from the thematic analysis.

4.3.1 Student Responses

Findings for RQ2. What is the students' perception of the RFC approach, in terms of learning and engagement?

The interview began with a few warm-up questions to make the participants feel comfortable and to increase the rapport between the participants and researcher. The Interview Questions (IQ) and the students' responses describing their overall perception of the RFC approach, in terms of learning and engagement are shown below:

IQ.1: What is your opinion on the content, quality and usefulness of the videos and other instructional materials in this course, given to you in the pre-class time?

Student #	***Responses***
Student 1	"The videos are very clear because it would be a very detailed explanation of the whole topic, and it was not that lengthy as well. Overall, the material itself was helpful, and the purpose was very good indeed."
Student 2	"The teaching materials were amazing, especially the videos. When I listened to the first-pre-class videos, I got a lot of information, and then I heard it again in the last class, the information stuck to my mind, so it was very helpful."

Student 3	"The video had all the necessary details and was easy to understand. Also, I feel it's great and so useful to watch the videos before the quiz and exam, and you can even remember the instructors voice during the exam itself."
Student 4	"The content was clear, and it was actually very useful...instead of listening to the materials for the first time in class, we would already be having a background about the information, which was so helpful."
Student 5	"I thought it was very clear and very helpful, because normally I don't like to
Student 6	"I found it very informative and helpful, like everyone else said…. I enjoyed the video lectures a lot"
Student 7	"I really like it. I think he explains everything in detail, and he clarifies everything."

IQ.2: **How did you find the discussions held during the online class time?**

Student #	*Responses*
Student 1	"I found that the discussion itself was not just a brief discussion about the video lecture. The discussion was enriched with other details in a way that I would be getting the entire lesson explained in a way over like two lectures."
Student 2	**"**.. In this approach, studying beforehand or watching the material before the lecture, we- the students- will be having our discussions with each other and the instructor, and everyone will have something to add. None will just sit there without knowing what happened. Everyone will be participating**"**
Student 3	"I agree with Student 1 and Student 2. The class discussions were very helpful."
Student 4	**"**The discussions are helpful, but it got stressful to watch the videos sometimes when we were very busy with other tasks.**"**
Student 5	**"**Yes, the discussion is good, but the only thing about this is that sometimes it is stressful. Sometimes we did not watch the video due to us being busy with some other work. In that scenario, when we were prompted to attend a sudden quiz in class with no class preparation, it got stressful.**"**
Student 6	"In my opinion it was a very beneficial and informative way of giving us information."
Students 7	"The discussions were very nice. Here in the discussions, students were coming prepared with the questions and it was to a point where the students were opening up the space for more questions and understanding the information more and they were now seeking to apply it in different contexts."

IQ.3 What is your opinion on the responsibility to learn on your own during the pre-class time?

Student #	*Responses*
Student 1	"I felt more responsible of course, and it also increased my independence in learning on my own."
Student 2	"It was a responsibility to watch all the videos so that you have a good background before coming to class."
Student 3	"I kind of enjoyed independent learning."
Student 4	"Actually, I did not find the responsibility difficult."
Student 5	"Well... it is slightly overwhelming, but I believe that I am able to learn material in a much better way than the usual lecture-based courses."
Student 6	"Yes, it's a responsibility, but I felt good participating in the class discussions if I had gone through the pre-class materials on time."
Student 7	"It was a responsibility, but it wasn't overwhelming."

IQ.4: What is your opinion on your own learning improvement in this RFC course?

Student #	*Responses*
Student 1	"I feel that during the discussion session itself in the class sessions, I feel like my mind is far more engaged than when I'm only receiving information. I feel like I am already thinking about the next point the instructor would be about to say. It is more like a rehearsal than just being there to learn about the concept from the beginning. It's good for revising the information which I already watched before."
Student 2	"I completely agree with Student 1. I don't have anything further to add here."
Student 3	"Absolutely. I feel that I can prepare some questions to ask during the discussion so I can get extra information, or I can think beyond this, so this is good for me."
Student 4	"I feel that in this course I was able to practice critical thinking in a better way."

Student #	*Responses*
Student 5	"In addition to engagement, I feel my own academic performance became better because I was able to think beyond the basic concepts."
Student 6	"I felt I was able to increase my own critical thinking in this course and kind of engage in a much better way with the learning in this course. "
Student 7	"It gives me more time to review the material and think about it. And in the classroom when the instructor is discussing this, I can ask about other things and details because I am not hearing it for the first time. So, processing that information is way more enhanced because I have already gone through the material once. Also, I was very interested in the whole course, so I was very motivated to research on my own. Maybe in other courses, I wouldn't be as motivated, because I wouldn't be as interested."

IQ.6: Based on your experience, what are your recommendations for improving the RFC learning approach?

Student #	*Responses*
Student 5	So, although this approach is very beneficial and it has a lot of advantages, it can also cause a reasonable amount of stress if the instructors are expecting me to know the answers before I come to the classroom. So, I would recommend that the in-class quiz - which is made to test our knowledge before we come to the classroom and just make sure that we have watched the videos or went through the pre-class materials- to be optional so that students who are comfortable with it go forward, but students who are not comfortable to answer quiz will not be penalized for it.
Student 1	I think the way this course was conducted was perfect, mainly because we were not penalized for not watching the videos, before we came to the in-class session. If there was some kind of penalty- for example we lose marks for not watching the video or we get our attendance taken away, then that would be a lot more stressful, and that even would not be good to have for all the other five courses that I am taking. It can be implemented for all the other courses as well.
Student 2	I do not think that all courses can be taught this way. In some courses, you need the instructor to explain the concept to you- either face to face or on the online live lecture to understand the whole concept. Other than that, if it is implemented, if I have five lectures per day, this would be 5 hours, and then I would have another 5 hours to engaged with the pre-class material before the class and I would be very overwhelmed
Student 4	Each semester we take approximately 5 to 6 courses so attending a 1 hour 15 minutes in-class session and then watching a 1-hour video would be just too much. While I understand that, we will understand better, but with so many videos to watch it will be way too overwhelming. But maybe implementing it in some courses, and in others we just stick to the regular one-way learning.
Student 3	If I have too many videos to watch I may not have enough time to study the material so with 6 courses and 6 hours per day, when would I study? I feel it would be a little bit hard.
Student 6	So, my recommendation would be to always watch the videos and take notes because when we go to the class we would be learning the material twice so this would help to keep the information stuck in our minds.
Student 7	I don't really have any criticism because I enjoyed the material, and I enjoyed how the information was presented. Maybe there could be some chances for team projects or some teamwork that would be nice, and it would also allow us to interact with our colleagues. But other than that, the teaching styles was nice. I enjoyed that.

4.3.2 Instructor Responses

Findings for RQ3. What is the instructor's perception of the RFC approach, in terms of learning and engagement?

IQ.1: What was your key interest and rationale towards using the Flipped Classroom Approach for your course?

> "I wanted to make a change especially with the COVID-19 situation and distant learning. I wanted to try to improve my method of teaching and expose students to a different learning experience."

IQ.2: How would you describe your own learning journey regarding the use of videos as the pre-class material?

> "I used two types of tools. First, the power point presentation where I record lectures audio and videos so… I record the presentation and I also record my image… myself speaking. I put this small window where I talk at the corner of the page so that the students can see me talking. Also, I also used YouTube. I created a YouTube channel.
>
> Let me first talk about the presentation. Yes, it took me a while. So I don't read the slides. I will try to speak more about the details. So I wrote a script for each slide. It saves time. It makes me more confident...So I know exactly when to make stops, comments...I found that if I spend the time preparing a script that will save me the time of recording over and over again.
>
> For the YouTube channel, I saw a seminar a long time ago. It was in this situation, I also wanted to learn Flipped Learning. So I went back to my notes...what is required and I saw some videos on YouTube… how to create a YouTube channel. And then I did it. I used the videos I recorded in presentations. I improved the quality a little bit like the audio quality, resolution and stuff. I posted on the YouTube channel trying to use the option that only students can use it. It is not open to the public. It is only released on my confirmation… whoever I allow to watch. Not everyone can watch it."

IQ.3: In addition to the videos and PowerPoint presentations, were you using any other instructional material, for example: videos that are posted by other instructors as supplementary information?

"Well, yes. One of my older students has shared with me videos. So I used to show them to the students and it contains a lot of information about cosmetics. I used those videos in addition to some videos that we prepared in the department about the preparation itself of a cream or a gel, whatever the kinds of foams of the cosmetics…that are present in the market just to show them how you can prepare a cream or… these things they have studied in previous courses so now they have videos for it and they are using their previous knowledge and now learning new knowledge according to that."

IQ.4: What are the different kinds of learning activities and strategies that you use within the classroom to increase learning engagement?

"The most important problem in online learning is typically the lack of student engagement. I wanted to make sure that at least most of my students engage in the course. So, what I try to do is use a few strategies:

Number One*:* I use polls during the lecture and use discussion, meaning that I open a question or give them an open question, maybe something that is debatable for them. Basically, they thought that I was going to grade them for that but the whole thing was not for grading. It was for me just to keep them engaged. Everyone tried participating to some extent.

Number Two: At the end of each class, I use Socrative, which is a website to put some quizzes for them just to make sure that they grasp the idea either from the videos that they saw before the lecture or the discussion during the lecture. I could not make them as a group during the online session...but my class was already a small group because I only had 17 students in the

class.. I think it was successful even as an individual because I was able to keep them engaged and participate.

In addition to that, I use what you call online discussion. That's a Blackboard forum just to put some questions for us to discuss online during one week. I give them one week to give me an answer and also comment on each other's answers. And I give them regular assignments to help them to apply what they learn in the classroom."

IQ.5: What do you think has been your biggest success in this approach, from this change?

"From my side, I definitely got more interaction with the students. If the lecture was done during the in-class session, I would be spending most of the lecture just giving them the lecture and maybe at the end of the lecture I tick two or three lesson objectives. I barely noticed who is interested or who is enjoying the material or not. However, keeping the time for the discussion gave me a lot of perspective from the student's side.

From the side of the student, the feedback that I get is that "Doctor, we are more prepared for any exam or any assessment than the normal method of teaching. So they have a very good explanation and overview of the material, even before starting to study it. And the discussion will enforce it into their minds maybe. So, they found that things that weren't clear are better. I think it just created more time for us to interact and grasp material better. That helped them in passing the assessment better. I can see that in their grades. I am having a hard time giving someone a C.**"**

IQ.6: What have been some of the challenges you faced in the Flipped Learning approach?

"Well, there were frequent incidents where students did not watch the video before coming to the classroom. This is the most annoying part of the whole thing. I also understand that the

student might have a quiz, might have an exam or something that makes them not watch the videos on time. Although I posted the videos way before, I tell them you can watch them any time. You do not have to watch them right before the lecture time.

Once they tell me I did not see the lecture, I ask them to promise me to see the next one. Of course, it takes time. I know that everyone is stressed. Maybe if it was an in-class lecture, I would have acted differently but again …at least I am an approachable person for them. So they know … I try to make it… I do not want to force it but I want to make them want to do it. That's what I am trying to do here."

IQ.7: In terms of the improvement that you are seeing, what are your next steps if you would like to consider this approach for the next term?

"Well, first I will try to include a couple of courses to make them flip… I will try to improve the quality of the videos and the…most importantly I will try to find out depending on the situation next semester if it is in-class or online, but I will try to find more methods to engage students during the class, to make them engage more, to make them participate more in the discussion and I was thinking of doing an early assessment every lecture… just a quick assessment. It doesn't have to be graded but it makes me measure where the students again are in terms of the material.

So, I think I will try to find a way to improve what we call the basics, where we stand at the beginning of each lecture in order to be able to build up and try to narrow the gaps between the students in the whole learning experience."

4.3.3. Extracted Codes and Themes

The Tables below describe the codes and themes extracted from the verbatim transcription of student focus group interview, and instructor interview.

Student Responses

Table 5: Extracted Codes and Themes from Student Interview Responses

Codes	**Themes**
Self-paced learning	Flexibility in Class Preparedness
Timely Availability of Instructional Resources	
24/7 Access	
Time-Management	
Clear and Detailed Content	Enhanced Quality of Learning Resources
Speed-watching of Long Videos	
Debates on the Length and Quality of Videos	
Usefulness	
Quality of Discussions	Discussions and Interactions
Learning through Peer Interaction	
Instructor Interaction and Feedback	
A greater need for enhanced collaborative learning strategies	
Enhanced Comprehension of Knowledge	Meaningful and Deep Learning
Deep Learning	

Relate new concepts with previous knowledge	
Self-Motivation	Autonomy and Agency
Self-setting of Learning Goals	
Self-evaluate Learning Progress	
Self-reliance on Learning (Autonomy)	

Instructor Responses

Table 6: Extracted Codes and Themes from Instructor Interview Responses

Codes	**Themes**
Learning Curve with adoption of several tools to enhance videos.	Experience with technology and EdTech resources
Knowledge gained about software and audio/visual settings for the pre-recorded videos	
Familiarity with preparing scripts for better videos and enhanced learner understanding.	
Instructor Interaction	Interaction & Feedback
Peer Interaction	
Use of Discussion Boards	
A need for enhanced collaborative learning strategies	
Use of Polls	Assessment of Learner Understanding
Use of Socrative website	
A need for more in-class assessment strategies before the session starts	
Time-Management Issue for Students	Class Preparedness

Chapter Five: Discussion

Overview

This chapter reviews and analyzes the findings to answer the research questions. The MMCSR has three primary research questions, and this chapter discusses and explains the findings according to the research literature. The chapter concludes with the limitations of this research and provides implications and recommendations for future research work.

5.1 Quantitative Analysis Discussion of Student Responses

5.1.1 Discussion for Research Question 1

RQ1: What is the impact of the implementation of RFC approach on students' behavioral, cognitive, emotional and agentic levels of engagement?

Behavioral Factors of Learning Engagement

The descriptive statistics from section 4.1.1 revealed a positive student perception of Behavioral engagement, as the mean values of item B1 to B9 were generally higher, with lower values of standard deviation. Only item B6: "*I become disruptive during this class (make noise or disturb friends)",* sustained the lowest mean, which itself indicates that students were thoroughly involved in learning, and refrained from exhibiting any behavior that would be deemed negative, or linked with disengagement.

The rationale for the positive learning perception of Behavioral engagement in this research study can be linked to three domains within the Behavioral engagement construct;

1. the students' conduct during the in-class session (Azvedo, 2015),

2. the students' on-task attention, interest, and their willingness to understand challenging topics (Reeve and Tseng, 2011), and
3. the students' active participation and contribution to the classroom activities (Baker et al., 2017).

The results revealed an overall positive perception to behavioral engagement. The results are consistent with other research studies that utilized Reeves LES to measure and analyze students' engagement in FC. In a he research study by Subramaniam and Muniandy (2019) a 4-point Likert scale LES questionnaire was used for Computer Science students and results revealed the Behavioral engagement level to be 3.04. In another study carried out on TESOL students enrolled in an Instructional Design course, Jamaludin and Osman (2014) used a 7-point Likert scale for the Reeves LES questionnaire where the mean for behavioral engagement was above 5.00. Results for both studies revealed students actively participating in the courses compared to the traditional didactic lecture-based course and students in the FCs particularly had a high behavioral engagement.

Emotional Factors of Learning Engagement

The descriptive statistics from section 4.1.2 revealed a positive student perception of emotional engagement, as the mean values of item E1 to E10 were significantly higher, with low values of standard deviation. Additionally, the lowest mean was observed for item E10: "*This lesson did not raise any interesting new ideas or insights"*, where a majority of students expressed their disagreement with the statement, thereby implying that they actually found the lesson interesting and therefore engaging.

Based on the aforementioned results, a rationale for the positive perception of emotional engagement can be explained by the variety of emotions students experience in academic settings,

which encapsulates the student feelings towards the learning environment, and the attitude and interaction with peers the instructor (Taylor and Sattler, 2013), as indicated in the E1 to E10 item list. Additionally, while a student can learn well without actually engaging emotionally, the self-determination to learn further may not occur unless a student is emotionally engaged, and vested in their learning. The results are also consistent with the research carried out by Jamaludin and Osman (2014), Subramaniam, and Muniandy (2019), where the findings revealed that FL improved student's emotional engagement and classroom participation, which therefore emphasizes the importance of emotional involvement in fostering successful learning.

Agentic Factors of Learning Engagement

The descriptive statistics from section 4.1.3 revealed a positive student perception of agentic engagement. Although students expressed a greater variety in their levels of agreement for A2, A3, and A4, generally students responded positively to the other items outlined for agentic engagement.

The rationale for the results in agentic engagement can be linked to the instructional approach and peer collaboration during the pre-class, in-class, and post-class session. Although the synchronous and asynchronous learning activities were designed with active-learning strategies initiated by the instructor to allow students to engage, results show that approximately 35% of students had been reluctant to open up to the instructor and express their preferences. This could be linked to certain psychological factors such as general reluctance/shyness of a student to interact with the instructor, and can be accounted for the settings in virtual learning environments, where the absence of physical interaction with other students and instructors frequently affects online interaction (Liu et al., 2007).

Although student responses for expressing their learning preferences to the instructor showed a greater degree of variability, the results showed that students learned to adjust and personalize their learning (on their own) to make it interesting, so that they can learn as much as possible. The results are similar to both, Jamaluddin and Osman's (2014) study and Subramaniam nd Muniandy's (2019) study, where even though agentic engagement had the lowest score compared to other engagement constructs in Reeve's LES questionnaire, students demonstrated higher self-determination to engage meaningfully in their learning as FC contributed to successfully creating a motivationally supportive and engaging learning environment.

Cognitive Factors of Learning Engagement

The descriptive statistics from section 4.1.4 revealed a highly positive student perception of cognitive engagement, as the mean values of items C1 to C9 were generally higher, typically with low values of standard deviation.

For the RFC in this study, students indicated that they were able to relate to the gained knowledge with their previous learning and experiences, as well as apply their learning in new situations which allowed them to engage cognitively. Consequently, the results for cognitive engagement situate well with the socio-constructivist learning theory (Vygotsky 1978), Master Mode in Bloom's Taxonomy (Krathwohl, 2002) as well adult learning principles (Knowles, 1984; Kearsley 2010) as explained in section 2.2. The results are also similar to several other research studies that have investigated the efficacy of FL environments and discovered cognitive engagement to be frequently high for students (Subramaniam and Muniandy, 2019; Jamaluddin and Osman, 2014; Kahu, 2013; Reeve 2013).

5.2 Qualitative Analysis Discussion of Student and Instructor Responses

The findings from the semi-structured interviews revealed the extracted codes through which certain unifying themes were conceptualized. For the student focus group interview, the themes include:

A. Class Preparedness and Flexibility in Learning,
B. Enhanced Quality of Learning Resources,
C. Discussions, interactions and Group Work,
D. Meaningful and Deep Learning, and
E. Autonomy and Agency.

For the instructor interview, the themes include:

A. Experience with technology and EdTech Resources
B. Interaction & Feedback
C. Assessment of Learner Understanding
D. Class Preparedness

This section discusses the extracted themes as per the Research Questions.

5.2.1 Discussion for Research Question 2

RQ2. What is the students' perception of the RFC approach, in terms of learning and engagement?

Class Preparedness and Flexibility in Learning

A majority of student responses highlighted that the timely availability of instructional resources allowed learners to be flexible in their learning time and structure their learning according to their

schedule. As indicated in the FLIPPED model proposed by Chen et al. (2014) (discussed in section 2.2), the flexible environment in the FL approach empowers students with the choice to learn from a variety of instructional materials, and that too at their own pace, contributing to a "fluid timeline of student work and concept comprehension" (Radder-Renter, 2020, p.1). Moreover, results revealed that the 24/7 ease and accessibility to video lectures and other learning resources facilitated participants pre-class, in-class, and even post-class engagement, as students were able to review materials if they had not understood the concept and revise the information accordingly.

However, despite its advantages, some students revealed that time management was a significant challenge for them during the pre-class online preparation, which affected their in-class participation. The comments are similar to other studies, where it was discovered that students who struggled with organizational skills and time management were overwhelmed with the autonomous responsibility of online learning in FC (Farrell and Brunton, 2020; Lo and Hew, 2017; Khanova et al.,2015) resulting in little, or no class preparation, that affected the overall learning perception of FL (Ahmed Uzir et al., 2020; Heinerichs et al., 2016).

Enhanced Quality of Instructional Resources

Responses from students revealed their general satisfaction and happiness with the content, quality, and usefulness of the pre-class learning materials. The pre-recorded video lectures allowed students to watch, pause and revise their gained knowledge according to their own learning preferences, and also allowed them to engage better during the class discussions. The results corroborate a prior study by Gustilo et al. (2015), who found that the utilization of videos in active learning environments supported higher student engagement and even led to better academic performance.

However, students also mentioned that the video lectures were typically an hour long and were split in case the video duration was even longer. With the lengthy video duration where several topics were discussed, students frequently speed-watched or read through the slides instead of watching the video, just so that they can prepare for the class in time. This phenomenon has been reported in other studies as well, where students were found to be disengaged if the video was too long (Slemmons et al., 2018), or bored if the online videos did not employ interesting visuals (Pierce and Fox, 2012). As a result, students stated that they read the slides in the MS PowerPoint presentation instead of watching the videos (Ossman and Warren, 2014), or even skipped to read or watch the pre-class teaching materials (Karabulut-Ilgu et al., 2018). While the student discussion on the length of pre-recorded videos brought several viewpoints in this study, where some students favored micro-lectures while others resisted, all students asserted that improper time-management was the main reason to skim through the video, although they found the content and quality engaging and rewarding, especially during the revision time in the post-class or pre-exam period.

Discussions, Interactions and Group Work

Students perceived that the pre-class preparation allowed them to actively engage and learn more from their peers and instructor during the in-class interaction. While small individual groups were not formed, all students in-class did interact online with each other and with their instructor as a huge group in both - synchronous interaction during the in-class discussion time, and also asynchronously on the Discussion forum in Blackboard Collaborate, where the instructor or students posted open-ended questions. This reflects well on the constructivist and the social constructivist learning theory, where the MKO individuals scaffold students learning and move them along the ZPD (Mok, 2014), as discussed in section 2.2. Students also reported that these

efforts culminated in actions where they were able to reflect more on the gained knowledge, during the post-class time.

Some students who had experienced group learning in other flipped classrooms with F2F sessions before COVID-19, also advocated a similar need for smaller groups online in which collaborative learning activities can be conducted, with the reasoning that this would lead to even higher engagement. This is also supported in recent research studies which have evaluated the effectiveness of smaller groups in RFC environments (Heiss and Oxley; 2021; Bond et al., 2020; Ho et al., 2020), citing that this allowed better interaction and rapport between students, and allowed even shy students to be more confident in their interactions, leading to higher engagement.

Meaningful and Deep Learning

Students' responses revealed that the pre-class learning allowed them to have an enhanced comprehension of knowledge and prepare for further questions, before attending the in-class sessions. Students also mentioned that the process of attaining new information pre-class, would not have occurred in the traditional lecture-based classroom, where they would be receiving the information for the first time during the in-class session.

Additionally, students were also able to relate their gained knowledge with their current and prior experience, as well as reinforce the concepts learnt during the discussion in the in-class session, allowing deeper learning and higher-order thinking skills to develop (Krathwohl, 2002). While this meaningful learning approach aligns with the Mastery Mode of learning, as discussed in section 2.2, it also aligns well with both, the social-constructivist learning theory as well as adult learning theory with relevance and emphasis on applying solution to a problem-centered learning content (Kearsley, 2010). This empowers students to exhibit more confidence in their learning and therefore, stay motivated and engaged throughout their learning.

Autonomy and Agency

The results showed that students felt more responsible towards their learning and demonstrated increased autonomy to understand the learning contents. According to Reeve (2013), the instructor primarily initiates the students' agentic contribution by developing positive instructor-student relations and peer-relations that facilitate autonomy in students and increase their confidence. Although these variables are mutually reciprocal, agentic engagement can culminate in actions where "learners enrich (e.g., challenging the activity), modify (e.g., working with a peer), and personalize (e.g., expressing a preference) learning" (Montenegro, 2017, p.122).

Concerning the RFC in this study, the majority of students revealed that they did not find the responsibility overwhelming as the other benefits far surpassed their concerns to attain knowledge on their own. Students highlighted they were able to self-regulate their learning goals and monitor their academic progress, as they felt motivated and engaged to do so. Other research studies have also highlighted the importance of self-regulation, agency, and autonomy in FL environments (Jamaluddin and Osman, 2014; Subramaniam and Munaidy, 2019). The benefit is not only limited to the students' higher achievement of learning outcomes but it is also linked with the development of other life-long skills, such as enhanced confidence and the capacity to create learning opportunities for themselves (Bjerede and Gielniak, 2017).

5.2.2 Discussion for Research Question 3

RQ3. What is the instructor's perception of the RFC approach, in terms of learning and engagement?

Experience with Technology and EdTech resources

The responses from the instructor revealed a keen interest and motivation to transform the teaching and learning experience for students within the online learning model, especially after the remote

learning implementation during the COVID-19 crisis. A major reason cited for this change was the typical lack of student engagement, which is prevalent in online learning models, especially those that adopt the lecture-based model of teaching (Affouneh et al., 2020).

Research studies, which have evaluated the instructors' perceptions with the shift towards the implementation of a FL environment, have commonly, reported the transition process to be overwhelming, and "that four distinct cyclic phases occur when transitioning to FL. These phases include motivation to change; preparations to flip (including cognitive, curricular, and student notification); adoption of pedagogy and practice strategies in learning environments; and reflections on the benefits and challenges of adopting the model" (Brewer and Movahedazarhouligh, 2018, p.3). The instructor responses indicated that the transition from the typical lecture-oriented online learning model to RFC was accompanied with a challenging learning curve, as he tested several technological and audio/visual resources to refine the video lectures, which acted as the key instructional material. In addition, the instructor did not just read information from the Microsoft PowerPoint slides, but actually learned the skill of script writing to describe scenarios through which he captured the students' attention and enhanced their conceptual understanding. The end-purpose of these efforts was to enhance the students' learning experience within a FL environment.

Interaction & Feedback

The responses from the instructor indicated a high satisfaction with the increased levels of interaction with the students, during both phases of the RFC; asynchronous interaction through the Discussion Boards on Blackboard Collaborate, and synchronous interaction with the provision of immediate feedback during the in-class sessions (Means et al., 2014).

The reversal in teaching time, with the advantage of meaningful enhanced learning (Herreid and Schiller, 2013), is indeed one of the key rationales of implementing a FL environment. As highlighted in several research studies, students appreciated the opportunity to collaborate with their peers (Bond and Bedenlier, 2019; Goh and Ong, 2019; McLaughlin, 2013), with the presence of the instructor who guided their thinking and their conversations.

Assessment of Learner Understanding

Responses from the instructor revealed the utilization of few formative assessment strategies, such as the use of online polls during the in-class session and a quiz at the end of the in-class session. While these assessment methods were not graded, students were repeatedly encouraged to participate and state their questions so that any concept misconception can be resolved.

A key rationale for implementing these strategies was to assess the learner's understanding and make sure that they are involved in their learning. Additionally, the pre-class learning is done individually as the preparation for the upcoming class, and it is necessary for the instructor to ensure that learners have the correct conceptual understanding of the basic information, before the in-class discussion proceeds with advanced concepts (Talbert, 2017). While the in-class assessments were not graded to reduce the pressure, the instructor recommended the need for more in-class assessment strategies at the beginning of the class to have a reliable comprehension, of the students' level of understanding, so that the discussion can proceed efficiently and result in the achievement of the learning objectives of the course.

Class Preparedness

Responses from the instructor revealed a general annoyance with the lack of pre-class preparation, which was often a frequent repetition amongst students.

Within research literature, a critical challenge for instructors stems from ensuring that students are prepared when they attend the in-class session (Lai and Hwang, 2016; Rahman et al., 2015) to ensure the success and productivity of the FL approach in FC (Rotellar and Cain, 2016). Yet the accountability of whether the student has gone through the learning materials before coming to class, is still cited as a major challenge (Jovanovic et al., 2019; Slemmons et al., 2018; Filiz and Kurt, 2015), with the students lack interest and boredom cited as the primary reason (Slemmons et al., 2018; Pierce and Fox, 2012). However, in this study, students indicated that while they enjoyed the pre-class recorded lectures, the students' poor time-management and balance of study load from other courses was a major reason for the lack of class preparation, as explained in section 5.2.1. To positively motivate students, the instructor gave frequent reminders to students during the-class sessions, to watch the videos whenever students have the time, and the instructor made sure to post the videos at an appropriate time, so that students get ample number of days to allocate their time and watch the videos before the attend the online in-class session.

5.3 Mixed-Method Analysis of Student and Instructor Responses

As explained in section 3.3, this MMCSR adopts a sequential research design to collect data, where the quantitative and qualitative data both hold equal priority/research weight (Kroll et al., 2005). The sequential integration of the quantitative data collection and analysis in Phase 1, followed by the qualitative data collection and analysis in Phase 2, allows inferences to be conceptualized. Therefore, this section analyzes the combined results from both qualitative and quantitative findings so that the final interpretation of these multitudes of perspectives allows a deeper understanding of the research topic (McCrudden and McTigue, 2018).

The findings of the LES Questionnaire in the RFC revealed a positive students' perception for the Behavioral, Emotional, Agentic, and Cognitive constructs of learning engagement, as the means

for each engagement constructs was above 3.9 in the 5-point Likert scale, for the entire class who had completed the LES questionnaire. From the Qualitative Findings, the responses from students and instructors revealed commonality in themes where it was determined that the content, quality, and availability of the pre-class materials and instructional videos were kept interesting to meaningfully engage students, resulting in effective learning. The rationale for the positive perception of cognitive engagement, which scored the highest mean in the LES questionnaire, can be linked with the instructor's efforts to explain the concepts through a scenario-based teaching approach - rather than just reading from the slides in the pre-recorded lecture. Additionally, the instructor also incorporated technological and audio/visual resources to refine the video lectures. Additionally, as indicated in the qualitative findings, the flexibility in the learning pace and availability of resources online, allowed students to revise the information by pausing and replaying the video several times, allowing them to self-regulate their learning progress and have a better grasp on their understanding.

Moreover, the purpose of an FC or RFC environment is primarily to optimize learning that occurs in the virtual and F2F sessions. While the responsibility of learning is transferred from the instructor to the learner in the pre-class learning time, the in-class sessions are specially reserved to maximize the interactions between learners and the instructors (Bond et al., 2020; Wong et al., 2019; Karabulut-Ilgu et al., 2018; Dziuban et al., 2018; Mok, 2014), allowing better understanding of concepts and to clear any misunderstandings in the learning process. In this study, the students received immediate feedback during the online in-class sessions and engaged with the instructor and their peers asynchronously on the Discussion boards in Blackboard. These strategies aided in the understanding and mastering of knowledge and skills, and ensured that deep learning, consequently leading to achievement of higher-order thinking skills. Furthermore, the high number of interactions allowed students to feel that their perspectives are valued, which positively reflected

on their passion and excitement to learn more on their own and from their peers, leading them to be more responsible for their learning. However, from the qualitative findings, responses from students and the instructor indicated that poor time management in the pre-class preparation did result in some amount of stress. This is particularly important, as the flipped approach requires a level where an instructor wants to explain more information based on the videos and other instructional material, yet if students have not gone through the materials before attending class, it can significantly deteriorate the quality of flipped teaching and learning.

Consequently, the variety of quantitative and qualitative findings offer diversity in perspectives, and their integration provides detailed inferences, which answer the research questions, aiding the understanding related to the instructor and students' perception of learning and engagement for the RFC approach in the course.

5.4 Implications

From the findings of the study, few recommendations can be made to enhance the RFC approach for other courses:

1. **Assign students in to smaller group for more effective collaborative learning**

   In this study, the RFC setting allowed the instructor and the students to interact through synchronous and asynchronous online discussion, however small individual groups were not formed. While creation of student groups can easily be managed in F2F instruction, it can also be managed within RFC instruction through Blackboard Breakout Rooms or Zoom Breakout Rooms. Results from several studies conducted on the effectiveness of FL environments in both F2F and remote learning in-class sessions, have supported the creation of small student groups to increase the students' interaction with each other and to engage in the learning process, which ultimately would result in deeper-levels of concept comprehension,

application and evaluation. Collaborative Learning activities through small individual groups can also allow the instructor to interact and provide feedback on an individual, as well as on a group level.

2. **Use Pre-Formative Assessment Strategies**

While formative and summative assessments are the typical assessment strategies to evaluate student learning, in FC the assessment of the student's pre-class knowledge can also be implemented through "pre-formative" (Talbert, 2015, para 5) assessment strategies. This type of assessment can provide a reliable comprehension of the students' level of understanding so that the instructor can lead the discussion to address any misconceptions and deal with situations in case a student has not come prepared in class. This can also make the in-class discussion and collaborative learning activities more productive and engaging for the students, as the instructor will specifically target those areas during the in-class session, where there were more discrepancies in the student answers in the pre-formative assessment.

3. **Provide Pre-Class Activity and Feedback**

In addition to pre-formative assessment strategies, the instructor can also consider embedding a pre-class activity. While students would be required to watch the pre-class videos, students can also be notified to prepare for a related activity in the class, for which immediate feedback can be given by the instructor. As an incentive, these activities could also be given bonus marks which may be added to the students overall grade. As there are no negative marks associated here, students would be encouraged to earn that extra credit by actually making efforts to go through the pre-class materials, which would also help them during the in-class discussion and activities.

4. **Use of "Micro-Lectures" and/or Mark Points in the Video Lecture**

The RFC in this study utilized a 60 minutes video as the pre-recorded lecture where all students appreciated the content, yet the length of the video was a debate with multiple opinions. Within research literature, findings from several studies in the FC environment have advocated the use of micro-lectures to successfully engage students (Ho et al., 2020; Hew et al., 2020; Bond and Bedenlier, 2019; Karabulut-Ilgu et al., 2018) and retain their attention span. It is therefore recommended to break down the lecture topics in a timeframe of 15 to 20 minutes per video to create the micro-lecture. Alternatively, the instructor may also use "mark points" within the single 60 minutes YouTube video, which would indicate discussion around a certain topic of the lecture itself, so that students can navigate easily to that particular section to prepare for the class or revise the information to clear any concept confusion.

5.5 Conclusion

While the sudden unprecedented shift from face-to-face instruction to online learning was primarily implemented to ensure learning continuity amid the COVID-19 crisis (Dhawan, 2020), the analysis of the psychological factors through which a student's internal investment or motivation to engage in learning is crucial. Grebennikov and Shah (2013) emphasized that the student's perception of learning has continuously evolved over the years, and the focus is not only on the students' gauging the pedagogical approaches and assessment of teaching practices, but also on creating a holistic learning environment, that embeds active learning strategies to enrich student engagement and motivation. This is especially critical, as the student's learning engagement is an efficient prognosticator to students' learning progress, academic performance, and success (Reeve et al., 2020; Eccles, 2016).

In this research study, the effectiveness of the RFC approach in terms of engagement and perceptions of learning revealed a positive perception, where the students were satisfied with the

RFC learning approach. The RFC provided the opportunity for a student-centered learning environment to be fostered, where the students were able to engage effectively across the Behavioral, Emotional, Cognitive, and Agentic constructs of engagement, and demonstrated increased levels of interaction with the instructor and their peers. The research study provides pedagogical and technological implications, which can be considered as an initiative of improvement for future implementation.

5.6 Limitations of the Study

The research study has a few key limitations. It was initially intended to have a larger sample size, however the RFC approach was implemented by only one instructor in a single course and therefore, the total number of participants were limited only to that particular course and to the single instructor. Although the MMCSR design allowed a smaller sample size, a key disadvantage is that the results can not adhere to generalizability.

Another limitation in this MMCSR is that the data could be collected only once due to participants' busy schedules. Since engagement is a complex construct, its detailed analysis may require data to be collected multiple times across different situations and that too by employing other data collection tools such as observation, to analyze its comprehensive effect. Additionally, despite its thorough examination and systemization in literature, the “variation in both the operationalization and measurement of the engagement construct has made it difficult to make comparisons between the studies’ findings” (Maroco et al., 2016, p.2) as several different factors could be involved in the process. Debates on the lack of consensus of the number of dimensions involved in student engagement, and its impact on research, including emphasis on how each of the constructs should be empirically validated have also been mentioned in other studies (Zepke, 2018; Ben-Eliyahu et

al., 2018; Sinatra et al., 2015), which precludes the need for further evaluation and synthesis of engagement constructs and the overlap between each construct (Azevedo, 2015; Boekaerts, 2016).

References

Abeysekera, L. and Dawson, P., 2015. Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. *Higher education research & development*, *34*(1), pp.1-14.

Affouneh, S., Salha, S., N., Khlaif, Z. (2020). Designing quality e-learning environments for emergency remote teaching in coronavirus crisis. Interdisciplinary Journal of Virtual Learning in Medical Sciences, 11(2), 1–3.

Ahmed, H.O.K., 2016. Flipped learning as a new educational paradigm: An analytical critical study. *European Scientific Journal*, *12*(10).

Ahmad Uzir, N.A., Gašević, D., Matcha, W., Jovanović, J. and Pardo, A., 2020. Analytics of time management strategies in a flipped classroom. *Journal of Computer Assisted Learning*, *36*(1), pp.70-88.

Akçayır, G. and Akçayır, M., 2018. The flipped classroom: A review of its advantages and challenges. *Computers & Education*, *126*, pp.334-345.

Appleton, J.J., Christenson, S.L., Kim, D. and Reschly, A.L., 2006. Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of school psychology*, *44*(5), pp.427-445.

Ashwin, P. and McVitty, D., 2015. The meanings of student engagement: Implications for policies and practices. In *The European higher education area* (pp. 343-359). Springer, Cham.

Ateş Çobanoğlu, A., 2018. Student teachers' satisfaction for blended learning via Edmodo learning management system. *Behaviour & Information Technology*, *37*(2), pp.133-144.

Azevedo, R., 2015. Defining and measuring engagement and learning in science: Conceptual, theoretical, methodological, and analytical issues. *Educational psychologist*, *50*(1), pp.84-94.

Baker, A.R., Lin, T.J., Chen, J., Paul, N., Anderson, R.C. and Nguyen-Jahiel, K., 2017. Effects of teacher framing on student engagement during collaborative reasoning discussions. *Contemporary Educational Psychology*, *51*, pp.253-266.

Bangert-Drowns, R.L. and Pyke, C., 2001. A taxonomy of student engagement with educational software: An exploration of literate thinking with electronic text. *Journal of Educational computing research*, *24*(3), pp.213-234.

Baskara, R., 2020. Designing and implementing Remote Flipped Classroom during the COVID-19 pandemic. In: *Language and Language Teaching Conference 2020*. [online] Language and Language Teaching Conference (LLTC). Available at: <http://e-conf.usd.ac.id/index.php/lltc/lltc2020/paper/view/528> [Accessed 15 February 2021].

Bates, J.E., Almekdash, H. and Gilchrest-Dunnam, M.J., 2017. The flipped classroom: A brief, brief history. In *The flipped college classroom* (pp. 3-10). Springer, Cham.

Bergmann, J. and Sams, A., 2012. *Flip your classroom: Reach every student in every class every day*. International society for technology in education.

Ben-Eliyahu, A., Moore, D., Dorph, R. and Schunn, C.D., 2018. Investigating the multidimensionality of engagement: Affective, behavioral, and cognitive engagement across science activities and contexts. *Contemporary Educational Psychology*, *53*, pp.87-105.

Bhatta, T.P., 2018. Case study research, philosophical position and theory building: A methodological discussion. *Dhaulagiri Journal of Sociology and Anthropology*, *12*, pp.72-79.

Bishop, J.L. and Verleger, M.A., 2013, June. The flipped classroom: A survey of the research. In *ASEE national conference proceedings, Atlanta, GA* (Vol. 30, No. 9, pp. 1-18).

Bjerede, M. and Gielniak, M., 2017. *What is Agentic Learning and Why is it Important?* | *Getting Smart*. [online] Getting Smart. Available at: <https://www.gettingsmart.com/2017/11/what-is-agentic-learning-and-why-is-it-important/> [Accessed 17 April 2021].

Bloom, B.S., 1968. Learning for Mastery. Instruction and Curriculum. Regional Education Laboratory for the Carolinas and Virginia, Topical Papers and Reprints, Number 1. *Evaluation comment*, *1*(2), p.n2.

Boekaerts, M., 2016. Engagement as an inherent aspect of the learning process. *Learning and Instruction*, *43*, pp.76-83.

Bomia, L., Beluzo, L., Demeester, D., Elander, K., Johnson, M. and Sheldon, B., 1997. The Impact of Teaching Strategies on Intrinsic Motivation.

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O. and Kerres, M., 2020. Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education*, *17*(1), p.2.

Bond, M. and Bedenlier, S., 2019. Facilitating Student Engagement through Educational Technology: Towards a Conceptual Framework. *Journal of Interactive Media in Education*, *2019*(1).

Bonwell, C.C. and Eison, J.A., 1991. Active Learning: Creating Excitement in the Classroom. ERIC Digest.

Braun, V. and Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), pp.77-101.

Brewer, R. and Movahedazarhouligh, S., 2018. Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education. *Journal of Computer Assisted Learning*, *34*(4), pp.409-416.

Bozkurt, A. and Sharma, R.C., 2020. Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education*, *15*(1), pp.i-vi.

Bransford, J.D., Brown, A.L. and Cocking, R.R., 2000. How people learn: Brain. *Mind*.

Brame, C., 2013. Flipping the classroom. Vanderbilt University Center for Teaching. Retrieved http://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/ [Accessed 14 May 2021].

Brewer, R. and Movahedazarhouligh, S., 2018. Successful stories and conflicts: A literature review on the effectiveness of flipped learning in higher education. *Journal of Computer Assisted Learning*, *34*(4), pp.409-416.

Brown, M., Hughes, H., Keppell, M., Hard, N. and Smith, L., 2015. Stories from students in their first semester of distance learning. *International Review of Research in Open and Distributed Learning*, *16*(4), pp.1-17.

Çakıroğlu, Ü. and Öztürk, M., 2017. Flipped classroom with problem based activities: Exploring self-regulated learning in a programming language course. *Journal of Educational Technology & Society*, *20*(1), pp.337-349.

Chandra, Y. and Shang, L., 2019. *Qualitative research using R: A systematic approach*. Springer.

Chen, Y., Wang, Y. and Chen, N.S., 2014. Is FLIP enough? Or should we use the FLIPPED model instead?. *Computers & Education*, *79*, pp.16-27.

Chenail, R.J., 2011. Interviewing the investigator: Strategies for addressing instrumentation and researcher bias concerns in qualitative research. *Qualitative Report*, *16*(1), pp.255-262.

Cohen, L., Manion, L. and Morrison, K., 2017. *Research methods in education*. Routledge.

Cohen, L., Manion, L., and Morrison, K. 2018. Research methods in education. (8th ed.). Oxon: Routledge.

Cook, D.L. and Kamalodeen, J.V., 2019. Mixed methods case study research. *Mixed Methods International Research Association*.

Creswell, J.W., 1999. Mixed-method research: Introduction and application. In *Handbook of educational policy* (pp. 455-472). Academic press.

Creswell, J.W., 2014. *A concise introduction to mixed methods research*. SAGE publications.

Creswell, J.W. and Clark, V.L.P., 2017. *Designing and conducting mixed methods research*. Sage publications.

Christenson, S.L., Reschly, A.L. and Wylie, C. eds., 2012. *Handbook of research on student engagement*. Springer Science & Business Media.

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A. and Sheikh, A., 2011. The case study approach. *BMC medical research methodology*, *11*(1), pp.1-9.

Davies, R.S., Dean, D.L. and Ball, N., 2013. Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Educational Technology Research and Development*, *61*(4), pp.563-580.

DeLozier, S.J. and Rhodes, M.G., 2017. Flipped classrooms: a review of key ideas and recommendations for practice. *Educational psychology review*, *29*(1), pp.141-151.

Dhawan, S., 2020. Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, *49*(1), pp.5-22.

DiCicco-Bloom, B., 5. Crabtree. BF (2006). *The qualitative research interview. Medical Education*, *40*(4), pp.314-321.

Doody, O. and Noonan, M., 2013. Preparing and conducting interviews to collect data. *Nurse researcher*, *20*(5).

Dziuban, C., Graham, C.R., Moskal, P.D., Norberg, A. and Sicilia, N., 2018. Blended learning: the new normal and emerging technologies. *International journal of educational technology in Higher education*, *15*(1), pp.1-16.

Eccles, J.S., 2016. Engagement: Where to next?. *Learning and Instruction*, *43*, pp.71-75.

Etikan, I., Musa, S.A. and Alkassim, R.S., 2016. Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), pp.1-4.

Farrell, O. and Brunton, J., 2020. A balancing act: a window into online student engagement experiences. *International Journal of Educational Technology in Higher Education*, *17*, pp.1-19.

Farland, M.Z., Sicat, B.L., Franks, A.S., Pater, K.S., Medina, M.S. and Persky, A.M., 2013. Best practices for implementing team-based learning in pharmacy education. *American journal of pharmaceutical education*, *77*(8).

Fauzi, S.S.M. and Hussain, R.M.R., 2016. Designing instruction for active and reflective learners in the flipped classroom. *Malaysian Journal of Learning and Instruction*, *13*(2), pp.147-173.

Flaherty, A.G., 2011. *The relationship between student engagement and professionalism in pharmacy students* (Doctoral dissertation, University of Kansas).

Filiz, O. and Kurt, A.A., 2015. Flipped learning: Misunderstandings and the truth. *Journal of Educational Sciences Research*, *5*(1), pp.215-229.

Findlay-Thompson, S. and Mombourquette, P., 2014. Evaluation of a flipped classroom in an undergraduate business course. *Business Education & Accreditation*, *6*(1), pp.63-71.

Finn, J.D., 1993. School Engagement & Students at Risk.

Fogg, K.C. and Maki, S.J., 2020. A Remote Flipped Classroom Approach to Teaching Introductory Biomedical Engineering During COVID-19. *Biomedical Engineering Education*, pp.1-7.

Fredricks, J.A., Blumenfeld, P., Friedel, J. and Paris, A., 2005. School engagement. In *What do children need to flourish?* (pp. 305-321). Springer, Boston, MA.

Gardner, H.E., 2000. *Intelligence reframed: Multiple intelligences for the 21st century*. Hachette UK.

Gasiewski, J.A., Eagan, M.K., Garcia, G.A., Hurtado, S. and Chang, M.J., 2012. From gatekeeping to engagement: A multicontextual, mixed method study of student academic engagement in introductory STEM courses. *Research in higher education*, *53*(2), pp.229-261.

Ghadiri, K., Qayoumi, M.H., Junn, E., Hsu, P. and Sujitparapitaya, S., 2014, June. Developing and implementing effective instructional stratgems in STEM. In *Proceedings of 121st ASEE Annual Conference & Exposition, Indianapolis, IN*.

Gilboy, M.B., Heinerichs, S. and Pazzaglia, G., 2015. Enhancing student engagement using the flipped classroom. *Journal of nutrition education and behavior*, *47*(1), pp.109-114.

Gillette C, Rudolph M, Kimble C, Rockich-Winston N, Smith L, Broedel-Zaugg K. A meta-analysis of outcomes comparing flipped classroom and lecture. American journal of pharmaceutical education. 2018 Jun 1;82(5).

Goles, T. and Hirschheim, R., 2000. The paradigm is dead, the paradigm is dead… long live the paradigm: the legacy of Burrell and Morgan. *Omega*, *28*(3), pp.249-268.

Gleason BL, Peeters MJ, Resman-Targoff BH, et al. An active learning strategies primer for achieving ability-based educational outcomes. Am J Pharm Educ. 2011;75(9):Article 186.

Goh, C.F. and Ong, E.T., 2019. Flipped classroom as an effective approach in enhancing student learning of a pharmacy course with a historically low student pass rate. *Currents in Pharmacy Teaching and Learning*, *11*(6), pp.621-629.

Grebennikov, L. and Shah, M., 2013. Monitoring trends in student satisfaction. *Tertiary Education and Management*, *19*(4), pp.301-322.

Guo, P.J., Kim, J. and Rubin, R., 2014, March. How video production affects student engagement: An empirical study of MOOC videos. In Proceedings of the first ACM conference on Learning@ scale conference (pp. 41-50).

Gustilo, L.E., Lapinid, M.R.C., Barrot, J.S., Gabinete, M.K.L., Magno, C.P. and Osman, A.J.M., 2015. Effects of knowledge channel videos on the achievement of students in various learning environments. *Advanced Science Letters*, *21*(7), pp.2276-2280.

Halverson, L.R. and Graham, C.R., 2019. Learner engagement in blended learning environments: A conceptual framework. *Online Learning*, *23*(2), pp.145-178.

Hamdan, N., Mcknight, P., Mcknight, K. and Arfstrom, K.M., 2013. A Review of Flipped Learning,©, 20. *Retrieved from http://flipperiet. dk/wp-content/uploads/2014/03/Review-of-Flipped-Learning. pdf [accessed May 06 2021]*.

Handelsman, M.M., Briggs, W.L., Sullivan, N. and Towler, A., 2005. A measure of college student course engagement. *The Journal of Educational Research*, *98*(3), pp.184-192.

Harrison, H., Birks, M., Franklin, R. and Mills, J., 2017, January. Case study research: Foundations and methodological orientations. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 18, No. 1).

Hashimov, E., 2015. Qualitative Data Analysis: A Methods Sourcebook and The Coding Manual for Qualitative Researchers: Matthew B. Miles, A. Michael Huberman, and Johnny Saldaña. Thousand Oaks, CA: SAGE, 2014. 381 pp. Johnny Saldaña. Thousand Oaks, CA: SAGE, 2013. 303 pp.

Heinerichs, S., Pazzaglia, G. and Gilboy, M.B., 2016. Using flipped classroom components in blended courses to maximize student learning. *Athletic training education journal*, *11*(1), pp.54-57.

Heiss, E.M. and Oxley, S.P., 2021. Implementing a flipped classroom approach in remote instruction.

Herreid, C.F. and Schiller, N.A., 2013. Case studies and the flipped classroom. *Journal of College Science Teaching*, *42*(5), pp.62-66.

Hew, K.F., Jia, C., Gonda, D.E. and Bai, S., 2020. Transitioning to the “new normal” of learning in unpredictable times: pedagogical practices and learning performance in fully online flipped classrooms. *International Journal of Educational Technology in Higher Education*, *17*(1), pp.1-22.

Ho, Y.F., Hsieh, L.L., Chao, W.K. and Huang, Y.C., 2020. Orientation to Community Pharmacy by online education amid the COVID-19 pandemic: Teaching and learning reflections. *Journal of Asian Association of Schools of Pharmacy*, *9*, pp.53-59.

Isti'anah, A., 2017. The effect of blended learning to the students’ achievement in grammar class. *IJEE (Indonesian Journal of English Education)*, *4*(1), pp.16-30.

Ivankova, N.V., Creswell, J.W. and Stick, S.L., 2006. Using mixed-methods sequential explanatory design: From theory to practice. *Field methods*, *18*(1), pp.3-20.

Jang, H., Kim, E.J. and Reeve, J., 2012. Longitudinal test of self-determination theory's motivation mediation model in a naturally occurring classroom context. *Journal of Educational psychology*, *104*(4), p.1175.

Jamaludin, R. and Osman, S.Z.M., 2014. The use of a flipped classroom to enhance engagement and promote active learning. *Journal of education and practice*, *5*(2), pp.124-131.

Jatau, A.I., Ming, L.C. and Awaisu, A., 2018. Quality assurance, accreditation, and glocalisation of pharmacy programmes. *Pharmacy Education*, *18*, pp.149-150.

Johnson, N., Veletsianos, G. and Seaman, J., 2020. US Faculty and Administrators' Experiences and Approaches in the Early Weeks of the COVID-19 Pandemic. *Online Learning*, *24*(2), pp.6-21.

Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A., 2007. Toward a definition of mixed methods research. *Journal of mixed methods research*, *1*(2), pp.112-133.

Jonassen, D.H. and Rohrer-Murphy, L., 1999. Activity theory as a framework for designing constructivist learning environments. *Educational technology research and development*, *47*(1), pp.61-79.

Jovanovic, J., Mirriahi, N., Gašević, D., Dawson, S. and Pardo, A., 2019. Predictive power of regularity of pre-class activities in a flipped classroom. *Computers & Education*, *134*, pp.156-168.

Kahu, E.R., 2013. Framing student engagement in higher education. *Studies in higher education*, *38*(5), pp.758-773.

Karabulut-Ilgu, A., Jaramillo Cherrez, N. and Jahren, C.T., 2018. A systematic review of research on the flipped learning method in engineering education. *British Journal of Educational Technology*, *49*(3), pp.398-411.

Khanova, J., Roth, M.T., Rodgers, J.E. and McLaughlin, J.E., 2015. Student experiences across multiple flipped courses in a single curriculum. *Medical education*, *49*(10), pp.1038-1048.

Kearsley, G., 2010. Andragogy: Knowles) the theory into practice database. A*ccessed from http://tip. psychology. Org*.

Kennedy, D.R., 2019. Redesigning a pharmacology course to promote active learning. *American journal of pharmaceutical education*, *83*(5).

Kim, J.Y., 2018. A study of students' perspectives on a flipped learning model and associations among personality, learning styles and satisfaction. *Innovations in Education and Teaching International*, *55*(3), pp.314-324.

Knapp, T.R. and Mueller, R.O., 2010. Reliability and validity of instruments. *The reviewer's guide to quantitative methods in the social sciences*, pp.337-342.

Knowles, M., 1984. Andragogy in Action. San Francisco. *Calif: Jossey-Bass*.

Knudson, D., 2020. A tale of two instructional experiences: student engagement in active learning and emergency remote learning of biomechanics. *Sports Biomechanics*, pp.1-11.

Krathwohl, D.R., 2002. A revision of Bloom's taxonomy: An overview. *Theory into practice*, *41*(4), pp.212-218.

Kroll, T., Neri, M.T. and Miller, K., 2005. Using mixed methods in disability and rehabilitation research. *Rehabilitation nursing*, *30*(3), pp.106-113.

Kuh, G.D., 2003. What we're learning about student engagement from NSSE: Benchmarks for effective educational practices. *Change: The Magazine of Higher Learning*, *35*(2), pp.24-32.

Kuh, G.D., 2001. The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties.

Lage, M.J., Platt, G.J. and Treglia, M., 2000. Inverting the classroom: A gateway to creating an inclusive learning environment. *The journal of economic education*, *31*(1), pp.30-43.

Lai, C.L. and Hwang, G.J., 2016. A self-regulated flipped classroom approach to improving students' learning performance in a mathematics course. *Computers & Education*, *100*, pp.126-140.

Lavrakas, P.J., 2008. *Encyclopedia of survey research methods*. Sage publications.

Lee, K.Y. and Lai, Y.C., 2017. Facilitating higher-order thinking with the flipped classroom model: a student teacher's experience in a Hong Kong secondary school. *Research and practice in technology enhanced learning*, *12*(1), pp.1-14.

Leslie, H.J., 2020. Facilitation fundamentals: redesigning an online course using adult learning principles and trifecta of student engagement framework. *Journal of Research in Innovative Teaching & Learning*.

Liu, X., Magjuka, R.J., Bonk, C.J. and Lee, S.H., 2007. Does sense of community matter? An examination of participants' perceptions of building learning communities in online courses. *Quarterly Review of Distance Education*, *8*(1), p.9.

Lo, C.K. and Hew, K.F., 2017. A critical review of flipped classroom challenges in K-12 education: Possible solutions and recommendations for future research. *Research and practice in technology enhanced learning*, *12*(1), pp.1-22.

Maheshwari, P. and Seth, N., 2019, Effectiveness of flipped classrooms: A case of management education in central India, International Journal of Educational Management, Vol. 33 No. 5, pp. 860-885.

Marlowe, C.A., 2012. The effect of the flipped classroom on student achievement and stress.

Maroco, J., Maroco, A.L., Campos, J.A.D.B. and Fredricks, J.A., 2016. University student's engagement: development of the University Student Engagement Inventory (USEI). *Psicologia: Reflexão e Crítica*, *29*.

Martin, A.J., 2007. Examining a multidimensional model of student motivation and engagement using a construct validation approach. *British Journal of Educational Psychology*, *77*(2), pp.413-440.

McLaughlin, J.E., Griffin, L.M., Esserman, D.A., Davidson, C.A., Glatt, D.M., Roth, M.T., Gharkholonarehe, N. and Mumper, R.J., 2013. Pharmacy student engagement, performance, and perception in a flipped satellite classroom. *American journal of pharmaceutical education*, *77*(9).

McCrudden, M.T. and McTigue, E.M., 2019. Implementing integration in an explanatory sequential mixed methods study of belief bias about climate change with high school students. *Journal of Mixed Methods Research*, *13*(3), pp.381-400.

Means, B., Bakia, M. and Murphy, R., 2014. *Learning online: What research tells us about whether, when and how*. Routledge.

Miller, R.B., Greene, B.A., Montalvo, G.P., Ravindran, B. and Nichols, J.D., 1996. Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary educational psychology*, *21*(4), pp.388-422.

Mishra, R.D. and Rasundram, J., 2017. Triangulation an essential tool to enhance the validity of a case study. *Computers in Human Behavior*, *4*, pp.69-74.

Mok, H.N., 2014. Teaching tip: The flipped classroom. *Journal of information systems education*, *25*(1), p.7.

Montenegro, A., 2017. Understanding the concept of student agentic engagement for learning. *Colombian Applied Linguistics Journal*, *19*(1), pp.117-128.

Muir, T., 2020. Self-determination theory and the flipped classroom: a case study of a senior secondary mathematics class. *Mathematics Education Research Journal*, pp.1-19.

Network, F.L., 2014. The Four Pillars of FLIP™.

Nyumba, T., Wilson, K., Derrick, C.J. and Mukherjee, N., 2018. The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and evolution*, *9*(1), pp.20-32.

O'Donnell, A.M., Reeve, J. and Smith, J.K., 2011. *Educational psychology: Reflection for action*. John Wiley & Sons.

Odysseyware. 2018. *Using ClassPace™ in a Flipped Classroom*. [online] Available at: <https://www.odysseyware.com/blog/using-classpace-flipped-classroom> [Accessed 14 May 2021].

Palincsar, A.S., 1998. Social constructivist perspectives on teaching and learning. *Annual review of psychology*, *49*(1), pp.345-375.

Palis, A.G. and Quiros, P.A., 2014. Adult learning principles and presentation pearls. *Middle East African journal of ophthalmology*, *21*(2), p.114.

Pappas, C., 2013. *The Adult Learning Theory - Andragogy - of Malcolm Knowles - eLearning Industry*. [online] eLearning Industry. Available at: <https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles> [Accessed 2 May 2021].

Parsons, J. and Taylor, L., 2011. Improving student engagement. *Current issues in education*, *14*(1).

Pekrun, R. and Linnenbrink-Garcia, L., 2012. Academic emotions and student engagement. In *Handbook of research on student engagement* (pp. 259-282). Springer, Boston, MA.

Patton, M.Q., 2002. Qualitative research and evaluation methods.(Sage Publications, Thousand Oaks, CA).

Pierce, R. and Fox, J., 2012. Vodcasts and active-learning exercises in a “flipped classroom” model of a renal pharmacotherapy module. *American journal of pharmaceutical education*, *76*(10).

Poirier, T.I., 2017. Is lecturing obsolete? Advocating for high value transformative lecturing. *American journal of pharmaceutical education*, *81*(5).

Radder-Renter, A., 2020. *The Flipped Classroom Model: What It Is And How It Works*. [online] Yeseep.org. Available at: <https://www.yeseep.org/blog/the-flipped-classroom-model-what-it-is-and-how-it-works> [Accessed 6 April 2021].

Rahman, A.A., Aris, B., Rosli, M.S., Mohamed, H., Abdullah, Z. and Mohd Zaid, N., 2015. Significance of preparedness in flipped classroom. *Advanced Science Letters*, *21*(10), pp.3388-3390.

Reeve, J., 2013. How students create motivationally supportive learning environments for themselves: The concept of agentic engagement. *Journal of educational psychology*, *105*(3), p.579.

Reeve, J., Cheon, S.H. and Jang, H., 2020. How and why students make academic progress: Reconceptualizing the student engagement construct to increase its explanatory power. *Contemporary Educational Psychology*, *62*, p.101899.

Reeve, J. and Lee, W., 2014. Students’ classroom engagement produces longitudinal changes in classroom motivation. *Journal of educational psychology*, *106*(2), p.527.

Reeve, J. and Tseng, C.M., 2011. Agency as a fourth aspect of students’ engagement during learning activities. *Contemporary Educational Psychology*, *36*(4), pp.257-267.

Robert Talbert, P., 2015. *Four Assessment Strategies for the Flipped Learning Environment*. [online] Faculty Focus | Higher Ed Teaching & Learning. Available at: <https://www.facultyfocus.com/articles/blended-flipped-learning/four-assessment-strategies-for-the-flipped-learning-environment/> [Accessed 8 May 2021].

Romanelli, F., Bird, E. and Ryan, M., 2009. Learning styles: a review of theory, application, and best practices. *American journal of pharmaceutical education*, *73*(1).

Rotellar, C. and Cain, J., 2016. Research, perspectives, and recommendations on implementing the flipped classroom. *American journal of pharmaceutical education*, *80*(2).

Ryan, F., Coughlan, M. and Cronin, P., 2009. Interviewing in qualitative research: The one-to-one interview. *International Journal of Therapy and Rehabilitation*, *16*(6), pp.309-314.

Sajid, M.R., Laheji, A.F., Abothenain, F., Salam, Y., AlJayar, D. and Obeidat, A., 2016. Can blended learning and the flipped classroom improve student learning and satisfaction in Saudi Arabia?. *International journal of medical education*, *7*, p.281.

Sandelowski, M., 1995. Sample size in qualitative research. *Research in nursing & health*, *18*(2), pp.179-183.

Schoch, K., 2016. Case study research. *The scholar-practitioner's guide to research design*, *1*, pp.5886-6283.

Simons, H., 2009. *Case Study Research in Practice*. SAGE.

Sinatra, G.M., Heddy, B.C. and Lombardi, D., 2015. The challenges of defining and measuring student engagement in science.

Skinner, E.A., Kindermann, T.A., Connell, J.P. and Wellborn, J.G., 2009. Engagement and disaffection as organizational constructs in the dynamics of motivational development.

Slemmons, K., Anyanwu, K., Hames, J., Grabski, D., Mlsna, J., Simkins, E. and Cook, P., 2018. The impact of video length on learning in a middle-level flipped science setting: implications for diversity inclusion. *Journal of Science Education and Technology*, *27*(5), pp.469-479.

Steen-Utheim, A.T. and Foldnes, N., 2018. A qualitative investigation of student engagement in a flipped classroom. *Teaching in Higher Education*, *23*(3), pp.307-324.

Straub, D., Boudreau, M.C. and Gefen, D., 2004. Validation guidelines for IS positivist research. *Communications of the Association for Information systems*, *13*(1), p.24.

Subramaniam, S.R. and Muniandy, B., 2019. The effect of flipped classroom on students' engagement. *Technology, Knowledge and Learning*, *24*(3), pp.355-372.

Szeto, E. and Cheng, A.Y., 2016. Towards a framework of interactions in a blended synchronous learning environment: what effects are there on students' social presence experience?. *Interactive Learning Environments*, *24*(3), pp.487-503.

Tague, J. and Baker, G.R., 2014. Flipping the classroom to address cognitive obstacles. *American Society for Engineering Education, Indianapolis*.

Taherdoost, H., 2016. Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research. *How to test the validation of a questionnaire/survey in a research (August 10, 2016)*.

Talbert, R., 2017. Myths and Facts About Flipped Learning. [online] EDUCAUSE. Available at: <https://er.educause.edu/articles/2017/9/myths-and-facts-about-flipped-learning> [Accessed 10 April 2021].

Tang, T., Abuhmaid, A.M., Olaimat, M., Oudat, D.M., Aldhaeebi, M. and Bamanger, E., 2020. Efficiency of flipped classroom with online-based teaching under COVID-19. *Interactive Learning Environments*, pp.1-12.

Tashakkori, A. and Creswell, J.W., 2007. Exploring the nature of research questions in mixed methods research.

Taylor, S.S. and Statler, M., 2014. Material matters: Increasing emotional engagement in learning. *Journal of Management Education*, *38*(4), pp.586-607.

Trowler, V., 2010. Student engagement literature review. *The higher education academy*, *11*(1), pp.1-15.

Twycross, A. and Shields, L., 2004. Validity and reliability-What's it all about? Part 2 Reliability in quantitative studies. Paediatric Nursing, 16(10), p.36.

van Alten, D.C., Phielix, C., Janssen, J. and Kester, L., 2020. Self-regulated learning support in flipped learning videos enhances learning outcomes. *Computers & Education*, *158*, p.104000.

Vasileiou, K., Barnett, J., Thorpe, S. and Young, T., 2018. Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC medical research methodology*, *18*(1), pp.1-18.

Veiga, F.H., Reeve, J., Wentzel, K. and Robu, V., 2014. Assessing students' engagement: A review of instruments with psychometric qualities. In *I Congresso Internacional Envolvimento dos Alunos na Escola: Perspetivas da Psicologia e Educação* (pp. 38-57).

Venkatesh, S., Rao, Y.K., Nagaraja, H., Woolley, T., Alele, F.O. and Malau-Aduli, B.S., 2020. Factors influencing medical students' experiences and satisfaction with blended integrated E-learning. *Medical Principles and Practice*, *29*(4), pp.396-402.

Vygotsky, L.S., 1978. Socio-cultural theory. *Mind in society*, *6*, pp.52-58.

Wong, C.S., Lu, A., Im, T.S. and Cheung, R.Y., 2019, July. Supporting Flipped Learning with Virtual-Reality Field Trips. In *2019 International Symposium on Educational Technology (ISET)* (pp. 54-59). IEEE.

Yazan, B., 2015. Three approaches to case study methods in education: Yin, Merriam, and Stake. *The qualitative report*, *20*(2), pp.134-152.

Yin, R.K., 2014. *Case study research: Design and methods (applied social research methods)*. Thousand Oaks, CA: Sage publications.

Yin, R.K., 2009. Case study research: design and methods/Robert K. *Yin, Applied social research methods series*, *5*.

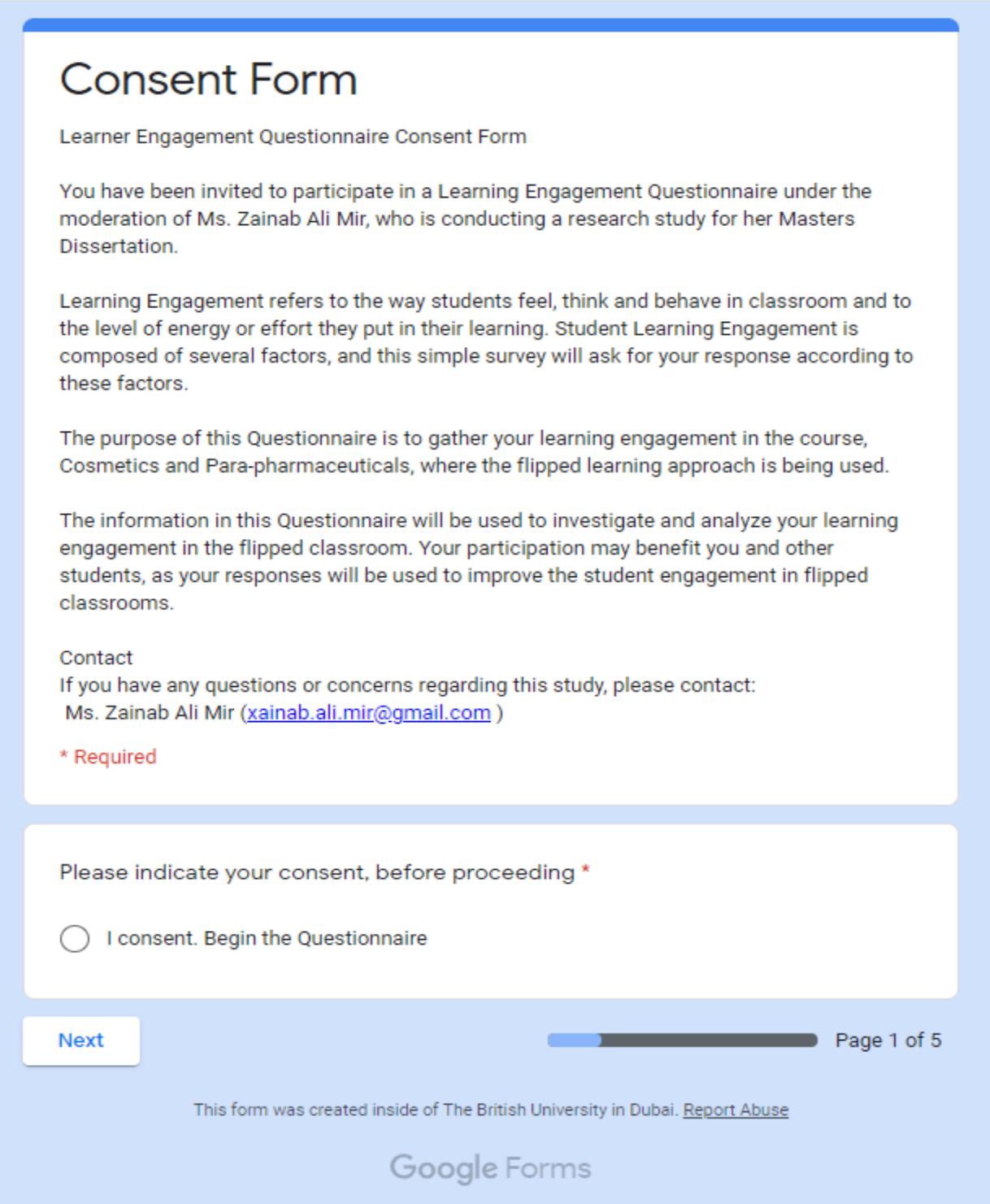
Zainuddin, Z. and Perera, C.J., 2019. Exploring students' competence, autonomy and relatedness in the flipped classroom pedagogical model. *Journal of Further and Higher Education*, *43*(1), pp.115-126.

Zepke, N., 2018. Student engagement in neo-liberal times: what is missing?. *Higher Education Research & Development*, *37*(2), pp.433-446

Zheng, B., Ward, A. and Stanulis, R., 2020. Self-regulated learning in a competency-based and flipped learning environment: learning strategies across achievement levels and years. *Medical education online*, *25*(1), p.1686949.

Appendix

Appendix 1: Consent Form (LES Questionnaire)



Consent Form

Learner Engagement Questionnaire Consent Form

You have been invited to participate in a Learning Engagement Questionnaire under the moderation of Ms. Zainab Ali Mir, who is conducting a research study for her Masters Dissertation.

Learning Engagement refers to the way students feel, think and behave in classroom and to the level of energy or effort they put in their learning. Student Learning Engagement is composed of several factors, and this simple survey will ask for your response according to these factors.

The purpose of this Questionnaire is to gather your learning engagement in the course, Cosmetics and Para-pharmaceuticals, where the flipped learning approach is being used.

The information in this Questionnaire will be used to investigate and analyze your learning engagement in the flipped classroom. Your participation may benefit you and other students, as your responses will be used to improve the student engagement in flipped classrooms.

Contact
If you have any questions or concerns regarding this study, please contact:
Ms. Zainab Ali Mir (xainab.ali.mir@gmail.com)

* Required

Please indicate your consent, before proceeding *

I consent. Begin the Questionnaire

Next

Page 1 of 5

This form was created inside of The British University in Dubai. Report Abuse

Google Forms

Appendix 2: LES Questionnaire

Learning Engagement Questionnaire

Learning Engagement refers to the way students feel, think and behave in classroom and to the level of energy or effort they put in their learning.

Please answer the questions below, which describe your learning engagement according to different factors.

Behavioral Factors of Learning Engagement *

Behavioral engagement is the actions and behaviors people take during learning, which may support or hinder learning.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
When I'm in this class, I listen very carefully to all the instructions	◯	◯	◯	◯	◯
I pay attention in this class	◯	◯	◯	◯	◯
I try hard to do well in this class	◯	◯	◯	◯	◯
When I'm in this class, I participate in class discussion	◯	◯	◯	◯	◯
I become disruptive during this class (make noise or disturb friends)	◯	◯	◯	◯	◯

Behavioral Factors of Learning Engagement *

Behavioral engagement is the actions and behaviors people take during learning, which may support or hinder learning.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I'm able to complete all the activities and exercises given in this class	○	○	○	○	○
I tried answering the difficult questions in this lesson without asking for much help	○	○	○	○	○
I feel I am more confident in handling difficult topics after attending this class	○	○	○	○	○

Back Next Page 2 of 5

Emotional Factors of Learning Engagement

Emotional engagement involves interest, boredom, happiness, anxiety, and other affective states, any of which factors could affect learners' involvement with learning

Emotional Factors of Learning Engagement *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
When we work on something in this class, I feel interested	○	○	○	○	○
This class is fun	○	○	○	○	○
I enjoy learning new things in this class	○	○	○	○	○
When I'm in this class, I feel good about myself	○	○	○	○	○
When we work on something in this class, I get involved	○	○	○	○	○
I am happy to be in this class	○	○	○	○	○
I feel excited about the things that I learn in this class	○	○	○	○	○
I find this class a fun place to be	○	○	○	○	○

Emotional Factors of Learning Engagement *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I enjoy the work that I do in this class.	◯	◯	◯	◯	◯
This lesson did not raise any interesting new ideas or insights	◯	◯	◯	◯	◯

This question requires one response per row

Back Next Page 3 of 5

Agentic Factors of Learning Engagement

The word "agentic" is described as your power to control your own goals and actions.
Agentic Engagement is described as proactive, intentional, and constructive contribution to the flow of the learning activity.

Agentic Factors of Learning Engagement *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I let my instructor know what I need	◯	◯	◯	◯	◯
I let my instructor know what I am interested in	◯	◯	◯	◯	◯
During this class, I express my likes and dislikes	◯	◯	◯	◯	◯
During this class, I ask questions to help me learn	◯	◯	◯	◯	◯
When I need something in this class, I'll ask the instructor for it	◯	◯	◯	◯	◯
I adjust with whatever we are learning so I can learn as much as possible	◯	◯	◯	◯	◯

Agentic Factors of Learning Engagement *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I try to make whatever we are learning as interesting as possible	◯	◯	◯	◯	◯

Back Next Page 4 of 5

Cognitive Factors of Learning Engagement

Cognitive Engagement is described as the use of sophisticate, and personalized learning strategies to acquire deeper conceptual understanding, rather than surface knowledge.

Cognitive Factors of Learning Engagement *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
When I study for this class, I try to connect what I am learning with my own experiences	◯	◯	◯	◯	◯
I try to make all the different ideas fit together and make sense when I study for this class	◯	◯	◯	◯	◯
When doing work for this class, I try to relate what I'm learning to what I already know	◯	◯	◯	◯	◯
I make up my own examples to help me understand the important concepts I study in class	◯	◯	◯	◯	◯
I learnt new concepts and how to apply them in this class	◯	◯	◯	◯	◯

Cognitive Factors of Learning Engagement *

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I worked independently in understanding the contents in this class	◯	◯	◯	◯	◯
I am very concerned about the quality of my achievement in the exercise and activity session in this class	◯	◯	◯	◯	◯
I took more responsibility of my own learning in this class	◯	◯	◯	◯	◯
I realized that information and communication technology is an option to enhance the understanding when solving problems or completing tasks in this class	◯	◯	◯	◯	◯

Back Submit Page 5 of 5

Appendix 3: Consent Form (Focus Group Interview)

Focus Group Interview Consent and Contact Information Form

Purpose:
You have been invited to participate in a focus group interview under the moderation of Ms. Zainab Ali Mir who is conducting a research study. The purpose of this focus group is to gather your perceptions with the flipped learning approach in your course, Cosmetics and Para-pharmaceuticals.

The information learned in this focus group will be used to assess your satisfaction with the flipped learning approach and take your feedback to improve this experience in the future.

Procedure:
As part of this study, you will be placed in a group of 6-8 individuals. You will be sent a meeting invite through MS Teams.

The researcher will ask you several questions while facilitating the discussion. Your responses will remain confidential, and no names will be included in the final report.

You can choose whether or not to participate in the focus group, and you may stop at any time during the course of the interview.

Please note that there are no right or wrong answers to focus group questions.

The researcher wants to hear the many varying viewpoints and would like for everyone to contribute their thoughts. Out of respect, please refrain from interrupting others. However, feel free to be honest even when your responses counter those of other group members.

Benefits and Risks:
Your participation may benefit you and other students. Your responses can provide meaningful and effective guidelines for implementation of the flipped learning approach in other pharmacy courses.

There are no risks anticipated in your participation.

Confidentiality:
Should you choose to participate, you will be asked to respect the privacy of other focus group members by not disclosing any content discussed during the study. The researcher will analyze the data, but—as stated above—your responses will remain confidential, and no names will be included in any reports.

Contact:
If you have any questions or concerns regarding this study, please contact:
Ms. Zainab Ali Mir (xainab.ali.mir@gmail.com)

Please mention your University Email address in the text box below. This will be used to add you to the Microsoft Teams Group

Your answer

Submit

Never submit passwords through Google Forms.

Appendix 4: Consent Form (Instructor Interview)

Consent Form (Instructor Interview)

This form is intended to take your consent to participate in an interview under the moderation of Ms. Zainab Ali Mir who is conducting a research study.

The purpose of this interview is to gather your perceptions with the flipped learning approach in your course, Cosmetics and Para-pharmaceuticals.

The researcher will analyze the data, but your responses will remain confidential, and no names will be included in any reports.

* Required

I understand that my participation is voluntary *

- ◯ I Agree
- ◯ I Disagree

I understand that my responses will be kept strictly confidential *

- ◯ I Agree
- ◯ I Disagree

I agree to take part in the above research study. *

- ◯ I Agree
- ◯ I Disagree

Submit

Appendix 5: Student Focus Group Interview Questions

Warm-up Question: Have you experienced Flipped classrooms before, OR is this your first student experience?

IQ.1: What is your opinion on the content, quality and usefulness of the videos and other instructional materials given to you in the pre-class time?

IQ.2: How did you find the discussions held during the online class time?

IQ.3: What is your opinion on the responsibility to learn on your own during the pre-class time? (For example Did you find it exciting or difficult to handle?)

IQ.4: What is your opinion on your own learning improvement in this RFC course? (For example, were you able to apply the gained knowledge further, and improve your critical thinking skills or did you feel no difference?)

IQ.5: Based on your experience, do you think the RFC Approach can be improved? Please give a few suggestions.

Appendix 6: Instructor Interview Questions

IQ.1: What was your key interest and rationale towards using the Flipped Classroom Approach for your course?

IQ.2: How would you describe your own learning journey regarding the use of videos as the pre-class material? Were you comfortable with making the videos and more importantly did you learn new tools while making these videos?

IQ.3: In addition to the videos and PowerPoint presentations, were you using any other instructional material, for example: videos that are posted by other instructors as supplementary information?

IQ.4: What are the different kinds of learning activities and strategies that you use within the classroom to increase learning engagement?

IQ.5: What do you think has been your biggest success in this approach, from this change?

IQ.6: What have been some of the challenges you faced in the Flipped Learning approach?

IQ.7: In terms of the improvement that you are seeing, What are your next steps if you would like to consider this approach for the next term?

Appendix 7: Verbatim Transcription (Student Focus Group Interview)

Moderator: Thank you very much for your time. As you have read in the Consent form prior to joining this interview, I will be asking a series of questions related to your perspective and experience with the RFC approach for your course, Cosmetics and Para-Pharmaceuticals. I will encourage everyone to feel comfortable and answer accordingly. You may raise your hand to answer at any time. I will also be mentioning the participants username to get their responses, so feel free to answer. Lets begin!

Warm-up Question **: Have you experienced Flipped classrooms before, or is this your first student experience?**

Student 1	"I haven't had personally an entire course built on this sort of approach, where you would have to study material before coming to the lecture. I have only had, in some instances, asked by the instructor in other courses to study before coming to class, where it wouldn't be the norm for the entire course throughout the semester"
Student 2	"I've experienced it previously in another course."
Student 3	"This is my first experience."
Student 4	*No Response*
Student 5	*No Response*
Student 6	*No Response*
Student 7	"I've experienced this in several other courses, previously and in this semester as well."

IQ.1 What is your opinion on the content, quality and usefulness of the videos and other instructional materials given to you in the pre-class time?

Student 1	"The videos are very very clear because it would be a very detailed explanation of the whole topic, and it was not that lengthy as well. The length of the video was almost an hour. So, If I could spare an hour before the upcoming lecture it was good enough. Also since it was a video format, I could speed through the video before the discussion in the in-class session, to speed up and remember what I have studied. Overall the material itself was helpful, and the purpose was very good indeed."
Student 2	"I agree with Student 1. The teaching materials were clear and

	amazing, especially the videos. I was able to catch the information and keep it in my mind. When I listened to the first pre-class videos, I got a lot of information, and then I heard it again in the last class, the information stuck to my mind, so it was very helpful.”
Student 3	“I feel it's a great experience, since we had a full image of the lecture, and we just discussed the materials so I feel it was stuck in my mind. So when I remember it easily when I study. The video had all the necessary details and was easy to understand. Also, I feel it's great and soo useful to watch the videos before the quiz and exam, and you can even remember the instructors voice during the exam itself.”
Student 4	“The content was clear and it was actually very useful. Instead of listening to the materials for the first time in class, we would already be having a background about the information, which was soo helpful. Also, I can watch the video before the quiz, but in case I have other quizzes/midterms going on, I don't have the time to watch it. In fact most of the time I’m unable to catch up, so I end up watching the video just before the class, not beforehand. For example, I can watch the video comfortably, only if I don’t have a quiz or exam on that day, because it does take time to watch the whole video.”
Student 5	“I thought it was very clear and very helpful, because normally I don’t like to write notes. So with videos it was easier so you could repeat it over and over, and proceed with whatever is needed, and I didn’t have to stress about writing it down during the lecture, or if I missed out something. To be honest, it was easier for us in exams, because like we had a very strong background of the concepts as shown in the videos. So when we had to study for another exam, it would take us one or maximum two days to finish the material, and that is why it was easier.”
Student 6	“I found it very informative and helpful, like everyone else said. The only downfall about it, was for example during the midterm season when I had to listen to the pre-recorded lecture and attend the lecture during the in-class session, and that was kind of like time-consuming for me. But other than that I enjoyed the video lectures a lot.”
Student 7	“I really like it. I think he explains everything in detail And he clarifies everything. So when we come for the in-Class session, he repeats some of the important points **during** the discussion And I feel that the information is stuck in my brain Because I already heard it in the pre recorded lecture and then I am having it again during the live

	discussion.”

Q.2 How did you find the discussions held during the online class time?

Student 1	“I found that the discussion itself was not just a brief discussion about the video lecture. The discussion was enriched with other details in a way that I would be getting the entire lesson explained in a way over like.. two lectures. So it was actually difficult for me to forget anything. After all of that, if I do forget, it would be all my fault. Also, it's not just good that the information sticks in my head. Basically you have two sources of acquiring the information, so it's a lot more difficult to drop something out.”
Student 2	“Unlike this course, in other classes, during any discussion, the instructor is speaking 90% of the time, and only some students will be participating because they have a background about the information. But in this approach, studying beforehand or watching the material before the lecture, we- the students- will be having our discussions with each other and the instructor, and everyone will have something to add. None will just sit there without knowing what happened. Everyone will be participating.”
Student 3	“I agree with student 1 and Student 2. The class discussions were very helpful.”
Student 4	“The discussions are helpful, but it got stressful to watch the videos sometimes when we were very busy with other tasks. In case we could not watch the video before coming to class, and in case the instructor asked us a direct question, it got slightly awkward to explain.” (*laughs*)
Student 5	“Yes, the discussion is good, but the only thing about this is that sometimes it is stressful. Sometimes we didn't watch the video due to us being busy with some other work. In that scenario, when we were prompted to attend a sudden quiz in class with no class preparation, it got stressful. It was also embarrassing to explain to the instructor that we hadn’t watched the video and that was the reason a quiz in class was stressful.”

Student 6	"In my opinion it was a very beneficial and informative way of giving us information. However during the midterm period, I was unable to watch the videos, and I became very confused in the in-class session where the discussion was happening, especially when I directly received a question from the instructor to answer. Other than this I found it very helpful."
Student 7	"The discussions were very nice. I feel that normally in the lecture course where we are receiving the information for the first time, it's hard to think or ponder about such questions when we are at a beginning stage. But over here in the discussions, students were coming prepared with the questions and it was to a point where the students were opening up the space for more questions and understanding the information more and they were now seeking to apply it in different contexts."

***Supplementary Question*:**

I believe you said the videos were typically for 1 Hour.

Was it one single video or was the topic split into two parts so that you could watch the videos as a sequence?

Student 1	"For the lecture, where the video was split into parts, I felt like it made preparing ourselves to watch the videos before the lecture a lot easier. Because if you see a video that is for example 150 minutes long, chances are that you'll not find that time or you'll feel like that you need to find a lot more time than you actually need. So for our Monday and Wednesday in-class sessions, if the instructor uploaded the video on a Wednesday/Thursday, we had typically 4-5 days, where we needed to only find the time to watch the video before the next in-class session, and we needed like maximum 60 minutes to sit and watch the videos, and you can even like fast-track through them to get all the important points. So that was a lot easier than if I were to have to watch a 150 minute video, even if I had to watch it in 4 days."
Student 2	"So when the instructor is making the pre-recorded video, he doesn't make it for more than an hour, which is approximately the time allocated for a typical university course lecture. As students our brain can not tolerate more than an hour of continuous information given through a lecture. So, when a lesson requires more than an hour of explanation, the instructor either divided the content into two videos, each for 40 minutes or made it as two videos each one hour long. He was very considerate when it came to this point, and this how this way of learning should go ahead"

Student 3	"Actually it depends on the content itself. Like if the slides are a bit long, the video can be 1 hour or sometimes 30 minutes. Only for one lecture, the instructor had splitted the content in to two videos"
Student 4	"As student 3 said, the length of the video depends on the content. So during the discussion time, if the video for example was 30 minutes, we were able to finish the entire discussion around the topic within the class time. But if the video was for example for 50 minutes, then the discussion was divided into two class sessions to accommodate all aspects of the content explained in the lecture video."
Student 5	"The instructor made a video which was maximum 1 hour long, which was relatively easy. But for me, maybe it was like a placebo effect where if you had two videos which were each 30 minutes long, I felt it would be easier to watch, and I would actually watch it. However if it was one video for an hour, I felt less motivated to watch it, and frequently contemplated delaying. Although in the end I would be watching the entire 60 minutes video, splitting it as two videos, gave me more motivation to watch it."
Student 6	"The instructor gave us a maximum of 50 minute video, so the length was very suitable for me. In the case when he divided the video to two parts either 20 minutes each, or 30 minutes each, for me that was better, as I felt it took me less time to watch the video"
Student 7	"To be honest, I forced myself to watch the videos and I made it a responsibility that I need to do this before I attend the class. A nice thing about recorded lectures is that you can speed it up. I used to speed it up by two times so that I would have the time to listen to the whole video in a short duration, And I would be able to understand and go through the materials quickly for the class discussion so that I know what we are talking about. Honestly I don't think it took enough time but It depends on every students schedule and the study load they have for that semester."

***Supplementary Question*:**

If this course was redesigned in a way where you could have the same content split into micro-lectures which would last for approximately 15-20 minutes explaining a certain concept, and the next concept is explained in the next video, would that be much more beneficial?

Student 5	"If there are too many videos, even if they are short videos, it

	would get a bit complicated and overwhelming, so I don't think I would really like that, especially if I see like 6 videos on Blackboard for an upcoming class, even though it would be for an exact hour, similar to a 1 hour video, but the effect would be slightly demotivating. So ideally if it is one /two videos that could be kept shorthand concise, that would be much better. Otherwise it would just give me bad vibes" *laughs*.
Student 1	"I think that if the same content is split into a number of videos, the effect that Student 5 mentioned may happen but it would mainly be related to the number of videos, not to the number of minutes. Because the overall feeling would be overwhelming if you have to watch for example 20 videos to make up to the 1 hour which is divided. A balance however with the number of videos would be perfect! Also, the only benefit of dividing the videos would be that it would allow quick navigation to a certain point. But I think that can also be done, if the instructor marks down the video points from X to Y and mentions it as a video note in the description box. The videos are hosted on the instructor's Youtube channel so this would help."
Student 3	"I agree with Student 1 and Student 5. 6 short videos would be overwhelming. However if the videos can be split into 30 minutes length and given, it would be perfect."

Supplementary Question:

Besides discussion, have you been exposed to some other format of learning within the classroom? For example: Have you worked collaboratively as groups in the in-class sessions?

Student 2	"We didn't work in groups at all. For the discussions, the instructor incorporated mini-quizzes within the in-class sessions which covered the topics in the previous lecture, just to make sure that we have the information in our brains."
Student 4	"The instructor also used the Discussion Board in Blackboard where he puts any specific information for example on the Cosmetics components, and then asks the questions about the topic. We give our opinions and answers as comments to this post, and he provides us with his feedback on it as well. We are also used to commenting on our colleagues' posts."
Student 1	"I wanted to provide a comment on the group work. I believe that if the course in-class sessions were supported as face-to-face classes on the campus, it would be more motivational for

	students to have group sessions. For example, if a student is in Flipped classrooms, he/she would be more motivated to go through the videos or any of the pre-class materials, in order to be an active member of the group. So on-campus I think this would be a lot more beneficial in this type of course, but I feel online the group work is much more difficult. Maybe I haven't experienced good group work online yet, so perhaps I feel that this approach is not suitable for any group activity in the in-class sessions to be held online."
Student 7	"In this class we didn't do group work. However in the other flipped courses that I have attended, I did do group work and I actually enjoyed it. I think it may have been beneficial if it was done for this course as well. Blackboard does have the system to manage breakout rooms so i think if this would have been implemented it would have been good to have an interactive and different form of learning."

IQ.3: What is your opinion on the responsibility to learn on your own during the pre-class time?

(For example Did you find it exciting or difficult to handle?)

Student 1	"I felt more responsible of course, and it also increased my independence in learning on my own."
Student 2	"It was a responsibility to watch all the videos so that you have a good background before coming to class. But it helped us a lot especially because hearing the information twice or thrice is better than hearing it once."
Student 3	"I kind of enjoy the independent learning I did in this course because it wasn't the usual way where I would be doing it after the class. In this case that deeper understanding happened in class so I just had to be attentive and that wasn't soo difficult because I was already understanding what was being discussed."
Student 4	"Actually I did not find it difficult. Our instructor encouraged us to watch the videos before coming to class but did not force it on us. When watching the videos, I made attempts to get at least a general idea, and that itself helped me during the class because the instructor explained the concept further and I could then understand it better during the class time."
Student 5	"Well.. it is slightly overwhelming but I believe that I am able to learn material in a much better way than the usual lecture based courses."
Student 6	"Yes it's a responsibility, but I felt good participating in the class discussions if I had gone through the pre-class materials on time."

Student 7	"It was a responsibility, but it wasn't overwhelming. Because when I come to the class, I am familiar with everything I am about to hear. Also in the typical one-way lecture based courses, we are supposed to study after the lecture anyway To understand and lock the information in our brain. but now it's the opposite now I have to Learn it on my own and then revise everything together with everyone in the classroom. I feel I don't have to review the whole information again until there is a quiz or a mid-term"

IQ. 4: What is your opinion on your own learning improvement in this RFC course? (For example, were you able to apply the gained knowledge further, and improve your critical thinking skills or did you feel no difference?)

Student 1	"I feel that during the discussion session itself in the class sessions, I feel like my mind is far more engaged than when I'm only receiving information. I feel like I'm already thinking about the next point the instructor would be about to say. It's more like a rehearsal than just being there to learn about the concept from the beginning. It's good for revising the information which I already watched before."
Student 2	"I completely agree with Student 1. I don't have anything further to add here."
Student 3	"Absolutely. I feel that I can prepare some questions to ask during the discussion so I can get extra information, or I can think beyond this, so this is like good for me."
Student 4	"I feel that in this course I was able to practice critical thinking in a better way."
Student 5	"In addition to engagement, I feel my own academic performance became better because I was able to think beyond the basic concepts."
Student 6	"I felt I was able to increase my own critical thinking in this course and kind of engage in a much better way with the learning in this course."
Student 7	"Yes, I think so.It gives me more time to review the material and think about it. And in the classroom when the instructor is discussing this, I can ask about other things and details because I am not hearing it for the first time. So processing that information is way more enhanced because I have already gone through the material once. Also I was very interested in the whole course, so I was very motivated to research on my own. Maybe in other courses, I wouldn't be as motivated, because I wouldn't be as interested."

IQ. 5: Based on your experience, do you think the RFC Approach can be improved? Please give a few suggestions.

Student 5	"Well.. Currently I have 6 courses. If for example the FL approach is implemented for all courses, and all the instructors expect me to know the answers because they expect me to watch the pre-class videos then it will be really stressful, especially if I'm busy in some days and it could not be possible for me to watch the video. So although this approach is very beneficial and it has a lot of advantages, it can also cause a reasonable amount of stress if the instructors are expecting me to know the answers before I come to the classroom. If I am taking four courses that implement this approach, and if I have four quizzes back to back in the classroom where I am expected to know the pre-class materials it will be extremely overwhelming for me. So I would recommend that the in-class quiz - which is made to test our knowledge before we come to the classroom and just make sure that we have watched the videos or went through the pre-class materials- I would suggest that to make this optional so that students who are comfortable with it go forward, but students who are not comfortable to answer quiz will not be penalised for it."
Student 1	"I think the way this course was conducted was perfect, mainly because we were not penalised for not watching the videos, before we came to the in-class session. If there was some kind of penalty- for example we lose marks for not watching the video or we get our attendance taken away, then that would be a lot more stressful, and that even would not be good to have for all the other five courses that I am taking. But, if it is optional for the class that I am taking, and the instructor can understand that we might have more difficult times where we can't catch up with everything, then I think this system is perfect. It can be implemented for all the other courses as well."
Student 2	"Yes, I agree with my colleagues. But I disagree with the comments that were made by Student 1, that it can be implemented for all courses. I don't think that all courses can be taught this way. In some courses, you need the instructor to explain the concept to you- either face to face or on the online live lecture to understand the whole concept. In my opinion some courses like medicine require further understanding with interaction with the instructor, and are not limited only to reading, so it can't really be implemented for all courses. Other than that, if it is implemented, if I have five lectures per day, this would be 5 hours, and then I would have another 5 hours to engaged with the pre-class material before the class and I would be very overwhelmed."

Student 4	"I agree with these points. Each semester we take approximately 5 to 6 courses so attending a 1 hour 15 minutes in-class session and then watching a 1 hour video would be just too much. While I understand that we will understand better, but with soo many videos to watch it will be way too overwhelming. But maybe implementing it in some courses, and in others we just stick to the regular one way learning."
Student 3	"I agree with them. If I have too many videos to watch I may not have enough time to study the material so with 6 courses, and 6 hours per day, when would I study? I feel it would be a little bit hard."
Student 6	"My recommendation is to always take notes. Personally, for me, it would always stick in my mind better, when I take notes while watching a video. So my recommendation would be to always watch the videos and take notes because when we go to the class we would be learning the material twice so this would help to keep the information stuck in our minds."
Student 7	"I don't really have any criticism because I enjoyed the material, and I enjoyed how the information was presented. Maybe there could be some chances for team projects or some teamwork that would be nice, and it would also allow us to interact with our colleagues. But other than that the teaching styles\ was nice. I enjoyed that. The videos were very helpful. I felt that I was familiar with everything so I could go over it very quickly. To be honest we are all hoping that even when we come back to the campus, this kind of approach can be considered with students where they can have access to pre recorded lectures because it would really help us out to review the information when needed and in a way where we can view the information and understand it immediately instead of going through thousands of notes."

Appendix 8: Verbatim Transcription of Instructor Interview

Moderator: Thank you very much for your time. As you have read in the Consent form prior to joining this interview, I will be asking a series of questions related to your perspective on learning and engagement and experience with the RFC approach for your course, Cosmetics and Para-Pharmaceuticals. So.. Lets begin!

IQ.1: What was your key interest and rationale towards using the Flipped Classroom Approach for your course?

Instructor:

"Well I have attempted a course in the summer … that was an online course for teaching and I have been inspired by that course about the use of Flipped Learning. I talked in that course about this method of teaching and the objectives that can be achieved and also how it can be done and what are the benefits for the students and for the professor and for the teaching experience in general. I have started... I decided to try it. I tried it in 4th semester and also for the spring semester. That was kind of inspiration for that. I wanted to make a change especially with the COVID-19 situation and distant learning. I wanted to try to improve my method of teaching and expose students to a different learning experience."

IQ.2: How would you describe your own learning journey regarding the use of videos as the pre-class material? Were you comfortable with making the videos and more importantly did you learn new tools while making these videos?

Instructor:

"Yes, of course! I used two types of tools. First, the power point presentation where I record lectures audio and videos so… I record the presentation and I also record my image… myself speaking. I put this small window where I talk at the corner of the page so that the students can see me talking. Also, I also used YouTube. I created a YouTube channel.

Let me first talk about the presentation. Yes, it took me a while. The first few ones were really exhausting. Then I figured out that I should write a scenario. I normally don't state only what is mentioned in the slide. So I don't read the slides. I try to keep whatever is in the slide for the students to study. I try to speak more about the details. So I wrote a script for each slide. I started

to write down what I want to say about each slide. That helped me a lot to decrease the amount of time required to record each slide because when you have the script you can… I can read it like we are talking right now. Imagine what I am saying is a script. I am reading it. It saves time. It makes me more confident. My voice tone can increase or decrease when I want. So I know exactly when to make stops, comments whatever… so it is kind of exactly like movie scripts. Then I came up with after three or four lectures or three or four recordings when I found that I have to repeat the recording because I didn't like what I said. So it was time consuming. I found that if I spend the time preparing a script that will save me the time of recording over and over again.

For the YouTube channel, I saw a seminar a long time ago. I remember it was a faculty member in the School of Medicine. He gave us a lecture about creating a YouTube channel. I never thought to do it. It was in this situation, I also wanted to learn Flipped Learning. So I went back to my notes. Saw how he created the channel, what is required and I saw some videos on YouTube… how to create a YouTube channel. And then I did it. I used the videos I recorded in presentations. I improved the quality a little bit like the audio quality, resolution and stuff. I posted on the YouTube channel trying to use the option that only students can use it. It is not open to the public. It is only released on my confirmation… whoever I allow to watch. Not everyone can watch it."

IQ.3: In addition to the videos and PowerPoint presentations, were you using any other instructional material, for example: videos that are posted by other instructors as supplementary information?

Instructor:

"Well, yes. Actually, for that particular course I was lucky. One of my older students has shared with me videos. This course is about cosmetics about how to prepare them, not how to use them. We are concerned with preparation of medicines and cosmetics in my department. He shared with me episodes from the series that was concerned about cosmetics formulation. It was a video from a TV series not like a documentary. It talked about what is included in our cosmetics generally speaking and how it is formulated and what can be toxic out of this. So I used to show them to the students and it contains a lot of information about cosmetics. The female students found it very interesting. They cleared out a lot of misconceptions and myths about cosmetics. I used to use those videos in addition to some videos that we prepared in the department about the preparation itself of a cream or a gel, whatever the kinds of foams of the cosmetics…that are present in the

market just to show them how you can prepare a cream or… these things they have studied in previous courses so now they have videos for it and they are using their previous knowledge and now learning new knowledge according to that."

IQ. 4: What are the different kinds of learning activities and strategies that you use within the classroom to increase learning engagement?

Instructor:

"Okay, so I use the Flipped classroom during online distance learning. The model that I have learned during that course I was talking about last summer was more for in-class learning. So I try to adapt what I learn from the current situation until we resolve the situation and go back to class.

The most important problem in online learning is typically the lack of student engagement. You are sitting behind the screen. Most of the students do not open their cameras. They don't even want to speak on audio. They only want to send text. I wanted to make sure that at least most of my students engage in the course. So what I try to do is use a few strategies:

Number One: I use polls during the lecture and use discussion, meaning that I open a question or give them an open question, maybe something that is debatable for them. To tell you the truth I told them "I am not going to read the text. I want to hear your voice. So if you have something to say, raise your hand, hear your voice, I want to know who is participating.**"** Basically, they thought that I am going to grade them for that but the whole thing was not for grading. It was for me just to keep them engaged. So I can actually say that it served well. Everyone tried participating to some extent.

Number Two: At the end of each class, I use Socrative™, which is a website to put some quizzes for them just to make sure that they grasp the idea either from the videos that they saw before the lecture or the discussion during the lecture. I try to make the lecture on purpose, not for explanation again, basically.. I won't give the lectures again. I just want to make sure that I only discuss the major important points so that to make sure that the student doesn't have the tendency …if you start to explain during the lecture again they will have the tendency not to watch the videos in the future. Doctor will say the same things during the lecture. Why should I spend time watching the video? So I make it more of a discussion and ask them specific questions about the videos or the lecture that they already saw. I try to keep them engaged.

To answer the question you asked about the group. No, I couldn't make them as a group during the online session. It was more of an individual but my class was already a small group because I only had 17 students in the class. I couldn't make it as a group because that was not possible using the Blackboard Collaborate™ but I think it was successful even as an individual because I was able to keep them engaged and participate.

In addition to that, I use what you call online discussion. That's a Blackboard™ forum just to put some questions for us to discuss online during one week. I give them one week to give me an answer and also comment on each other's answers. And I give them regular assignments to help them to apply what they learn in the classroom. I think all this is in addition to flipped learning."

Moderator Comment: Actually, from the responses I received from the students, they were very very impressed with it. In fact, considering the point you said about not grading them, this was one of the points that was raised that if it was graded we may not have liked it but the fact that you created the environment so engaging we actually enjoyed.

Instructor:

"Well, what helped me in that course was that it is a very special topic meaning that the student who enrolled in this course already chose it. It was not imposed on them through the curriculum. So they have two or three alternatives in the school. They pick up whatever they want.

So, in the first lecture I told them that if you are in this course for anything other than the fact that you like it, you have other alternatives ...but I want you to get engaged. I want you to benefit from the course. I want you to have a nice experience. Even for me this course is different from other courses that I teach. I teach two undergraduate courses and two post graduate courses each semester. So this is a special course as it is a special topic, and I always try to make it more enjoyable to the students. I always say this to them that if you are not interested in the course, I don't think you will like it. I would like you to engage, to talk. I want them to learn the skill of debating, presenting, and never be afraid of expressing their ideas, and also that nothing is wrong when you talk in the class. That is why I found that it was a good approach to selectively start a flipped approach in this particular course for me."

Moderator: Thank you for this detailed response. Now comes the next Question.

IQ. 5: What do you think has been your biggest success in this approach, from this change?

Instructor:

“Okay. I will tell you the biggest success from my side and from the student’s side.

From my side, I definitely got more interaction with the students. In a typical lecture based course, I spend a lot of time in the class just explaining lectures, so it was one direction communication. However in this course with the flipped approach, this part is already seen by the students before the lecture so I can interact more even with online learning. I know the names of the students - I can tell you out of 17 students who are really interested in the lecture - who attends - and who pays attention - who watches the videos even before the lecture. I can even tell you who is going to answer me. That’s a lot of detail, and I think I knew them better, even if it was an online lecture. If the lecture was done during the in-class session, I would be spending most of the lecture just giving them the lecture and maybe at the end of the lecture I tick two or three lesson objectives. I barely noticed who is interested or who is enjoying the material or not. However, keeping the time for the discussion gave me a lot of perspective from the student’s side, such as what they see in cosmetics formulation and what they experienced using cosmetics formulation. For example, they are mostly teenagers who frequently use anti-acne products and they give me a lot of nice feedback that was not included in the lecture about the side effects and they know and what they don’t know. I was like a teengaer decades ago (*laughs*) and the products that were available in the market in the 90s are not the same as now. So they gave me a nice feedback about things that I actually intend to include in the lectures later for the following semester. So actually … this time for discussion and interaction would not be available if the traditional lecture-based teaching method is used during the in-class session.

From the side of the student, the feedback that I get is that “Doctor we are more prepared for any exam or any assessment than the normal method of teaching.” The reason for that is… I am talking about those who follow the flipped learning meaning watching the lecture and attending the discussion because now they got the idea twice before studying or before starting to study or memorizing or whatever method they want to use. So they have a very good explanation and overview of the material, even before starting to study it. Just watching the video… so that is one thing. This is like attending the lecture. And the discussion will enforce it into their minds maybe. So, they found that things that weren’t clear are better. I think it just created more time for us to interact and grasp material better. That helped them in passing the assessment better. I can see that

in their grades. I am having a hard time giving someone a C. And they do get good grades. What can I do about that?"

IQ.6: What have been some of the challenges you faced in the Flipped Learning approach?

Instructor:

"Well, there were frequent incidents where students did not watch the video before coming to the classroom and I am sure that not 100 percent will see the video. This is the most annoying part of the whole thing, as the approach requires a level where you as an instructor want to explain more information based on the video, yet students did not make the effort to see that video. I will tell you what… every week I have a couple of lectures. At least to one of them I always have to stress on watching the videos but I also understand that the student might have a quiz, might have an exam or something that makes them not watch the videos on time. Although I posted the videos way before, I tell them you can watch them any time. You don't have to watch them right before the lecture time. So what I do I always try to stress on this point. As I said I try to make a poll or at least at the beginning of the lecture I try to ask general questions to know where everyone in the class stands. For example, today we were talking about anti-aging products. My question was what do you think about the anti-aging products I talked about in the lecture? So this is a very general question. What do you remember? Can you give me an example? This is before you start the lecture. This way I know who knows and who doesn't and sometimes I ask randomly and sometimes I let them ask. When I find that some people are not participating, I start to ask randomly, choose any name and ask. Once they tell me I didn't see the lecture, I ask them to promise me to see the next one. Of course, it takes time. I know that everyone is stressed. Maybe if it was an in class lecture I would have acted differently but again …at least I am an approachable person for them. So they know … I try to make it… I don't want to force it but I want to make them want to do it. That's what I am trying to do here."

IQ. 7: In terms of the improvement that you are seeing, What are your next steps if you would like to consider this approach for the next term?

Instructor:

"Well, first I will try to include a couple of courses to make them flip… I will try to improve the quality of the videos and the…most importantly I will try to find out depending on the situation next semester if it is in-class or online but I will try to find more methods to engage students during

the class, to make them engage more, to make them participate more in the discussion and I was thinking of doing an early assessment every lecture… just a quick assessment. It doesn't have to be graded but it makes me measure where the students again are in terms of the material. Sometimes you need to know what the background is like where to start because some students are more ahead than others? Some students really know cosmetics formulation because they read a lot and others barely know anything. At first I thought it was male and female, for example females are more interested but I had a lot of male students this semester who are very knowledgeable about cosmetics.

Even things that I didn't know like eyeliner for example or makeup or I am not talking about things like toothpaste or things that are commonly used by everyone. Nah! I am talking about female cosmetics that males are actually knowledgeable about. So I think I will try to find a way to improve what we call the basics, where we stand at the beginning of each lecture in order to be able to build up and try to narrow the gaps between the students in the whole learning experience."

Appendix 9: Thematic Analysis for Students Responses

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
Student 4	I end up watching the video just before the class, not beforehand. For example, I can watch the video comfortably, only if I don't have a quiz or exam on that day, because it does take time to watch the whole video.	Self-paced learning	Flexibility in Class Preparedness
Student 1	So for our Monday and Wednesday in-class sessions, if the instructor uploaded the video on a Wednesday/Thursday, we had typically 4-5 days, where we needed to only find the time to watch the video before the next in-class session, and we needed like maximum 60 minutes to sit and watch the videos, and you can even like fast-track through them to get all the important points. So that was a lot easier than if I were to have to watch a 150 minute video, even if I had to watch it in 4 days.	Timely Availability of Instructional Resources	
Student 3	I feel it's a great experience, since we had a full image of the lecture, and we just discussed the materials so I feel it was stuck in my mind. So when I remember it easily when I study. The video had all the necessary details and was easy to understand. Also, I feel it's great and soo useful to watch	24/7 Access	

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
	the videos before the quiz and exam, and you can even remember the instructors voice during the exam itself.		
Student 4	Also, I can watch the video before the quiz, but in case I have other quizzes/midterms going on, I don't have the time to watch it. In fact most of the time I'm unable to catch up, so I end up watching the video just before the class, not beforehand.	Time-Management	
Student 1	The videos are very very clear because it would be a very detailed explanation of the whole topic, and it was not that lengthy as well.	Clear and Detailed Content	Enhanced Quality of Learning Resources
Student 2	The teaching materials were clear and just amazing, especially the videos. I was able to catch the information and keep it in my mind.		
Student 3	The video had all the necessary details and was easy to understand.		
Student 4	The content was clear and it was actually very useful..		
Student 5	I thought it was very clear and very helpful, because normally I don't like to write notes.		
Student 6	I found it very informative and helpful, like everyone else said…. I enjoyed the video		

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
	lectures a lot		
Student 7	I really like it. I think he explains everything in detail And he clarifies everything.		
Student 1	So, If I could spare an hour before the upcoming lecture it was good enough. Also since it was a video format, I could speed through the video before the discussion in the in-class session, to speed up and remember what I have studied. Overall the material itself was helpful, and the purpose was very good indeed.	Speed-watching of Long Videos	
Student 7	A nice thing about recorded lectures is that you can speed it up. I used to speed it up by two times so that I would have the time to listen to the whole video in a short duration		
Student 6	The only downfall about it, was for example during the midterm season when I had to listen to the pre-recorded lecture and attend the lecture during the in-class session, and that was kind of like time-consuming for me.	Debates on the length and Quality of Videos	
Student 3	I feel it's a great experience, since we had a full image of the lecture, and we just discussed the materials so I feel it was stuck in my mind. So when I remember it easily		

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
	when I study. The video had all the necessary details and was easy to understand.		
Student 3	I feel it's a great experience, since we had a full image of the lecture, and we just discussed the materials so I feel it was stuck in my mind. So when I remember it easily when I study. The video had all the necessary details and was easy to understand.		
Student 1	Overall the material itself was helpful and the purpose and was very good indeed.	Usefulness	
Student 2	When I listened to the first pre-class videos, I got a lot of information, and then I heard it again in the last class, the information stuck to my mind, so it was very helpful.		
Student 3	Also, I feel it's great and soo useful to watch the videos before the quiz and exam, and you can even remember the instructors voice during the exam itself.		
Student 4	It was actually very useful...instead of listening to the materials for the first time in class, we would already be having a background about the information, which was soo helpful."		
Student 5	I thought it was very clear and very helpful, because normally I don't like to write notes.		

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
Student 6	I found it very informative and helpful, like everyone else said…. I enjoyed the video lectures a lot		
Student 1	I found that the discussion itself was not just a brief discussion about the video lecture. The discussion was enriched with other details in a way that I would be getting the entire lesson explained in a way over like.. two lectures.	Quality of Discussions	Discussions, Interactions and Group Work
Student 2	But in this approach, studying beforehand or watching the material before the lecture, we- the students- will be having our discussions with each other and the instructor, and everyone will have something to add.		
Student 3	I agree with student 1 and Student 2. The class discussions were very helpful.T		
Student 4	The discussions are helpful, but it got stressful to watch the videos sometimes when we were very busy with other tasks.		
Student 5	Yes, the discussion is good, but the only thing about this is that sometimes it is stressful. Sometimes we didn't watch the video due to us being busy with some other work. In that scenario, when we were prompted to attend a sudden quiz in class with no class preparation, it got stressful.		

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
Student 6	In my opinion it was a very beneficial and informative way of giving us information.		
Student 7	The discussions were very nice.		
Student 2	But in this approach, studying beforehand or watching the material before the lecture, we- the students- will be having our discussions with each other and the instructor, and everyone will have something to add. None will just sit there without knowing what happened. Everyone will be participating	Learning through Peer Interaction	
Student 2	But in this approach, studying beforehand or watching the material before the lecture, we- the students- will be having our discussions with each other and the instructor, and everyone will have something to add. None will just sit there without knowing what happened. Everyone will be participating	Learning through Instructor Interaction and Feedback	
Student 7	Maybe there could be some chances for team projects or some teamwork that would be nice, and it would also allow us to interact with our colleagues.	A greater need for enhanced collaborative learning strategies	
Student 1	I found that the discussion itself was not just a brief discussion about the video lecture. The discussion was enriched with other details in a way that I would be getting the	Enhanced Comprehension of Knowledge	Meaningful and Deep Learning

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
	entire lesson explained in a way over like.. two lectures.		
Student 4	I made attempts to get at least a general idea, and that itself helped me during the class because the instructor explained the concept further and I could then understand it better during the class time		
Student 7	When I come to the class, I am familiar with everything I am about to hear. Also in the typical one-way lecture based courses, we are supposed to study after the lecture anyway To understand and lock the information in our brain. but now it's the opposite now I have to Learn it on my own and then revise everything together with everyone in the classroom. I feel I don't have to review the whole information again until there is a quiz or a mid-term		
Student 4	Our instructor encouraged us to watch the videos before coming to class but did not force it on us. When watching the videos, I made attempts to get at least a general idea, and that itself helped me during the class because the instructor explained the concept further and I could then understand it better during the class time.		

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
Student 1	...So it was actually difficult for me to forget anything. After all of that, if I do forget, it would be all my fault. Also, it's not just good that the information sticks in my head. Basically you have two sources of acquiring the information, so it's a lot more difficult to drop something out.	Deep Learning	
Student 7	here in the discussions, students were coming prepared with the questions and it was to a point where the students were opening up the space for more questions and understanding the information more and they were now seeking to apply it in different contexts.		
Student 3	In this case that deeper understanding happened in class so I just had to be attentive and that wasn't soo difficult because I was already understanding what was being discussed.		
Student 2	it helped us a lot especially because hearing the information twice or thrice is better than hearing it once.		
Student 5	Well.. it is slightly overwhelming but I believe that I am able to learn material in a much better way than the usual lecture based courses.		

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
Student 6	I felt I was able to increase my own critical thinking in this course and kind of engage in a much better way with the learning in this course.		
Student 5	In addition to engagement, I feel my own academic performance became better because I was able to think beyond the basic concepts.		
Student 4	I feel that in this course I was able to practice critical thinking in a better way.		
Student 3	I feel that I can prepare some questions to ask during the discussion so I can get extra information, or I can think beyond this, so this is like good for me.		
Stud1nt 1	I feel that during the discussion session itself in the class sessions, I feel like my mind is far more engaged than when I'm only receiving information. I feel like I'm already thinking about the next point the instructor would be about to say. It's more like a rehearsal than just being there to learn about the concept from the beginning. It's good for revising the information which I already watched before.	Relate new concepts with previous knowledge	
Student 7	I was very interested in the whole course, so I was very motivated to research on my	Self-Motivation	Autonomy and Agency

Student	Extracted Verbatim Text (Raw Data)	Codes	Themes
	own. Maybe in other courses, I wouldn’t be as motivated, because I wouldn't be as interested.		
Student 1	I felt more responsible of course, and it also increased my independence in learning on my own.	Self-reliance on Learning (Autonomy)	
Student 2	It was a responsibility to watch all the videos so that you have a good background before coming to class.		
Student 3	I kind of enjoy the independent learning I did in this course because it wasn’t the usual way where I would be doing it after the class		
Student 5	Well.. it is slightly overwhelming but I believe that I am able to learn material in a much better way than the usual lecture based courses.		
Student 6	Yes it's a responsibility, but I felt good participating in the class discussions if I had gone through the pre-class materials on time		
Student 7	“It was a responsibility, but it wasn't overwhelming.”		

Appendix 10: Thematic Analysis for Instructor Responses

Extracted Verbatim Text	**Extracted Codes**	**Themes**
Let me first talk about the presentation. Yes, it took me a while. The first few ones were really exhausting. I try to keep whatever is in the slide for the students to study..	Learning Curve with adoption of several tools to enhance videos.	Experience with technology and EdTech resources
I used the videos I recorded in presentations. I improved the quality a little bit like the audio quality, resolution and stuff. I posted on the YouTube channel trying to use the option that only students can use it.	Knowledge gained about softwares and audio/visual settings for the pre-recorded videos	
So I wrote a script for each slide. I started to write down what I want to say about each slide. That helped me a lot to decrease the amount of time required to record each slide because when you have the script you can… I can read it like we are talking right now	Familiarity with preparing scripts for better videos and enhanced learner understanding.	
, I definitely got more interaction with the students. In a typical lecture based course, I spend a lot of time in the class just explaining lectures, so it was one direction	Instructor Interaction	Interaction & Feedback

Extracted Verbatim Text	Extracted Codes	Themes
communication. However in this course with the flipped approach, this part is already seen by the students before the lecture so I can interact more even with online learning.		
hat's a Blackboard™ forum just to put some questions for us to discuss online during one week. I give them one week to give me an answer and also comment on each other's answers. And I give them regular assignments to help them to apply what they learn in the classroom. I think all this is in addition to flipped learning.	Use of Discussion Boards	
No, I couldn't make them as a group during the online session. It was more of an individual but my class was already a small group because I only had 17 students in the class. I couldn't make it as a group because that was not possible using the Blackboard Collaborate™ but I think it was successful even as an individual because I was able to keep them engaged and participate.	A need for enhanced collaborative learning strategies	

Extracted Verbatim Text	Extracted Codes	Themes
I use polls during the lecture and use discussion, meaning that I open a question or give them an open question, maybe something that is debatable for them. To tell you the truth I told them "I am not going to read the text. I want to hear your voice. So if you have something to say, raise your hand, hear your voice, I want to know who is participating."	Use of Polls	Assessment of learner understanding
At the end of each class, I use Socrative™, which is a website to put some quizzes for them just to make sure that they grasp the idea either from the videos that they saw before the lecture or the discussion during the lecture.	Use of Socrative website	
I was thinking of doing an early assessment every lecture… just a quick assessment. It doesn't have to be graded but it makes me measure where the students again are in terms of the material. Sometimes you need to know what the background is like where to start because some students are more ahead than others?	A need for more in-class assessment strategies before the session starts	

Extracted Verbatim Text	Extracted Codes	Themes
This is the most annoying part of the whole thing, as the approach requires a level where you as an instructor wants to explain more information based on the video, yet students did not make the effort to see that video. I will tell you what… every week I have a couple of lectures. At least to one of them I always have to stress on watching the videos but I also understand that the student might have a quiz, might have an exam or something that makes them not watch the videos on time. Although I posted the videos way before, I tell them you can watch them any time. You don't have to watch them right before the lecture time. So what I do I always try to stress on this point.	Time-Management Issue for Students	Class Preparedness