

**THE IMPACT OF FLIPPING THE CLASSROOM IN AN UNDERGRADUATE
ENGLISH COURSE ON STUDENT TEST ANXIETY: A MIXED-METHODS
APPROACH ON A CASE STUDY**

""""A Thesis
"
""""presented to
""
" the Faculty of Humanities
"
" at Notre Dame University-Louaize

In Partial Fulfilment
of the Requirements for the Degree
Master of Arts in Education – School Management and Educational Leadership

by
STEPHANIE-JOY FIKANY

JULY 2019

.....

© **COPYRIGHT**
By
Stephanie-Joy Fikany
2019
All Rights Reserved

IMPACT OF THE FLIPPED CLASSROOM ON TEST ANXIETY

Thesis Signature Page

THE IMPACT OF FLIPPING THE CLASSROOM IN AN UNDERGRADUATE
ENGLISH COURSE ON STUDENT TEST ANXIETY: A MIXED-METHODS
APPROACH ON A CASE STUDY.

A Thesis
Submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Education – School Management and Educational Leadership

by

Stephanie-Joy Fikany

Department of Psychology, Education, and Physical Education
Notre Dame University – Louaize
Lebanon

Spring, 2019

Thesis Committee:

<i>Name</i>	<i>Signature of Approval</i>	<i>Date</i>
<i>Maha Mouchantaf, Ass. Prof.</i> Thesis Advisor, Academic Title		<i>July 10, 2019</i>
<i>Ft. Joseph Tamous, Ass. Prof.</i> 1 st Reader, Academic Title		<i>July 10, 2019</i>
<i>Harvey Oueijan, Ass. Prof.</i> 2 nd Reader, Academic Title		<i>July 10, 2019</i>

Abstract

Many students experience anxiety before an assessment: It can either be a normal feeling before any kind of assessment, also called performance anxiety, or it can be due to unpreparedness before an assessment. The flipped classroom methodology was introduced to 20 students enrolled in an English in the workplace course (ENL230) at Notre Dame University in Louaize Lebanon (NDU), for two modules in an attempt to reduce their unpreparedness anxiety before an assigned assessment. The flipped classroom requires students to cover the new material outside of class, and to practice it in class with the help of their teacher and peers. This study was based on a concurrent mixed method design. It was hypothesized that the test anxiety levels of students after flipping the classroom would be lower than their test anxiety levels before flipping the classroom. The results gathered by observations, participation forms, questionnaires and a focus group interview; compared between 2 non flipped and 2 flipped chapters; showed that most students were experiencing performance anxiety, and that the ones experiencing unpreparedness anxiety were less anxious after the adoption of the flipped classroom methodology. This methodology targeted the timing and content comprehension aspects of the unpreparedness anxiety. In addition, the research question explored: “did the flipped classroom methodology help students be more confident in their studies?” was affirmed by the results of the instruments used. Furthermore, it was observed that the test anxiety levels of the students enrolled in scientific majors (representing 47.34% of the sample) were less affected by the flipped classroom methodology than the students enrolled in non-scientific majors. Therefore when disregarding the results of the students

enrolled in the faculty of natural and applied sciences, the flipped classroom methodology successfully decreased the unpreparedness anxiety by 60%.

Acknowledgments

I would like to express my sincere gratitude to my thesis advisor Dr. Maha Mouchantaf for her continuous support, patience, guidance and motivation in my masters thesis. The door to her office was always opened whenever I needed her help, and she always found convenient ways to overcome all the difficulties that were presented and consistently facilitated every step of the study. She allowed this paper to be my own work without any interference and supported my vision of the study. She encouraged me not to procrastinate while understanding my busy work schedule.

In addition to my thesis advisor, I would like to state my appreciation to the rest of my thesis committee: Father Joseph Tannous and Dr. Harvey Oueijan, who accepted the difficult task of overviewing and correcting my thesis in a short restricted time, and whose insights helped me better my work.

I would also like to extend my appreciation to the dean of the humanities faculty at Notre Dame University – Louaize, Dr. Kamal Abouchedid for allowing me to perform my research in his faculty and trusting that I would be ethical in my study. Dr. Abouchedid and Dr. Mouchantaf had a large impact on my development as an education student and always encouraged me to use my scientific background in synergy with my education studies.

Finally, I wish to thank my family for their continuous encouragement, support and understanding especially when I required a quiet environment during my studies.

Table of Contents

Thesis Signature Page.....	iii
Abstract.....	iv
Acknowledgments.....	vi
Chapter 1: Introduction.....	1
Statement of the problem.....	1
Purpose of the study.....	3
Statement of the hypothesis and research question.....	4
Definition of terms.....	4
Chapter 2: Review of Related Literature.....	11
The Flipped Classroom.....	11
What is it?.....	11
The theories behind it.....	13
How it came to be.....	17
The four pillars of the flipped education.....	19
Its benefits.....	20
Its Challenges.....	22
International and local studies.....	23
Conclusion.....	25
Chapter 3: Method.....	27
Context of the University.....	27
Participants.....	28
Instruments and Data analysis.....	28
Design.....	34
Procedure.....	34
Ethics.....	35
Chapter 4: Results and Analysis.....	37
Information gathered by the participation forms.....	37
Class observations.....	39
Questionnaires 1 and 2.....	40
Focus-group interview.....	46
Chapter 5: Discussion.....	49
Limitations.....	49
Recommendations.....	52

Conclusion and Future Studies	54
Conclusion	54
References.....	58
Appendix A: Participation Consent Form.....	68
Appendix B: Questionnaire 1.....	70
Appendix C: Questionnaire 2.....	71
Appendix E: Focus Group Interview Questions	73

Chapter 1: Introduction

Statement of the problem

In Lebanon, as well as in many other countries, students are pressured to perform well on tests. The culture of competition and excellence pressures students throughout their school and university years, and high levels of anxiety are reported (Saigh & Antoun, 1984). It is not uncommon to walk past anxious students preparing to enter for their assessment. According to Nolting (2000), there are five causes for test anxiety: “test anxiety is a learned behavior; the association of grades and personal worth causes test anxiety; test anxiety can come from a feeling of lack of control; test anxiety can be caused by a teacher embarrassing a student; being placed into a course above your ability can cause test anxiety; test anxiety develops from fear of alienation from parents, family and friends due to poor grades; test anxiety can be caused by timed tests and the fear of not finishing the test even if one can do all the problems”. According to Sarason and Mandler (1952), anxiety impacts test performance: cognitive interference (thoughts that impede performance (Sarason, Sarason, Pierce (1995)), which is related to test anxiety, lowers the performance of individuals with high levels of anxiety. Nolting (2000) pointed out that when this anxiety level got high, it pushed students to leave the test room as soon as they finished filling in their answers and without double-checking them, which had a negative impact on their test scores.

On a personal level, I have always been a good student in most of the school subjects except mathematics. I became anxious not only before an assessment but at every mathematics period. When it came to assessments, I always found a way to get the

average passing grade by working the grading system, or “playing the school” by meeting enough of the requirements of the grading rubrics to pass. I started facing these difficulties in grade 9 due to the pressure emanating from the official Brevet exams, and because I could not follow my mathematics teacher’s rhythm in class. I would copy every answer off the board without understanding the concepts, then go home with a dozen of exercises to solve. I had difficulties replicating the solving strategies the teacher used in class, and I did not have a tutor to help me at home. According to Borg and Shapiro (1996) the incompatibility of an instructor’s teaching style and a learner’s learning style may cause less learning and also a reduction of interest in the subject matter. And that was my case: My dislike of mathematics impeded my learning in the following years and my difficulties kept piling up and created a snowball effect that I dragged with me till graduation.

As a university student majoring in biology, I had to take physics and chemistry classes which dealt with mathematical equations. Even though I had a better comprehension of the information taught, I still felt anxious before assessments that required mathematical skills. On the other hand, I developed a great interest in the biology and education material which motivated me to study ahead of time mostly through the internet: I searched for deeper explanations or re-explanations of difficult biological concepts taught in class and, by chance, discovered Khan Academy website (<https://www.khanacademy.org/>) which is a virtual class where an instructor would teach any subject matter on a virtual board. This instructor would tape himself explaining different concepts in different ways. It simulated being in class but provided the ability to choose the timing, pause, rewind, and fast forward the parts of the explanation which

helped me in the mastery of topics. I shared this website with my classmates who loved and benefited from the new way of studying and started feeling more confident in class discussions, had a better understanding of the information, and some even became less anxious before assessments (aspects pertinent to this study).

I was later on introduced in my educational studies to the flipped classroom methodology which used a similar approach of teaching and learning to the one I had used through Khan Academy. I therefore found it important to introduce through this study this methodology to other students who had similar difficulties to mine.

Purpose of the study

Seeing that test anxiety is a common problem for many students, and that the flipped classroom methodology was able to help reduce this anxiety on a personal level and in an informal observation during my undergraduate studies, I was interested in studying and confirming the link between the flipped classroom and test anxiety.

After doing a research on that topic, it was found that many international studies have been targeting the effect of the flipped classroom on student achievement (Saunders, 2014), student engagement (Lage, Platt & Treglia, 2000), and their perceptions of the flipped classroom (Johnson, 2013). However, no study was made to assess the impact of this methodology on students' test anxiety levels.

Therefore, the purpose of this research was to examine whether using the flipped classroom methodology for a couple of chapters helped reduce students' test anxiety after these chapters. This study also aimed at shedding the light on the benefits of using the flipped classroom at a university level.

Even though the flipped classroom can be used at a school level, I have chosen to pursue this research at a university level in order to back up my personal experience with the flipped classroom that occurred during my undergraduate studies. However, I have chosen an English elective course instead of a biology course because I found it interesting to see the effect of the flipped methodology on students from different backgrounds and not only for biology majors. My familiarity to the topic helped me put myself in the participant's shoes and aided me in anticipating difficulties and limitations.

Statement of the hypothesis and research question

This study was based on both quantitative and qualitative methods which results were analyzed concurrently throughout the study in order to validate each other.

For the quantitative method, it was hypothesized that:

Hypothesis: The test anxiety levels of students after flipping the classroom would be lower than their test anxiety levels before flipping the classroom.

For the qualitative method, the research question explored was:

Research question: Did the flipped classroom methodology help students be more confident in their studies?

Definition of terms

This research is based on two main concepts: the flipped classroom methodology, and test anxiety. It is therefore important to understand what each of these terms refer to in this study.

In order to understand what the flipped classroom is, the concepts of E-learning, distance education, blended learning, flipped classroom and traditional education are reviewed.

E-learning:

Also called blended learning; E-learning relies on educational tools that are accessible online, and/or uses any kind of technology support (touch screens, pads, videos, online tools...) to assist teaching and learning (Yang & Dong, 2017). These can be accessed from within the educational institution during the normal class period with the help and interference of peers and instructors, or from outside the educational institution (Layton, 2017). E-learning is not a new concept. “First technologies such as film and radio were added to the teacher’s toolbox”, and approaching the end of the last century, and with the outburst of new technologies, digital tools heaved into the educational scene (Underwood, 2014, pp.3-14).

Distance education:

Distance education, also known as distance learning, is characterized by its geography. Students and teachers are in different locations at all times. In-person interactions are absent. In order to learn and connect with their peers and instructors, students often resort to using technology (thus e-learning) (Contributor, 2017). This is a

broad definition of the concept due to the fact that it has undergone many iterations that theorists still disagree on its defining characteristics (Adams, 2016).

According to Adams (2016), the most agreed upon definition of distance learning was given by Desmond Keegan and is based on 6 features : “(1) separation of the teacher and learner, (2) organization and support services from an educational institution, (3) the use of technical media to provide educational content, (4) the provision of two-way communication so students can benefit from and optimally initiate dialogue, (5) the potential for student-to-student interaction, and (6) the “industrialization” of education, which provides economies of scale.” (Adams, 2016).

The first generation of distance learning, called the correspondence generation, started by mail correspondence between the instructors and their students via post. The later generations relied on the multimedia technologies.

Blended learning:

Whittaker (2013) defines blended learning as “the term most commonly used to refer to any combination of face-to-face teaching with computer technology (online and offline activities/materials)”. The instructor would give online material to help students broaden their understanding, or to use this material in order to complete an assigned project. The online material do not replace the primary face-to-face instructions, they both occur synchronously in a way to complement each other (Pappas, 2016).

Flipped Classroom:

The flipped classroom, also known as flipped learning or inverted classroom, is a student-centered teaching methodology that is based on switching between the work done

in class and the work done at home: it delivers the instructional content online (outside of the classroom), and the homework (activities, case studies, problem solving, group work...) is done later in class (Brame, 2013). Mainly, this methodology is based on getting the students familiar with the new concepts outside of class using different instruments, in order to provide more in-class time to work on their skills with the help of their instructor (Ouda & Khadri, 2016). According to Ouda and Khadri (2016) "The flipped education includes any kind of exploitation of internet technology to leverage the learning in a classroom, so that a teacher can devote more time interacting and communicating with students rather than teaching" (p.417). Fulton (2012) claimed that flipping the classroom allowed the instructors to better perceive students' difficulties and learning styles.

Therefore, by its use of technology tools outside of the classroom, the flipped methodology integrates certain aspects of the E-learning and distance education by having the students learn the content outside of the classroom.

The flipped classroom differs from blended learning by the fact that the e-learning and the face-to-face instructions do not occur in a blended way. This approach is more clear-cut: the e-learning takes place initially to introduce the new material, and then the face-to-face instructions follow during class time (Pappas, 2016).

In this study, the flipped classroom methodology is compared to the traditional education methods in regard to their effect on student test anxiety.

Traditional Education:

Traditional education takes place in a traditional classroom where students are seated behind their desks and books following a teacher-centered system of education where the teacher delivers the instructions (sage on the stage) and the students passively receive the information (Huson, 2017). Students are given practice and memorization exercises to do at home as homework. Sometimes this kind of education uses group work in class or as a project given at home. After spending time on the passive delivery of the content, teachers use the minimal class time left to respond to students’ questions and to work on some exercises and practices.

The main differences between the traditional classroom (instructor-centered approach) and the flipped classroom (student-centered approach) are summarized in

Table 1:

General Example Comparing Two Approaches

	Instructor-Centered Approach	Student-Centered Approach (Flipped Class)
Before Class	Students work on homework connected to previous week's lecture.	Students are guided through new learning material that asks questions, provides immediate feedback, and collects questions in preparation for in-class activity.
	Instructor prepares new lecture.	Instructor reviews results of student work & prepares learning opportunities.
Start of Class	Students have limited knowledge about new lecture content or what to expect.	Students use their personally prepared questions to guide their own learning and take responsibility for it.
	Instructor has limited knowledge of student prior knowledge and thus makes assumptions about their needs.	Instructor uses student questions to address student specific needs.
During Class	Students listen, watch, take notes, and try to follow along.	Students practice applying the skills expected of them to learn.
	Instructor lectures new instructional material.	Instructor guides the educational process with feedback and provides short demonstrations or mini-lectures to clarify material when required.
After Class	Students work independently to assimilate lecture material (i.e.: homework), usually with delayed feedback.	Students continue applying knowledge and skills to more complex tasks. Students work individually or in small groups to solve problems or collaborate on projects.
	Instructor grades past homework.	Instructor posts any additional resources to help students.
Office Hours	Students grapple over what to study and request confirmation.	Students have the information about their learning progress and know where to seek help based on their analytics.
	Instructor repeats lecture content.	Instructor personalizes student learning by addressing a student's gap.

Table 1: General comparison between traditional and flipped classrooms (Sauk Valley Community College, N.A.).

These differences show that students are more actively involved in the learning process before, during, and after class when following the flipped classroom methodology, compared to the traditional classroom. On the other hand, teachers clearly have more preparations to do for a flipped classroom. Two main benefits of the flipped classroom are apparent: active student learning and personalization of the learning process.

Student Test Anxiety:

In order to discuss the effects of the flipped classroom on student test anxiety, we should first define what it means. Test anxiety is used in diverse studies under different definitions:

In psychology, test anxiety is a normal feeling anyone experiences when undergoing some sort of assessment. This kind of anxiety, at moderate levels, helps the person focus on his/her performance. However, when this anxiety reaches high levels, it becomes an impediment to showing the real performance level of the person. People who experience this kind of anxiety, even though they are well prepared for a test, are usually perfectionists, people who stress a lot in their daily lives, or people who give high importance to the results of the assessment. Psychology therefore contrasts between test anxiety and unpreparedness anxiety which is exclusively caused by being not well prepared for the test (Lohmann, 2016; Nolting, 2000; "Understanding & Overcoming Test Anxiety – Resources for Students – Area Mental Health Agencies – The Counseling Center – Minnesota State University, Mankato", 2017).

In order to differentiate between these two types of test anxiety, and to reduce the confusion, the term “performance anxiety”, used by D’Acry (2013) to refer to “test

anxiety”, was used in this study. Therefore, test anxiety was differentiated between “performance anxiety” and “preparedness anxiety”.

Assuredly, the Anxiety and Depression Association of America (2017) refers to test anxiety as a combination of both performance and unpreparedness anxiety with having as its “Causes: Fear of failure [...]; Lack of preparation [...]; Poor test history [...]”.

In this study, when the term “test anxiety” was used, it was to refer to both performance and unpreparedness anxiety experienced by the students before an assessment. Both types were differentiated through the questionnaires.

Chapter 2: Review of Related Literature

The Flipped Classroom

What is it?

The flipped classroom methodology is based on inverting what is done in class with what is done out of class (Crouch & Mazur, 2001; Mazur, 1997). According to Baker (2000), this methodology has been used back in the 1990s by some educators but is becoming popular during this last decade. Recent research on the flipped classroom offer definitions that describe it as a type of blended learning where online learning (E-learning) and in-class learning are mixed (Abeysekera & Dawson 2015). However, the flipped classroom is more than that: It is a student-centered approach where the “students will be meeting a topic for the first time online usually via short and to the point videos, rather than through attending a lecture”.

With the introduction and use of technology in universities, teachers are often uploading their lectures online, and students are finding it more convenient to study at home as a kind of E-learning, and consider attendance optional (Reidsema, Kavanagh, Hadgraft & Smith, 2017). However, Carol Chamoun El Bared, school teacher and instructor at the Universite Saint Joseph Lebanon in the faculty of Education, expert in flipping the classroom and head of the “Inversons La Classe” (let’s flip the classroom) association in Lebanon, claims that flipping a classroom does not have to be restricted to technological instruments. Throughout her experience, and by facing many difficulties in the Lebanese context regarding the poor internet connectivity and the unavailability of personal computers to many of her students, she claims that the information can be

provided to students through their books or by distributing hard copy documents for them to view first-hand at home. The flipped classroom is not based on the use of e-learning, but it is rather based on the first-hand encounter of the information by the students outside of the classroom. She therefore states that the flipped classroom methodology is very adaptive to each situation it is being used in and does not have rigid guidelines.

The flipped classroom transforms the role of the teacher and of the students: The students take responsibility for their learning and become active learners in class; and the teachers are no longer information delivery persons (sage on the stage). “If decades of solid research in the learning sciences have taught us anything, it is that active learning is a more effective method for developing conceptual knowledge and understanding” (Reidsema et al., 2017). The flipped classroom also helps students develop their knowledge and skills by providing more active learning time in-class with the personalized guidance of the teacher through class discussions, problem-solving exercises, inquiry-based activities, group work, etc.

Considering that e-learning is commonly used in the flipped classroom methodology, Bishop and Verleger (2013) divided this methodology into two parts: the direct computer-based individual learning at home, and the interactive learning activities in the classroom. This methodology follows a 6 steps process:

1. Define content scope, learning objectives and instructional strategies in a way to align what is done outside of class with what is done in class.
2. Prepare the instructional content given to students prior to class.
3. Motivate students to cover the material.

4. In class, go through active learning activities that deepen students' understanding.
5. Extend student learning post-class.
6. Have an ongoing evaluation and assessment throughout the whole process.

(Communications, 2019)

www.laclasseninversee.com describes the flipped classroom in a simple but meaningful way: “du Face à Face au Côte à Côte”, meaning: from face-to-face, to side by side.

The theories behind it

Cognitive development:

Piaget's theory of cognitive development (1967) showed that a student is active in the building of his own knowledge in four different stages (sensorimotor, preoperational, concrete and formal). This theory is reflected in the self-regulated learning approach of the flipped classroom where the student becomes an active learner (Berret, 2012). Indeed, instead of being passive receivers of teacher-transmitted information (sponges), students in the flipped classroom context become active learners. They take control of their studies and become responsible for managing the timing and content of their learning. Teachers move from “the sage on the stage” to “the guide on the side” (Rahman, Abdullah, Mohamed, Mohd Zaid & Aris, 2014). Without the student's commitment to become an active learner, the flipped classroom would fail. Consequently, students should be well prepared before adopting this methodology (“En deux mots... - Inversons la Classe”, 2019). Once the students have covered the material outside of class by themselves, the

active learning moves to the in-class discussions and exercises that students work on either by themselves or with their peers, while being guided and helped by their instructor.

Therefore, the cognitive development theory plays an important role in the student-centered flipped classroom methodology.

Social development theory:

In 1978, Lev Vygotsky showed the importance of social interactions in the development of knowledge (social development theory). Rather than having a classroom where the teacher lectures and the students listen, the flipped classroom introduces peer learning, teacher guidance, one-on-one interventions, group work, and class discussions and debates. In a flipped classroom, the teacher is freed from lecturing and more time is given for class activities where the teacher can move around the classroom and interact with the working students to help them with their difficulties. Teachers who flipped their classroom claimed they spent 4 times more average time helping students individually ("En deux mots... - Inversons la Classe", 2019).

Bloom's taxonomy:

Bloom's taxonomy (1956) categorized educational learning objectives and consists of six categories placed in order of complexity (with the lower order thinking skills placed at the bottom of the pyramid): Remember, understand, apply, analyse, evaluate, and create. Traditional teaching targets the bottom two categories (remember; understand)

and reaches the higher categories through homework and assigned projects. In other words, the simple levels are covered in class, while the more complex ones are left for the students to cover on their own. The flipped classroom however covers the remembering and understanding levels outside of class, and focuses on the higher levels in class with the assistance of their instructor (Brame, 2013). The low level cognitive tasks are autonomously done by the students ("En deux mots... - Inversons la Classe", 2019) and the in-class tasks engage students in higher order attributed learning outcomes (Eaton, 2017).

This diagram provides examples and explanations linking the flipped classroom to the different categories of Bloom’s taxonomy:



Flipped Classroom Design Template (Bloom’s Modified Taxonomy)

All learning segments aligned to clear learning outcomes and assessment

Pre-class <i>Understand and Remember</i>	In – Class <i>Apply and Analyse</i>		Post-Class <i>Creating, Evaluating, Reflecting</i>
Identify Key Concepts	Apply Key Concepts	Analyse Key Concepts	Assessing higher order synthesis of Key Concepts
Purpose: <ul style="list-style-type: none"> Define key concepts Identify relevance of topic Shift the workload from in class to pre class Embed Interactivity/checkpoints for student feedback Review and analyse student responses to checkpoints 	Purpose: <ul style="list-style-type: none"> Clarify pre-class responses Address any salient areas where pre-class activity was not clear Provide teacher and peer feedback to the pre-class responses Work through Instructor guided examples on ‘real world’ applications Highlight relevance 	Purpose: Students <ul style="list-style-type: none"> Workshop authentic tasks in a real world or simulated context. Actively learn in a safe space Provide and receive peer to peer and student to teacher feedback prepare students for assessment Explicitly identify relevance to authentic applications 	Purpose: Students <ul style="list-style-type: none"> apply key concepts to new situations within broader and more complex contexts Receive feedback on performance from peers and teacher Provide opportunity for students to reflect on further learning needs and devise improvement strategies
Examples of activities to embed interactive checkpoints in: <ul style="list-style-type: none"> Short Reading Narrated PowerPoint Short lecture recording 7-10 min Audio/Video Articulate/Adobe Presenter (Interactive Learning Module) Discussion Board/Chat room 	Examples: <ul style="list-style-type: none"> Case study/real life worked exemplars Team Based Learning (Assurance Testing) In class voting e.g., Plickers Simulation activities with instructor providing debrief 	Examples: Real-world examples including: <ul style="list-style-type: none"> Case studies Student demonstration/ presentations Tutorials In class debate Simulation with student leading the debrief 	Examples: <ul style="list-style-type: none"> Tutorial Assignment Field work Clinical Placements Report Writing Project work and research Written and/or oral exams

(The University of Adelaide, n.d.)

Constructive alignment:

Biggs (2003) describes constructive alignment as a teaching design in which students are preliminarily familiar with what they should learn (learning outcomes). Tyler (1949) claims the curriculum and syllabus should be developed in a way to allow the student to learn actively. In other words, content and methods (assessments, learning experiences...) should be linked to the learning outcome of the lesson. This approach is reflected in the flipped classroom methodology when students are beforehand familiarised with the objectives and learning outcomes of the lesson they will cover outside of class. Their familiarity with the learning objectives would guide the students' independent studies outside of class and would help keep them on a consistent track. This alignment helps students understand the purpose of their assignments and assessments and would motivate them to explore new information both in and out of class (Biggs & Tang, 2007).

Differentiated instruction:

The theory developed by Carol Ann Tomlinson (2006) offers types of assignments specific to each student's learning style (Myers, n.d.).

The flipped classroom methodology requires the students to go through the material prior to class and to respond to an online quiz or to complete a small activity that would be submitted to the teacher before the in-class time. These submissions would allow the instructor to identify students' difficulties and tailor the content, activities and approaches of the in-class practices to the specific needs of each student.

Joe Hirsch (2014) introduced the term “fliperentiated” which combines the flipped instructional model with the differentiated instructional model. He claims that students perform better “under conditions that activate their preferred learning style.”

Differentiated learning is possible in a flipped classroom at two instances: out of class, and in class. Starting with out of class, the teacher can provide different types of educational support that students can choose to study from according to their preferences (texts, videos, images, pre-recorded lessons, books...). In addition, students can accommodate their learning time to their learning rhythm: they can study when they find it fit; and they can pause, replay or forward a video ("En deux mots... - Inversons la Classe", 2019). Then in class, the differentiated learning preferences of students can be accounted for by “flexible groupings, scaffolded content, diverse instruction, and student choice” (Hirsch, 2014).

Indeed, the flipped classroom showed to be effective for both talented and gifted students as well as average and students with difficulties (Rahman et al., 2014).

How it came to be

The flipped classroom is a methodology that developed over time (Stayer, 2007). It was based on the distance education approach initiated in 1995 that provided an online platform for instructors to post educational content. Baker used this platform to post lecture notes, online quizzes and manage online classroom conversations, and extended class time for applications of the new concepts (Baker, 2000). Between 1996 and 1998, he held conferences introducing the “classroom flip”, while simultaneously, Lage, Platt

and Treglia were implementing the similar “inverted classroom” by assigning textbook readings, printable slides and online videos (Lage, Platt, & Treglia, 2000).

Two specific science educators played a key role in developing the flipped classroom in 2007: Jonathan Bergman and Aaron Sams from Woodland Park High School discovered a software that allowed them to record their PowerPoint presentations while adding their voice and annotations, and posted these videos online for students who missed classes. This method was then named the “flipped classroom” and this term was used by Salman Khan in his TED talk (Khan, 2011) which made it a popular concept.

In spite of the fact that there is no defined and specific structure and format of a flipped classroom, all applications of this method have common traits that are clearly stated in The Flipped Class Manifest (Bennett, Bergmann, Cockrum, Fisch, Musallam, Overmyer, Sams, & Spencer, 2012): The transfer of selected educational content outside of the classroom in order to provide more in-class time for face-to-face interactions; the instructors become educational guides instead of information providers and students become active learners; and students have access to a large pool of information when needed which provides the teacher with more opportunities to develop their higher order thinking skills.

In order to help in the implementation of the flipped classroom, Persky and McLaughlin, (2017) advised teachers to take into consideration the time required for flipping. Based on a literature review, they developed these guidelines:

Course Section	Proposed Time Ratio Allocation	Recommendation
Course Objectives	—	Course objectives should focus on higher order thinking (eg, Bloom's Cognitive Taxonomy of application and above) and include skills such as critical thinking, communication, and teamwork. These objectives should be aligned with real-world pharmacy situations.
Pre-class Activity (can include assessments)	0.5-1.0 (eg, 1.5 to 3 hours per week for 3 credit course)	Pre-class materials should orient student to foundational definitions and concepts that will be built upon during class. This material should be direct, relevant, efficient, experience-level appropriate (eg, novice, advanced beginner), accountability-driven, and provided to students well in advance of the due date.
In-class Activity (can include assessments)	1.0 (eg, 3 hours per week for 3 credit course)	Class time should emphasize active engagement through structured activities guided or facilitated by the instructor. The instructor should provide support for activities that extend pre-class learning to apply concepts, solve complex problems, interpret information, or otherwise engage in real-life practices that develop higher-order skills.
After-class Activity (can include assessments)	0.25-0.5 (instructor directed) 0.5-0.75 (student-directed) (eg, 1.5 to 3 hours per week for a 3-credit course)	After-class work should reinforce the course objectives and be increasing in complexity and integration of material. Topics should be relevant to future course work, spaced appropriately, and diverse in nature to increase transferability.
Assessment	Included in ratios above	Assessments should be designed to fully reflect the depth and breadth of learning in the flipped classroom. Diverse approaches should be used in an effort to provide formative and summative feedback to students and faculty regarding progress toward achieving course learning objectives.
Overall Course	1(in-class learning):2 (out-of-class learning) (eg, 6 hours of out-of-class work for 3 hours of in-class work for 3 credit course)	Course objectives, pre-class and in-class activities and assessments should be designed according to sound instructional alignment principles. Resources (eg, time, personnel, training) should be identified and secured prior to implementation of the flipped model. Consideration should be given to how the course and its requirements fit into the larger curriculum and co-curriculum.

The four pillars of the flipped education

The Flipped Learning Network (2014) identified four main pillars F-L-I-P on which the flipped classroom is based:

1. F : Flexible environment :

Teachers provide a flexible timeline for students' learning. They also might physically adjust their classroom setting in order to accommodate for their in-class activities.

2. L : Learning culture :

By switching from a teacher-centered model to a learner-centered model, the students become active learners who are motivated to learn what they are assigned independently. These learners are encouraged to explore a wider scope of information when they need it.

3. I : Intentional content :

The instructor makes sure that all the material provided outside and inside of class, and that all the activities, assignments and assessments are aligned with the learning objectives and outcomes.

4. P : Professional educator :

The instructor's tasks become more complex in a flipped classroom than in a traditional classroom. Teachers should allocate more time for material preparations; they should continually observe their students and help in their differentiated needs; and conducts continual formative assessments.

Its benefits

The flipped classroom presents advantages to both the students and the teachers through its use of “collaborative learning, active learning, problem-based learning and project-based learning” (Du, Fu & Wang, 2014).

The flipped classroom methodology benefits the students by providing them with:

- Self-regulated learning, autonomy and responsibility: With the information available online at all times, the students are able to access the information at any time they find fit (Ogden, 2015). In addition, students are responsible for covering the material outside of class in order to be able to follow with the in-class activities.

- Self-paced instructional setting: the students can pause, skip, and repeat the material and are responsible for covering it (Overmyer, 2012).
- Active learning opportunities: the students discover and construct their own knowledge outside of class (Gannod, Berg & Helmick, 2008) and practice through in-class assignments in order to reach mastery of the information.
- Personalized interactions with the teacher (Lage, Platt, & Treglia, 2000) allow for targeting of individualized difficulties (differentiated learning).
- Peer learning opportunities in-class (social development theory) (Du, Fu & Wang, 2014).
- Low levels of frustration (Du, Fu & Wang, 2014) by familiarizing the students with the content and by targeting their difficulties in-class with the personalized assistance of their teacher.
- Multiple intelligence applicability (Du, Fu & Wang, 2014) by allowing the teacher to characterize their students' needs and preferences.
- Shift from teacher-centered to student-centered approaches.
- Improvement of higher-order thinking skills (Bloom's taxonomy), and enhancement of problem-solving skills (Estes, Ingram & Liu 2014).
- Reasons to be more engaged ("The Teacher's Guide to Flipped Classrooms | Edudemic", 2017). Students are encouraged to prepare the material prior to class (teachers can sometimes give extra motivation points after submitting their online quiz or short assignment before class). During class, students are familiar with the material and can ask more questions and participate in class discussions more frequently.

In previous studies, the flipped classroom has been shown to enhance student academic performances (Tune, Sturek & Basile, 2013) both at school and university level (Rahman et al., 2014).

Garrow, Hotle and Mumbower (2013) claimed that compared to their experiences with the traditional methodology, “students in the flipped classroom seemed to learn faster and ask more in-depth questions”.

For the instructor, the flipped classroom provides the following benefits:

- Efficient use of class time (Cole, 2009): Ability to cover both the theory and the practice part (Reidsema et al., 2017).
- More time to work one-on-one with the students (Du, Fu & Wang, 2014).
- Ability to identify student learning difficulties by online quizzes, and class discussions ("The Teacher's Guide to Flipped Classrooms | Edudemic", 2017).
- Opportunities to apply differentiated learning strategies.

Its Challenges

Reidsema et al. (2017) shared a concern about the first stages of introducing the flipped classroom:

“When we insist that our students prepare in advance of our direct involvement with them, we are likely to be interfering with our student’s conceptions of teaching and the student–teacher relationship. While the degree of acceptance to which this new proposition will be received will vary with age, year of study, previous curriculum

experiences and current institutional practices, there will be some very strong feelings triggered from both students and teachers.”

In addition, teachers complain that the flipped methodology requires a considerable amount of extra work and preparations from their behalf compared to the traditional approach ("En deux mots... - Inversons la Classe", 2019).

According to Du, Fu and Wang (2014): Students in poor areas might find difficulties accessing the internet when needed. In addition, they claimed that the flipped classroom is heavily dependent on student motivation when they are asked to cover the information before coming to class, or else the flipped classroom methodology would fail. And lastly, they found that “keeping everyone on the same subject can get tricky” when student curiosity might lead them on extended online trails searching for information they will like to discuss in class.

On another hand, students complained that while studying at home, they were not able to ask questions on the spot. Even though they could meet with the instructor prior to class, or even ask their questions during class time, students seemed keen on having the possibility of having their questions answered on the spot (Garrow et al., 2013).

International and local studies

International studies on the flipped classroom were both quantitative and qualitative. The quantitative ones aimed at exploring the effects of the flipped classroom on student achievement, but most found little or no significant difference in test scores pre- and post- flipping (Aguilar-Roca & O’Dowd, 2015; Papadopoulos, Santiago-Román & Portela, 2010; Saunders, 2014; Williams, 2015). However the big impact of the flipped

classroom was observed qualitatively in students' attitudes (Day & Foley, 2006; Stelzer, Brookes, Gladding & Mestre, 2010; Johnson, 2013).

In 2012, Dubai American Academy decided to try the flipped classroom methodology after many student complained that "they find little value in homework because they are forced to rely on peers when assistance is required because the content level exceeds their parents' knowledge". They also complained about the amount of time spent by the teacher lecturing in class while being pressured to cover the program on time (Marlowe, 2012). As a result:

"Students reported lower stress levels in this type of classroom environment compared to other classes. While semester grades showed improvement, exam grades did not show significant improvement. Overall, students displayed positive feelings towards the treatment and enjoyed the associated benefits of being able to choose their own assignments and explore concepts they found interesting more in-depth"
(Marlowe, 2012).

In Lebanon, most school and university teachers use the traditional way of teaching by lecturing and giving memory-based and practice-based homework. Even though our curriculum was last updated in 1997 ("CRDP", 2017), it is important to start updating our teaching methodologies aiming for active student learning inside and outside of the classroom. Very few teachers have been experiencing with this methodology in Lebanon and some have been sharing their experiences on a blog specifically dedicated to

motivate teachers to use this methodology ("La Classe Inversée au Liban - Le site des professeurs du Liban", 2017).

In 2016, Sara Abou Afash and Ibrahim Kibbi made one of the pioneering quantitative studies about the impact of the flipped classroom on students in Lebanon. They succeeded at challenging, motivating, engaging students in their learning process, using class time more effectively, and at improving test scores (Abou Afash & Kibbi, 2016).

Another research paper was done at the American University of Beirut (AUB) aiming at investigating "the effectiveness of the flipped classroom model in teaching and learning as well as the skills that can be acquired by" the students. The latter reported a broader and deeper understanding of the information, and reported 5 main themes: "self-regulated learning, problem-solving skills, teamwork and communication skills, enjoyment, and creativity" (Baytiyeh, 2017).

Girgis Khodr and Waller (2017) introduced the flipped classroom to education students at the Lebanese University and gathered data about the students' opinions regarding this method. Students reported being more engaged and found the methodology more flexible than the traditional one.

Conclusion

In a society where grades are fundamental indicators of student success and intelligence, the students are kept under a lot of pressure to excel in their assessments and class rankings. The flipped classroom is a learner-centered methodology that helps students master the information efficiently by making them active learners in their education, by giving them time to study at their own pace, by teaching them to be

responsible, by providing them with problem-solving activities that target higher thinking skills, and by providing social interactions that promote their learning through the help of their peers and the personalized help of their teacher.

However, the flipped classroom methodology is not the perfect solution that solves every educational obstacle. It provides a new approach that requires more effort than the traditional approach coming from the teachers and the students but has been found beneficial on many levels. Nonetheless, certain users of the flipped classroom advise not to use this methodology during the whole semester/school year, but rather to mix up the methodologies ("Témoignages d'enseignants - Inversons la Classe", n.d.).

Chapter 3: Method

Context of the University

Notre Dame University (NDU), founded in 1987, is a Lebanese non-profit Catholic institution of higher education located in Zouk Mosbeh that follows the American model of liberal arts education ("About NDU | NDU", 2019). It currently includes 7 faculties: the faculty of architecture, arts and design; the faculty of business administration and economics; the faculty of engineering; the faculty of humanities; the faculty of law and political science; the faculty of natural and applied sciences; and the faculty of nursing and health sciences ("About NDU | NDU", 2019). NDU was accredited by the New England Commission of Higher Education (NECHE) in 2018. Even though the university is a religious establishment, it does not impose its religion on any student or staff member. It in fact believes in a unified Lebanon where people of different color, race, gender and religion coexist. Therefore, the participants of any NDU sample represent a mixture of different cultures.

Students enrolled in different majors have different contract sheets to complete in order to graduate, however the students are also required to take some common courses listed under the list of General Education Requirements (GER) also called the Liberal Arts Curriculum which includes certain English courses for students to choose from. These contract sheets are shaped by the mission and vision of the university: Its mission is to “provide comprehensive quality education that fosters excellence in scholarship, lifelong learning, enlightened citizenship, human solidarity, moral integrity, and belief in God”; and its vision is to provide: “students access to the finest faculty and a

comprehensive curriculum taught in the Maronite tradition”; “a highly personalized academic experience”; “strong, interdisciplinary, liberal arts core”; excellence in “selected highly specialized areas”; “programs and utilize technologies consistent with the changing needs”; and “a community in which all aspects of University life is a reflection of its values” (“About NDU | NDU”, 2019).

Participants

The participants of this study were students enrolled in the ENL230 course entitled “English in the work place” which was given in the Spring 2019 semester. This course is one of the elective courses students from all majors have to take from the Liberal Arts Curriculum. The course was scheduled on a MWF basis from 1PM till 2PM. The number of participants was 20 students who according to the participation consent form (discussed in the instruments section of this chapter) were enrolled in different majors: advertising and marketing (1 student); banking and finance (2 students); basic education (1 student); biology (2 students); computer science (4 students); economics (1 student); financial engineering (1 student); hotel management (1 student); international affairs and diplomacy (1 student); Information technology (1 student); mathematics (1 student); mechanical engineering (3 students); physics (1 students).

Instruments and Data analysis

This study was based on a concurrent mixed methods approach and thus used quantitative and qualitative instruments.

The quantitative data was collected through a participation consent form and two questionnaires:

The participation consent form (Appendix A) collected information about the student's major, number of semesters spent at university, and number of courses taken during that specific semester. In addition, each participant was assigned a number in order to respect participant's anonymity and to help monitor the progress of the study. To help students remember this assigned number, they were asked to use the last three digits of their phone number which was unknown by the instructor and myself.

Two questionnaires (Appendix B & C) based on an adapted version of Sarason's test anxiety scale (1984) were distributed before each of the two assigned quizzes. Sarason's questions targeted the performance anxiety aspect and did not cover the preparedness anxiety, therefore some adaptations were made to target both. The questionnaires followed the multiple choice format of Sarason's test and included 10 items: 4 items measuring performance anxiety (b;f;h;i); 4 items measuring unpreparedness anxiety (2 related to timing (a;d); 2 related to content comprehension (c;e)); 1 item identifying personal problems; 1 open ended "other reasons" item.

The anxiety level results were measured and analyzed according to Table 2:

For each of the 4 items (performance ; unpreparedness)	Interpretation
1/4	Low anxiety level
2/4	Mild anxiety level
3/4	High anxiety level
4/4	Very high anxiety level

Table 2: Analysis criteria of questionnaire items.

The questionnaires also included 1 Likert scale item in Questionnaire 1, and 2 Likert scale items in Questionnaire 2. According to Schreiber, Nora, Stage, Barlow & King (2006) the number of participants for a Likert scale question to be reliable and valid should be of an effective of 10:1 (10 participants for each item). Suitably, the sample studied matched 20 participants.

The Likert scale results were measured by percentages for the whole class and individually, and were compared.

The second questionnaire also provided an open ended question for students to express what factors reduced their anxiety in the second quiz.

The qualitative data was collected through class observations and a focus group interview:

The class observations (Appendix D) were done as a first set during the two assigned non-flipped chapters and aimed at observing the traditional way the class was given; and was compared to the second set of class observations done during the two flipped chapters. The class observations targeted the teaching methodology and the level and quality of student participation in class. The form used in Appendix D is a modified version of the New Hanover County School's peer to peer classroom observation form ("Peer to peer classroom observation form", n.d.).

The interview (Appendix E) was a phenomenological focus group interview done after the post-flipping quiz, and captured a comprehensive account of the participants' experiences throughout the study (Patton, 2015). According to Lichtman (Lichtman, 2013), "what distinguishes focus group interviewing from qualitative interviewing with a

single individual is that the group interaction may trigger thoughts and ideas among participants that do not emerge during an individual interview”.

The number of questions in the focus group interview was 6 and followed Lichtman’s (2006) guidelines who stated that the number of questions asked in a group interview should be around 5 or 6 questions. These questions were shaped according to McNamara (1999)’s general guidelines for conducting interviews that covered the different types of interviews, the types of topics in question, and the sequence and wording of the questions: It followed an open-ended interview type with some closed fixed-response questions. The types of topics used were: Behaviors (what they have done), opinions and values (what they think about the topic), feelings (how they feel about the topic), and background/demographics. It also followed the advised sequence of questions: First questions are factual questions, the next questions targeted the present before the past, and the last questions were open-ended.

The focus group interview helped in validating the factors that reduced their anxiety (after flipping) and provided a deeper understanding of their experience with the flipped classroom. The data gathered was recorded, transcribed, coded for key points and patterns, and analyzed.

Flipping the classroom:

The instructor who has been giving the course for many semesters was asked to choose 2 chapters (modules 6 and 7) for the non-flipped part of the study, and 2 other chapters (modules 15 and 16) for the flipped part in a way that the 4 chapters were of

equal difficulty and equal length. Two chapters were chosen to be flipped because, after taking the opinion of teachers who use the flipped classroom, students often show resistance to a change of methodology, especially one that requires them to study more outside of class. Therefore, students were introduced to the new methodology during the first chapter, and were more familiar to it during the second chapter. In addition, the instructor assigned two quizzes: the first quiz covered both modules 6 and 7 (pre-flip), and the second quiz covered modules 15 and 16 (post flip).

The flipped classroom methodology followed a 6 steps process (Communications, 2019):

1. Scope and objectives: The instructor shared the learning objectives and explained why these modules were important. The instructional strategy was also explained.
2. Pre-class content: students gained familiarity with the material before class. They were asked to prepare the material at their own pace through PowerPoint presentations and links provided through an online padlet, and by referring to their books.
3. Pre-class activities that motivated the students to prepare before class: students were asked to respond to non-graded online quizzes corresponding to both flipped modules before class. They were also encouraged to prepare questions related to the material they found difficulties with.
4. In-class activities that provided students with opportunities to deepen their understanding: The instructor briefly reviewed the material of both assigned modules stressing on the difficulties picked up by the online quizzes. A short

question/answer session was made with the students; in addition to problem solving exercises that were solved individually or in peers, and were corrected in a group class fashion. Discussions of real-life examples were done between the group-class and the instructor.

5. Post-class activities that extend student learning: the skills learned by the students through these two modules were practiced and needed in the later modules and assessments.
6. Ongoing evaluation and assessment: done by the instructor during the whole administration period of the flipped chapters and through the post-flip assigned quiz.

Flipped classroom material:

Students were provided with an online link (<https://padlet.com/stephaniefikany/ENL230modules15and16>) to a padlet that contains the PowerPoint presentation of each module, some links that provide a deeper explanation of some concepts, and a short non-graded anonymous online quiz that had to be done after covering each module in order to help the teacher identify student difficulties. Students were able to use it as a self-paced instructional setting.

In class, students worked individually or in groups on the exercises provided in their books with the help of their instructor when needed.

Design

This research was based on a concurrent mixed method design where qualitative and quantitative data collection were done at the same time (Hesse-Biber & Leavy, 2011a). This design is also called a convergent parallel type of mixed methods design (Creswell, 2014).

Data analysis and interpretation was done by comparing results: both quantitative and qualitative data were simultaneously compared using statistical trends that were supported by qualitative themes (Creswell, 2014).

Procedure

The study followed 11 steps:

1. The course was chosen according to its schedule; number of enrolled students; and with the approval of the instructor.
2. The students were introduced to the study and were asked to sign a participation form.
3. The regular way of instruction was observed without interference during the classroom sessions covering modules 6 and 7.
4. Questionnaire 1 was done before the 1st scheduled quiz (pre-flip).
5. The data analysis and interpretation (1) of questionnaire 1 results was done.
6. Modules 15 and 16 were flipped and classroom observations were made without interference during the flipping sessions.
7. Questionnaire 2 was done before the 2nd scheduled quiz (post-flip).

8. The focus-group interview was done during the class session following the 2nd quiz session.
9. The data analysis and interpretation (2) of questionnaire 2 and focus group interview results followed.
10. A comparison was made between the results of data set 1 and data set 2.
11. The conclusion was drawn.

Ethics

Since my research was a mixed method research that used observations, questionnaires and interviews, ethics will had an important role in the gathering of the data. It is important to talk about ethics in research because the moral integrity of a researcher affects the reliability and validity of the findings (Hesse-Biber & Leavy, 2011b). In addition, respecting privacy and guaranteeing confidentiality are key to obtaining accurate information from the participants.

As for my own ethical standpoint, I believe that we should always treat others the way we would like to be treated. Therefore, I followed these key points adapted from Smith (1990):

- The purpose of the study was clearly explained to the participants. They were also informed that they will be asked about their anxiety levels before the first scheduled quiz (before changing the teaching methodology) and after the second quiz (after changing the teaching methodology).
- The flipped classroom procedure was introduced at the time of the designated modules and not in the beginning in order to keep any normal behavior unaffected.

- Their individual consent for participation was gathered through a distributed participation consent form (Appendix A).
- The study was anonymous and respected the participant's privacy. Each participant was assigned a three digit number.
- The teacher involved in the study was also given anonymity.
- Questions asked in the questionnaires and the focus group interview were directly related to the study. No unrelated or personal questions were used.
- During observations, the observer was non-participant and did not interfere in the normal progress of events.

Chapter 4: Results and Analysis

As previously stated, this study was based on a concurrent mixed method approach. The quantitative data (participation forms and both questionnaires) and qualitative data (class observations and focus-group interview) results were compared and analysed synchronously.

Information gathered by the participation forms

PARTICIPANT NUMBER	MAJOR	Faculty	NUMBER OF SEMESTERS SPENT	NUMBER OF COURSES IN THIS SEMESTER
132	computer science	Natural and applied sciences	4	5
536	computer science	Natural and applied sciences	6	6
713	computer science	Natural and applied sciences	6	5
816	computer science	Natural and applied sciences	6	4
875	Information technology	Natural and applied sciences	7	5
257	biology	Natural and applied sciences	4	5
984	biology	Natural and applied sciences	6	4
718	physics	Natural and applied sciences	5	5
332	mathematics	Natural and applied sciences	4	5
559	economics	Business administration & Economics	6	4
209	financial engineering	Business administration & Economics	8	4
201	hotel management	Business administration & Economics	5	5
766	banking and finance	Business administration & Economics	7	5
373	basic education	Humanities	4	6
x	advertising and marketing	Humanities	x	x
517	international affairs and diplomacy	Law and political science	9	4
288	mechanical engineering	Engineering	6	5
613	mechanical engineering	Engineering	6	5
857	mechanical engineering	Engineering	6	1

Table 3: Information gathered by the participation forms regarding major, number of courses and semesters.

Note: One student dropped the course before the end of the study and was therefore removed from the data entry. Consequently, the total number of students who were still participating was 19.

The average number of semesters that the participants spent at the university was 5.8 semesters, and the average number of courses they were taking during that semester was 4.4 courses. These results showed that the participating students were acclimated with the university lifestyle and averagely took a fair number of courses (noting that the maximum number of courses normally allowed without a petition at this university is 6 courses), and would therefore have had a handful of assignments and studying to do, which could have affected their anxiety level and time management.

According to the information provided by the students and by referring to the university website, each major was associated to its corresponding faculty and a percentage of faculty participation in the study was calculated based on a total of 19 students:

Faculty	Number of Students	Percentage
Natural and applied sciences	9	47.37%
Business administration & Economics	4	21.05%
Humanities	2	10.53%
Law and political science	1	5.26%
Engineering	3	15.79%

Table 4: Distribution of students by faculties

It is observed that almost half (47.37%) of the participants were enrolled in the Natural and Applied Sciences Faculty.

Class observations

Class observations based on the observation form (Appendix D) were made firstly during the pre-flipping modules 6 and 7 which took 3 sessions to cover. The customary teaching methodology was based on lecturing, discussions, coaching, teacher direct questions and answers, and providing practice opportunities when possible. The teacher used a variety of grouping formats throughout the session: whole group, paired and individual formats depending on the instructional strategies that were being used. Students were listening, reading and writing, some were answering, and few were asking questions. They used their books for exercising and the overhead projector to follow the PowerPoint slides provided by the teacher. Students listened to the information explained by their teacher and then applied them to their practice exercises. They were well managed but were not highly engaged most of the session, the same handful of students were always answering or asking questions.

The second set of observations was made during the flipped modules 15 and 16 which were covered over 3 teaching sessions. The teacher started by recalling the important information of the modules that the students had already covered prior to class and focused on the difficulties that the online quiz picked up. The lecturing time was shorter compared to the pre-flipping modules and more time was given for practice exercises and questions. Compared to the first set of observations, a larger number of students were engaged during these sessions whether by answering the teacher's questions more confidently or by asking deeper and more specific questions about the information they had difficulties with. Students were observed helping each other during practice exercises and were also more reliant on the teacher's presence and support. Similarly, the material

used in class were the student's books and the overhead projector but to a lesser extent.

These observations contributed to the affirmation of the research question: "Did the flipped classroom methodology help students be more confident in their studies?", but the latter was more vigorously confirmed by the focus-group interview responses discussed further ahead in this chapter.

Questionnaires 1 and 2

The tables that follow presents the results and analysis of students' quantitative data gathered by the questionnaires 1 and 2 (The full table is found in Appendix F and is here broken down for analysis). The abbreviations used are as follow:

x = not available (the participant did not fill the information); Q1 = questionnaire 1; Q2 = questionnaire 2; PRE = pre-flipping in questionnaire 1; POST = post-flipping in questionnaire 2; P = performance anxiety; U = unpreparedness anxiety (includes t and c); t = timing; c = content comprehension.

The coloured columns are the participants' answers to the questionnaires:

PARTICIPANT NUMBER	Q1 how anxious	Q2 how anxious	Q2 less/same/more
132	not at all	not at all	same
536	a little bit	moderately	more
713	moderately	moderately	same
816	not at all	not at all	same
875	a little bit	a little bit	same
257	not at all	not at all	same
984	moderately	a little bit	less
718	not at all	not at all	same
332	not at all	not at all	same
559	a little bit	not at all	less
209	not at all	a little bit	more
201	a little bit	not at all	less
766	a little bit	not at all	less

373	moderately	a little bit	less
x	a little bit	not at all	less
517	moderately	a little bit	less
288	moderately	a little bit	less
613	moderately	a little bit	less
857	moderately	a little bit	less

- Column: “Q1 how anxious” represents the participant’s response to question number 1 of questionnaire 1.
- Column: “Q2 how anxious” represents the participant’s response to question number 1 of questionnaire 2.

These two columns served to validate the participants’ response to question number 3 of questionnaire 2 and their responses in the interview.

- Column: “Q2 less/same/more” represents participants’ response to question number 3 in questionnaire 2. “Yes” answers were transcribed as *less*; “I feel the same” answers were transcribed as *same*; and “No” answers were transcribed as *more*.
- ➔ Participants’ responses were aligned with their answers to question number 1 of both questionnaires.
- ➔ Results percentages are as follow:

Result	Faculty	Percentage
Decreased (<i>less</i>)	SC;BE;BE;BE;HU;HU;PS;EN;EN;EN	52.63%
Same (<i>same</i>)	SC;SC;SC;SC;SC;SC;SC	36.84%
Increased (<i>more</i>)	SC;BE	10.53%

Table 5: Faculty participation percentages.
 Abbreviations: SC= natural and applied sciences; BE= business administration and economics; HU= humanities; PS= law and political science; EN= engineering.

- ➔ It is observed that 52.63% of participants reported feeling less anxious before their second assessment compared to their first.
- ➔ It is visible that all the participants who reported no change in their anxiety level were enrolled in the natural and applied sciences faculty. These represent 77.78% of the natural and applied sciences students in that sample.

Student responses regarding anxiety types:

#	Anxiety PRE	Anxiety POST	PRE categories	POST categories	PRE results	POST results	Changes in P	Changes in U
132	x	x	X	x	OP / OU	OP / OU	same	same
536	a c h	a c d h	1P 2U(t;c)	1P 3U (t;t;c)	Low P / Mild U	Low P / High U	same	increased
713	a b f h	d b f h	3P 1U(t)	3P 1U(t)	High P / Low U	High P / Low U	same	same
816	x	x	x	x	OP / OU	OP / OU	same	same
875	f	f	1P	1P	Low P / OU	Low P / OU	same	same
257	x	x	x	x	OP / OU	OP / OU	same	same
984	b d f h	b f h	3P 1U(t)	3P	High P / Low U	High P / OU	same	decreased
718	x	x	x	x	OP / OU	OP / OU	same	same
332	x	x	x	x	OP / OU	OP / OU	same	same
559	c	x	1U (c)	x	OP / Low U	OP / OU	same	decreased
209	x	f g	x	1P pers	OP / OU	Low P / OU	increased	same
201	b f g h	b f h	3P pers	3P	High P / OU	High P / OU	same	same
766	f	x	1P	x	Low P / OU	OP / OU	decreased	same
373	d	g	1U (t)	pers	OP / Low U	OP / OU	same	decreased
x	f	x	1P	x	Low P / OU	OP / OU	decreased	same
517	a d f h	a b f g h	2P 2U(t;t)	3P 1U (t) pers	Mild P / Mild U	High P / Low U	increased	decreased
288	b d g h	b h	2P 1U(t) pers	2P	Mild P / Low U	Mild P / OU	same	decreased
613	d g	x	1U (t) pers	x	OP / Low U	OP / OU	same	decreased
857	a d f g h	a f h	2P 2U(t;t) pers	2P 1U (t)	Mild P / Mild U	Mild P / Low U	same	decreased

- Column: “Anxiety PRE” represents participant’s response to question number 2 in questionnaire 1.
- Column: “Anxiety POST” represents participant’s response to question number 2 in questionnaire 2.

- Columns: “PRE categories” and “POST categories” assigned each of the responses of question number 2 to their respective categories: as previously stated:
 - Items b; f; h; i correspond to the performance anxiety (P).
 - Items a and d correspond to the timing (t) subcategory of the unpreparedness anxiety.
 - Items c and e correspond to the content comprehension (c) subcategory of the unpreparedness anxiety.
 - Item g corresponds to personal problems.
 - Item j corresponds to the “other” option.
 - Students who reported having unpreparedness anxiety were mostly indicating timing struggles more than content comprehension difficulties: out of 12 answers reporting pre-flip unpreparedness anxiety, 16.67% rooted in content comprehension while 83.33% rooted in timing.
 - 36.84% of participants reported having personal problems throughout the study.
 - The personal problems category submissions were disregarded from the analysis for not being related to the objective of the study.
- Columns: “PRE results” and “POST results” translated the submitted data for each of the performance and unpreparedness anxiety according to the following criteria: 0 items = 0; 1 item = Low; 2 items = Mild; 3 items = High; 4 items = Very High.
 - No “other reasons” answers were submitted.

In order to examine the hypothesis: “The test anxiety levels of students after flipping the classroom would be lower than their test anxiety levels before flipping the classroom”, the results were examined for each participant individually. Since looking at the results of the whole class as a group and checking if the total anxiety levels were decreased, stayed the same or increased, would not indicate the reasons why the changes occurred; each participant was examined as an independent entity. Therefore, the changes in anxiety levels pre- and post- flipping for each student were recorded in Columns “Changes in P” and “Changes in U” separately.

Due to the previous observation that highlighted a role for the faculty affiliation of the participants in their reported anxiety levels, the results were grouped by faculties and showed that:

Faculty	Changes in P	Changes in U
Natural and applied sciences	same	same
Natural and applied sciences	same	increased
Natural and applied sciences	same	same
Natural and applied sciences	same	same
Natural and applied sciences	same	same
Natural and applied sciences	same	same
Natural and applied sciences	same	decreased
Natural and applied sciences	same	same
Natural and applied sciences	same	same
Business administration & Economics	same	decreased
Business administration & Economics	increased	same
Business administration & Economics	same	same
Business administration & Economics	decreased	same
Humanities	same	decreased
Humanities	decreased	same
Law and political science	increased	decreased
Engineering	same	decreased
Engineering	same	decreased
Engineering	same	decreased

Table 6: Changes in performance and unpreparedness anxiety.

For a total of 19 participants, the percentages are as follow:

Performance anxiety:	Unpreparedness anxiety:
– Decreased: 10.53%	– Decreased: 36.84%
– Same: 78.95%	– Same: 57.89%
– Increased: 10.52%	– Increased: 5.26%

These results show that the performance and unpreparedness anxiety levels mainly stayed the same with the change of methodology (78.95% and 56.89% respectively).

However, by previously noticing the weight of the natural and applied sciences students in their high representation in the sample (47.37%) and in the fact that 77.78% of them reported no change in their anxiety levels; another calculation was done by removing these students' results from the data gathered.

For a total of 10 participants (removing the 9 science students), the new percentages showed that:

Performance anxiety:	Unpreparedness anxiety:
– Decreased: 20%	– Decreased: 60%
– Same: 60%	– Same: 40%
– Increased: 20%	– Increased: 0%

These new results clearly contrasted with the whole-group results regarding the changes in unpreparedness anxiety levels. They showed that the change in methodology did not majorly affect the performance anxiety levels which stayed the same pre- and post- flip (78.95% with the science students, and 60% without the science students).

However, the flipped classroom methodology had an effect on the unpreparedness anxiety levels of the participants: it mainly decreased by 60%, stayed the same for 40% of the participants and increased for 0% of them.

These contrasting results indicated that the flipped classroom methodology did not impact the students enrolled in the faculty of natural and applied sciences as much as it impacted the rest of the participants.

Relating back to the flipped classroom methodology, it was expected to target the unpreparedness anxiety and not the performance anxiety due to the fact that it helped students manage their study time, familiarized them with the content, and gave them more support in its mastery (therefore targeting the timing and content comprehension subcategories of the unpreparedness anxiety). The percentages calculated from the sample dismissing the science students were aligned with these assumptions and therefore supported our hypothesis.

Focus-group interview

The focus-group interview was done in the session following the second assessment session in the absence of the instructor. 15 students were present on that day. The interview was audio recorded and transcribed (Appendix G).

Coding was done over content and timing of responses drawing attention to: opinions (positive and negative); interjections and quiet times.

It was observed that one specific participant's opinion was repeated by that same participant in an abrupt way in the beginning and the end of the interview. This student was claiming that they "didn't like" the flipped classroom for no specific reason. These

answers were bluntly given by a student who according to the class observations was outspoken and regularly nagged about having to study or about the questions in the assessments. Even though this participant had a dominant character and other students were shy to answer at first; another contradicting opinion arose after a short hesitant quiet moment, which led to other comments flowing easily into the conversation.

The responses for each of the 6 main questions were categorized and the results are as follow:

Questions 1 and 2 were assertive yes or no questions about the majors and the course to which students responded anonymously. Their answers aligned with the data the participants provided in their participation consent form validating the data.

The answers to the rest of the questions were grouped into positive and negative categories relating to the location (at home), the timing, the content, and the confidence levels.

Few of the negative comments were justified, while others mentioned the absence of the teacher at home while studying: “when we are studying at home, sometimes questions come up on the spot and we can’t ask about them”. Some students complained about not finding time to study outside of class.

Many positive comments praised the comfort of the participants with choosing where and when to study. It was noticed that the category that was mentioned the most was timing. The participants appreciated the benefits of having the liberty to control when they were studying, but few complained about not finding the time for it. These results aligned with the answers given in questionnaire 1 where struggles with the timing subcategory was the most common between all participants.

Other students felt more confident with their studies: “I felt comfortable studying at home”; “We took the time we needed to study”, “we came to class already knowing what we are studying”; “I was more familiar with the material”. While others mentioned the benefits of having the teacher present while doing the assignments and exercises.

The second questionnaire allowed the addition of other comments (table below) that were not mentioned during the interview. 2 participants claimed not being anxious during the first assessment, while another stated the opposite due to the fact that they were not aware that they had an assessment the first time. Another participant claimed always being anxious before any assessment. Different comments were directly related to the methodology claiming they became more experienced and that they “started to catch up with the instructor's style”.

To conclude, the answers of the focus-group interview aligned with the quantitative data results gathered and affirmed the research question. The quantitative and qualitative results showed that the flipped classroom methodology reduced the unpreparedness anxiety of participants affecting the whole sample with the exception of the students enrolled in the faculty of natural and applied sciences.

Q2 answers: why?
I wasn't anxious in the previous quiz
I am always anxious before any examination, got used to the feeling a bit
more experienced
I didn't worry last quiz
I started to catch up with the instructor's style
last time I didn't know we had a quiz

Chapter 5: Discussion

Limitations

The case study:

This case study used questionnaires and focus-group interview to gather data. All three of these methods presented limitations to the study:

A case study is limited by not being generalizable in the orthodox way. Each case study represents a specific and unique group of the larger population. This group has its own dynamics. Even though, this specific focus group gathered participants from different majors, ages and backgrounds, the results of this study cannot be claimed as typical. (Hodkinson & Hodkinson, 2001).

The sample size and demographics:

Another problem related to the participants was the sample size and characteristics. Although a case study does not require a specific number of participants since it reflects on a specific context without comparing it to another, the demographics of the sample used were not up to the initial expectations. The course was chosen specifically to reflect a balanced mix of students coming from different faculties. However, the results showed that the sample weighed for the natural and applied sciences faculty (almost half of the sample) and their weight clearly affected the final results of the study. If the sample size would have been bigger, then there would have been a lesser chance of one faculty outweighing the others.

The questionnaires:

Questionnaires do not guarantee the honesty of the respondents. In addition, respondents may not have put much thought in their answers and might have interpreted the questions subjectively (what is good for someone may be poor for someone else). More so, “The process of coding in the case of open ended questions opens a great possibility of subjectivity by the researcher” (“The advantages and disadvantages of questionnaires”, n.d.). Others claim that questionnaires do not present the opportunity of a deeper understanding of the participants’ responses (Bieske, 2002), which is why an interview has been needed.

The focus group interview:

A focus group interview has been used for its many advantages in timing and information gathering; however this instrument also presents limitations. “Limitations of focus groups include the tendency for certain types of socially acceptable opinion to emerge, and for certain types of participant to dominate the research process” (Smithson, 2000). These dominant individuals are outspoken participants that might skew the results. “For example, a shy dissenter might never reveal important insights, or a single persuasive participant might cause other participants to change their original opinions” (Mack, n.d.). Although as a facilitator I have tried to involve everyone in the discussion; that does not guarantee solving the dominant individuals’ effects on the group. “Some participants may find a focus group situation intimidating or off-putting” and “may feel under pressure to agree with the dominant view” (“Evaluated”, n.d.).

Another limitation is set by the interviewer: some participants may feel the need to agree with the interviewer's point of view (since the aim of the study has been reported to them in the participation agreement form) (Writing, 2019).

On another hand, during this study's interview which took place one session after the post-flip assessment session, the number of present students was 15 instead of 19 students. Therefore, some points of views and inputs were missing from the data collection.

Personal limitations:

Other limitations also presented themselves: The participant's like or dislike of the course might have affected the results. In addition, some students appeared to have needed more time to familiarize with the flipped classroom methodology, some due to absences during class time.

Student motivation:

This study was preceded by a mock-trial model where a larger number of chapters were flipped (6 modules). As a result, students showed laziness and no motivation in preparing this large amount of chapters at home using the flipped methodology. Starting the third chapter, they started coming to class unprepared. This was due to a culture of laziness among the students, and the fact that this course was a GER and not a major course for them to take as seriously. It was not worth the effort. Therefore in this actual study, the number of flipped chapters was reduced to 2.

Recommendations

After assessing the results of this study and pointing out its limitations, here are some recommendations that can be applied for a future replication:

Sample:

At the beginning of the study, the sample size and demographics were not expected to affect the results. The sample was chosen on the basis of having enough participants for the Likert scale question to be reliable and valid. However, the analysis showed that the demographics of the sample did affect the results. Therefore, it is recommended to choose a well-balanced sample that does not over-represent a specific group, nor under-represent another one.

Just as the results showed an interesting observation regarding the students enrolled in the natural and applied sciences faculty, the same conclusion might have been extracted if another one of the represented faculties also accounted for a large percentage of the sample. Hence two recommendations can be given: either choose a balanced sample, or choose and compare different samples each representing an individual faculty.

Participant-identified recommendation:

As previously stated by the students during the focus group interview, the flipped classroom methodology did not allow them to ask questions to their teacher while they were preparing the material outside of class. They claimed that they would have preferred to have their questions answered while studying and not wait for the in-class period. In fact, this complaint was also found addressed by participants of the flipped classroom in the literature. These students proposed a solution for that problem: they “thought a course

forum, chat-room or message board could help address this limitation” (Garrows et al., 2013).

Differentiated learning:

The flipped classroom methodology allows the instructors to apply differentiated learning to their out-of-class assigned activities and their in-class activities. However in this study, the timing for observations and periods assigned for flipping was too short to allow the instructor to apply the differentiation approach.

Therefore, it is recommended to give the flipped classroom a longer assigned timing for the execution of the flipping. This way the teacher would be given more time to assess and identify the different needs of the students, and would have more in-time class to work on differentiated activities and tasks.

Conclusion and Future Studies

Conclusion

Test anxiety is commonly experienced by school and university students, especially in cultures where grades and rankings are valued above any other achievement. This test anxiety has been shown to have two origins: performance anxiety, which is a normal feeling any person has before any kind of assessment and at low levels could help that person focus and perform better; and unpreparedness anxiety, which is a feeling a person has when they do not feel well prepared for the assessment.

In order to tackle this issue in an attempt to reduce test anxiety before an assessment, the flipped classroom methodology, which had shown to be effective on a personal level, was introduced to students enrolled in an ENL 230 class at NDU.

The flipped classroom methodology, based on a switch between what is done in class and what is done outside of class, targeted the unpreparedness anxiety aspect of students' test anxiety. This methodology allows for a more flexible study time for students and provides more time for in-class active learning activities.

This methodology has been applied to two chapters followed by their appointed assessment. Test anxiety levels were collected through questionnaires based on an adapted version of Sarason's test anxiety scale. These results were collected before a traditional assessment, and compared to the results collected before the post-flip assessment.

This study was based on a concurrent mixed methods approach and gathered its data through participation forms, questionnaires, observations and a focus-group interview. This change in methodology successfully reduced students' unpreparedness anxiety by

targeting the timing and content comprehension subcategories. According to the focus-group interview, the possibility of studying at their own time was the most appealing aspect of the flipped classroom for the participants. On the other hand, the quantitative results showed that students enrolled in the faculty of natural and applied sciences were less affected by the change in methodology compared to the other participants. The overall concurrent data analysis supported the initial hypothesis: “The test anxiety levels of students after flipping the classroom would be lower than their test anxiety levels before flipping the classroom.” and confirmed the explored research question: “Did the flipped classroom methodology help students be more confident in their studies?”.

Future studies:*Sample demographics:*

While recognizing the limitations of this study and looking into the results that indicated a relationship between student’s majors and their stress levels, it is recommended for future studies on the flipped classroom to further investigate the effect of the participants’ different backgrounds (majors, age and others) on their stress levels before an assessment. This issue can be targeted by choosing a sample that equally represents the number of participants enrolled in different faculties.

This stress level variation may be due to the fact that some majors require frequent written assessments which provide familiarity and habit for the students; while other majors have a different approach to assessments (mainly in arts majors which require projects more than written assessments).

Another approach would be to choose a sample that represents one faculty and adapt the assessment method to the ones they traditionally use.

Course category:

Another recommendation is to make this same study on a major requirement course, due to the fact that students take these courses more seriously and stress levels before assessments may be higher than in a GRE course, which might encourage students to work harder at home before class as required by the flipped classroom methodology.

School level:

This study was done at a university level because as described in the statement of the problem, by a personal experience and observation, the test anxiety was tackled by the flipped classroom methodology at a university level. Therefore the study was chosen to be replicated at first hand in a university context.

It is therefore recommended for future studies to explore the effect of the flipped classroom on test anxiety at a school level. Although practitioners of this methodology report that students feel less anxious and more engaged in the classroom, no actual reports were done on this topic.

Effects of the flipped classroom in Lebanon:

With regard to the literature about the effects of the flipped classroom on student engagement and performance in the Lebanese context, we find a small amount of official studies reporting those results. Therefore, more research on the flipped classroom

methodology should be done whether regarding its effects on test anxiety, engagement, performance, and opinions about it in both the school and university context.

References

- Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. *Journal of Higher Education Research & Development*, 34(1), 1–14.
- Abou Afash, Sara, A., & Kibbi, I. (2016). The Role of The Flipped Classroom to Enhance User Experience in Cells and Molecules Course Junior-Levelled Students At The American University Of Science and Technology–Achraiyeh Campus. *IJIRES*, 3(3), 199-207.
- About NDU. (n.d.). *Notre Dame University*. Retrieved from <http://www.ndu.edu.lb/about-ndu>
- Adams, T. (2016). Distance education. In S. Danver (Ed.), *The SAGE encyclopedia of online education* (pp. 338-347). Thousand Oaks,, CA: SAGE Publications, Inc. doi: 10.4135/9781483318332.n112
- Baker, J. W. (2000). *The "classroom flip": Using web course management tools to become the guide by the side*. Paper presented at the 11th International Conference on College Teaching and Learning, Jacksonville, Florida, USA.
- Bergmann, J.,& Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*, International Society for Technology in Education, Washington, D.C.
- Bennett, B., Bergmann, J., Cockrum, T., Fisch, K., Musallam, R., Overmyer, J., Sams, A., Spencer, D. (2012). The flipped class manifest. *The Daily Riff*. Retrieved from: <http://www.thedailyriff.com/articles/the-flipped-class-manifest-823.php>

Berrett, D. (2012), "How 'flipping' the classroom can improve the traditional lecture".

The Chronicle of Higher Education, 12(19), 1-3.

Bieske, B. (2002). *Research methods. Uses and limitations of questionnaires, interviews, and case studies*. University of Manchester.

Biggs, J. (2014). Constructive alignment in university teaching. *HERDSA Review of Higher Education*, 1, 5-22.

Biggs, J., & Tang, C. (2007). *Teaching for quality learning at university* (3rd ed.).

Maidenhead: McGraw-Hill/Society for Research into Higher Education & Open University Press.

Bishop, J. L., & Verleger, M. A. (2013). The Flipped Classroom: A Survey of the

Research. *120th American Society for Engineering Education Annual*

Conference and Exposition, 30, 1-18.

Bloom, B.S. (1956). *Taxonomy of Educational Objectives*, Handbook I: The Cognitive

Domain New York: David McKay Co Inc.

Brame, C., (2013). Flipping the classroom. *Vanderbilt University Center for Teaching*.

Retrieved from <http://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/>

Cole, J. E. du, & Kritzer, J. B. (2009). Strategies for success: Teaching an online course.

Rural Special Education Quarterly, 28(4), 36-40.

Communications, N. (2019). Steps to Flipping Your Class. *New York University*.

Retrieved from <https://www.nyu.edu/faculty/teaching-and-learning-resources/strategies-for-teaching-with-tech/flipped-classes/steps-to-flipping-your-class.html>

CRDP. (2017). *Crdp.org*. Retrieved from <http://www.crdp.org/curriculum?f=2&la=en>

- Creswell, J. (2014). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research* (4th ed., pp. 563-605). Harlow: Pearson.
- Crouch, C., & Mazur, E. (2001). Peer instruction: ten years of experience and results. *American Journal of Physics*, 69(9), 970-977.
- Day, J., & Foley, J. (2006). Evaluating a Web Lecture Intervention in a Human–Computer Interaction Course. *IEEE Transactions on Education*, 49(4), 420-431. <http://dx.doi.org/10.1109/te.2006.879792>
- Du, S., Fu, Z., & Wang, Y. (2014). The Flipped Classroom—Advantages and Challenges. In *International Conference on Economic Management and Trade Cooperation* (pp. 17-20). Xi'an: Atlantis Press.
- Eaton, M. (2017). The flipped classroom. *The Clinical Teacher*, 14(4), 301-302. doi: 10.1111/tct.12685
- En deux mots... - Inversons la Classe. (2019). Retrieved from <http://www.laclassinversee.com/la-classe-inversee/en-deux-mots/>
- ENL 230 Modules 15 and 16. (2019). *Padlet*. Retrieved from <https://padlet.com/stephaniefikany/ENL230modules15and16>
- Estes, M.D., Ingram, R. and Liu, J.C. (2014), “A review of flipped classroom research, practice, and technologies”. *International HETL Review*, 4(7), 1-8.
- Evalued. (n.d.). *Evalued*. Retrieved from <http://www.evalued.bcu.ac.uk/tutorial/4b.htm>
- Fulton, K. P. (2012). 10 Reasons to Flip. *Phi Delta Kappan*, 94(2), 20–24. <https://doi.org/10.1177/003172171209400205>

- Gannod, G. C., Burge, J. E., & Helmick, M. T. (2008). *Proceedings of the 30th International Conference on Software Engineering: Using the inverted classroom to teach software engineering*. New York, NY: ACM.
- Garrow, L. A., Hotle, S., & Mumbower Stacey. (2013). Flipped classroom: investigating student learning and attitudes in a switched-role, interactive environment. *OR/MS Today*, 40(4), 10. Retrieved from <http://link.galegroup.com/apps/doc/A341938709/AONE?u=ndul&sid=AONE&xid=406d4979>
- Girgis, E., Khodr, M., & Waller, L. (2017). Education Students' Responses to Flipped Learning Methodology in the Lebanese University. *Pubs.sci epub.com*. Retrieved from <http://pubs.sci epub.com/education/4/12/3>
- Hesse-Biber, S., & Leavy, P. (2011a). *The PRACTICE of QUALITATIVE RESEARCH* (2nd ed., pp. 282-286). California: SAGE.
- Hesse-Biber, S., & Leavy, P. (2011b). *The PRACTICE of QUALITATIVE RESEARCH* (2nd ed., pp. 55-89). California: SAGE.
- Hirsch, J. (2014). "Fliperentiated" Instruction: How to Create the Customizable Classroom. *Edutopia*. Retrieved from <https://www.edutopia.org/blog/fliperentiated-instruction-create-customizable-classroom-joe-hirsch>
- Hoda Baytiyeh, (2017) "The flipped classroom model: when technology enhances professional skills", *The International Journal of Information and Learning Technology*, 34(1), 51-62. [https:// doi.org/10.1108/IJILT-07-2016-0025](https://doi.org/10.1108/IJILT-07-2016-0025)

- Hodkinson, P., & Hodkinson, H. (2001). The Strengths and Limitations of Case Study Research. In *Making an Impact on Policy and Practice* (pp. 9-10). Cambridge.
- Johnson, G. (2013). *Student Perceptions of the Flipped Classroom* (B.Ed.). University of British Columbia.
- Khan, S. (2011, March). *Salman Khan: Let's use video to reinvent education* | Video on TED.com. TED: Ideas worth spreading, Retrieved from:
http://www.ted.com/talks/salman_khan
- La Classe Inversée au Liban - Le site des professeurs du Liban. (2017). *Sites.google.com*. Retrieved from <https://sites.google.com/site/lesitedesprofesseursduliban/la-classe-inversee>
- Lage, M., Platt, G., & Treglia, M. (2000). Inverting the classroom: A gateway to creating an inclusive learning environment, *Journal of Economic Education*, 31(1), 30-43.
- Lichtman, M. (2013). *Qualitative research in education* (p. 129). Los Angeles: SAGE Publications.
- Mack, S. (n.d.). Disadvantage of a Focus Group Interview. *Small business*. Retrieved from <https://smallbusiness.chron.com/disadvantage-focus-group-interview-22097.html>
- Marlowe, C. (2012). *The Effect of the Flipped Classroom on Student Achievement and Stress* (MA.). Montana State University.
- Mazur, E. (1997). *Peer Instruction: A User's Manual Series in Educational Innovation*. Prentice Hall, Upper Saddle River, NJ.
- McNamara, c. (1999). *General Guidelines for Conducting Research Interviews*. Minnesota.

Myers, J. (n.d.). Flipped Learning Meets Differentiated Instruction. *Gaggle Speaks*.

Retrieved from <https://www.gaggle.net/speaks/flipped-learning-meets-differentiated-instruction/>

Nolting, P. (2000). *Math Study Skills Workbook: Your Guide to Reducing Test Anxiety and Improving Study Strategies* [Ebook] (1st ed., pp. 1-6). Boston, Ma: Houghton

Mifflin Company. Retrieved from <https://www.biblio.com/book/math-study-skills-workbook-your-guide/d/898121245>

Ogden, L. (2015). Student Perceptions of the Flipped Classroom in College Algebra.

PRIMUS, 25(9-10), 782-791. <http://dx.doi.org/10.1080/10511970.2015.1054011>

Ouda, H., & Khadri, A. (2016). Flipped Learning As A New Educational Paradigm: An

Analytical Critical Study. *European Scientific Journal*, 12(10), 417-438. doi:

10.19044/esj.2016.v12n10p417

Overmyer, J. (2012). Flipped classrooms 101. *Principal*, 46-47.

Papadopoulos, C., Santiago-Román, A., & Portela, G. (2010). *Work in Progress –*

Developing and Implementing an Inverted Classroom for Engineering Statics.

University of Puerto Rico- Mayagüez.

Pappas, C. (2016). Blended Learning vs Flipped Learning: Can you tell the difference? -

eLearning Industry. Retrieved from <https://elearningindustry.com/blended-learning-vs-flipped-learning-can-tell-difference>

Patton, M. (2015). *Qualitative Research & Evaluation Methods* (4th ed., pp. 432-443).

California: SAGE.

Peer to peer classroom observation form (n.d.). Retrieved from

<http://www.nhcs.k12.nc.us/snipes/Forms/PeertoPeerClassroomObservationForm.pdf>

Persky, A., & McLaughlin, J. (2017). *Summary of Recommendations, Including Proposed Time Allocation Ratios, for the Flipped Classroom* [Image]. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5607728/>

Piaget, J. (1967). *Logique et connaissance scientifique*. Gallimard, Paris.

Rahman, A., Abdullah, Z., Mohamed, H., Mohd Zaid, N., & Aris, B. (2014). Flipped classroom: Reviving cognitive development among school students. In *3rd International Seminar on Quality and Affordable Education*. Universiti Malaya.

Reidsema, C., Kavanagh, L., Hadgraft, R., & Smith, N. (2017). *The Flipped Classroom* (pp. 3-14). New York: Springer.

Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reactions to Tests. *Journal of Personality and Social Psychology*, *46*, 929–938.

Sarason I.G., Sarason B.R., & Pierce G.R. (1995) Cognitive Interference. In: Saklofske D.H., Zeidner M. (eds) *International Handbook of Personality and Intelligence. Perspectives on Individual Differences*. Springer, Boston, MA

Sauk Valley Community College. *General Example Comparing Two Approaches* [Image] (N.A.). Retrieved from <https://www.svcc.edu/departments/instructional-design/teaching/resources/course-design/flipped-classrooms.html>

Saunders, J. (2014). *The Flipped Classroom: its Effects on Student Academic Achievement and Critical Thinking Skills in High School Mathematics* (Ph.D.). Liberty University.

Schreiber, J., Nora, A., Stage, F., Barlow, E., & King, J. (2006). Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review. *The Journal of Educational Research*, 99(6), 323-338.

<http://dx.doi.org/10.3200/joer.99.6.323-338>

Smith, L. (1990). Ethics in Qualitative Field Research. *Qualitative Inquiry in Education: The continuing debate*. New York: Teachers College Press.

Smithson, J. (2000). Using and analysing focus groups: limitations and possibilities. *Social Research Methodology*, 3(2), 116.

Stelzer, T., Brookes, D., Gladding, G., & Mestre, J. (2010). Impact of multimedia learning modules on an introductory course on electricity and magnetism. *American Journal of Physics*, 78(7), 755-759.

<http://dx.doi.org/10.1119/1.3369920>

Strayer, J. (2007). *The effects of the classroom flip on the learning environment: a comparison of learning activity in a traditional classroom and a flip classroom that used an intelligent tutoring system* (Doctoral Dissertation). ETD Center 1189523914.

Témoignages d'enseignants - Inversons la Classe (n.d.). *La Classe Inversee*. Retrieved from <http://www.laclassinversee.com/exemples-denseignants/temoignages-denseignants/>

The advantages and disadvantages of questionnaires. *University of Leicerster*. Retrieved from https://www.le.ac.uk/oerresources/lill/fdmvco/module9/page_51.htm

The Flipped Learning Network. (2014). The Four Pillars of F-L-I-P™. *Flipped learning*.

Retrieved from https://flippedlearning.org/wp-content/uploads/2016/07/FLIP_handout_FNL_Web.pdf

The Teacher's Guide to Flipped Classrooms / Edudemic. (2017). Edudemic.com.

Retrieved from <http://www.edudemic.com/guides/flipped-classrooms-guide/>

The University of Adelaide. *Flipped Classroom Design Template (Bloom's Modified*

Taxonomy) [Image]. Retrieved from https://www.adelaide.edu.au/flipped-classroom/resources/Flipped_Classroom_Design_Template.pdf

Tomlinson, C., & McTighe, J. (2006). *Integrating differentiated instruction & understanding by design*. Alexandria, Va.: Association for Supervision and Curriculum Development.

Tune, J., Sturek, M., & Basile, D. (2013). Flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology.

Advances in Physiology Education, 37(4), 316-320.

<http://dx.doi.org/10.1152/advan.00091.2013>

Tyler, R.W. (1949). *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press.

Underwood, J. (2014). *Research on e-Learning and ICT in Education*. New York, NY: Springer.

Vygotsky, L. (1978), Interaction between learning and development. *Readings on the Development of Children*, 23(3), 34-41.

Whittaker, C. (2013). Introduction. In Tomlinson B. and Whittaker C. (eds.) (pp. 11-23)

Williams, A., Aguilar-Roca, N., & O'Dowd, D. (2015). Lecture capture podcasts: differential student use and performance in a large introductory course.

Educational Technology Research and Development, 64(1), 1-12.

<http://dx.doi.org/10.1007/s11423-015-9406-5>

Writing, A. (2019). Advantages & Disadvantage of a Focus Group. *Small Business*.

Retrieved from <http://smallbusiness.chron.com/advantages-disadvantages-focus-group-784.html>

Yang, F., & Dong, Z. (2017). *Learning Path Construction in e-learning*. Singapore:

Springer.

Appendix A: Participation Consent Form

This consent form is dedicated to students enrolled in the ENL230 course in the Spring 2019 semester, who are invited to participate in the thesis research study titled “*The impact of flipping the classroom in an undergraduate English course on student test anxiety: a mixed-methods approach on a case study*”.

The following information is provided to help you decide whether you wish to participate in the study. You should know that you are free to withdraw your participation at any time.

Researcher: Stephanie-Joy Fikany

Advisor: Dr. Maha Mouchantaf

Requirement for: Masters in Education

Purpose of the study

You may be familiar with the stress and anxiety you experience before you enter for your assessment. In order to help you reduce this anxiety, this study will aim at boosting your confidence in your studies, by helping you with your difficulties, and by providing a self-paced instructional setting (you will be able to learn your material at any time you find convenient, and not only during class time).

Procedure

Briefly, in the flipped classroom: you will read the information first hand at home, and you will do your homework in class with the help of your peers and teacher.

Type of research intervention

All what you are asked to do as a participant will be to fill in a short questionnaire before your 2 assigned assessments, and participate in a short focus group interview (during class time) after the second assessment.

No risks

Your participation will be anonymous: you will be assigned a number in order to keep track of your individual progress. No personal questions will be asked in the questionnaire or interviews. All questions aim at specifically and ethically gathering data for the purpose of the research.

Researcher’s background information

Completed the biology degree and Teaching Diploma and started the Masters in biology at NDU. Completed the CAPES certificate at USJ. Pursuing the masters in education at NDU.

Certificate of Consent

Participant number:

In order to help you memorize your number, please choose the last 3 digits of your cellphone number (your cellphone number is unknown by the instructor).

Your anonymous number will be: _ _ _

I have read the description of the research and accept the invitation to participate in this study by answering the questionnaires and interview questions with all honesty.

1. Your major : _____
2. Number of semesters you spent at university: _____
3. Number of courses taken this semester: _____

Signature:

Appendix B: Questionnaire 1

Kindly respond to the following questions by being as honest as possible.

Your participant number: _____

1. How anxious are you before the upcoming assessment?

Not at all A little bit Moderately A lot

2. If you answered “A little bit/Moderately/A lot”, kindly check next to the reasons why you think you are anxious at this moment:

- a. I should have studied more
- b. I usually forget everything I know while doing the assessment
- c. There are some things I did not understand in the chapters
- d. I was not studying regularly
- e. The chapters assigned for the assessment are very difficult
- f. Distracting thoughts keep popping into my head
- g. I forget things because I am too preoccupied with my personal problems
- h. Right now I am worried about my GPA
- i. I am thinking about how much brighter the other students are than I am
- j. Other reasons : _____

Appendix C: Questionnaire 2

Kindly respond to the following 2 questions by being as honest as possible.

Your participant number: _____

3. How anxious are you before the upcoming assessment?
Not at all A little bit Moderately A lot
4. If you answered “A little bit/Moderately/A lot”, kindly check next to the reasons why you think you are anxious at this moment:
- k. I should have studied more
 - l. I usually forget everything I know while doing the assessment
 - m. There are some things I did not understand in the chapters
 - n. I was not studying regularly
 - o. The chapters assigned for the assessment are very difficult
 - p. Distracting thoughts keep popping into my head
 - q. I forget things because I am too preoccupied with my personal problems
 - r. Right now I am worried about my GPA
 - s. I am thinking about how much brighter the other students are than I am
 - t. Other reasons : _____
5. Do you feel ***less*** anxious than you were on your previous quiz?
Yes I feel the same No
6. If you answered Yes/No on question number 3; why do you think so?
-

Appendix D: Class Observation

1. Date and Module:

Module: ___ **Date:** ___
Pre-flip: ___ **Post-flip:** _____

2. Focus on Instruction

2a. Identify instruction practices

___ Coaching ___ Modeling ___ Teacher-direct Q and A
 ___ Discussion ___ Presentation ___ Testing
 ___ Hands-on Exp. ___ Providing Directions ___ Lecture
 ___ Learning Centers ___ Providing Practice Opportunities ___

2b. Identify grouping format

___ Whole group ___ Small Group ___ Paired ___ Individual

3. Focus on the Learner

3a. Identify student actions

___ Listening ___ working with hands-on ___ Speaking
 ___ Reading ___ Writing ___

3b. Identify instructional materials

___ Computer Software ___ Overhead/board/flip chart ___ Video
 ___ Manipulatives ___ Published print materials ___ Web sites
 ___ Hand held tech ___ Real-world objects ___ Worksheets
 ___ Lab/activity sheet ___ Student created material ___
 ___ Oral ___ Textbook

3c. Determine level of student work

___ Recalling Information (knowledge) ___ Breaking down info into parts
 (analysis)
 ___ Understanding info (comprehension) ___ Putting information together in new
 ways (Synthesis)
 ___ Using information in a new way (apply) ___ Making judgments and
 justifying positions (Evaluate)

3d. Determine levels of class engagement

___ Highly engaged – Most students are authentically engaged
 ___ Well managed _ Students are willingly compliant, ritually engaged
 ___ Dysfunctional – Many students actively reject the assigned task or substitute
 another activity

Appendix E: Focus Group Interview Questions

1. Is this course a core requirement for anyone?
2. How many of you felt less anxious before quiz 2 than before quiz 1?
3. How many of you enjoyed the flipped classroom?
4. What did you dislike about the flipped classroom?
5. What did you like about the flipped classroom?
6. Is there anything you would like to add?

APPENDIX F: Participants' Data

PARTICIPANT NUMBER	MAJOR	Faculty	NUMBER OF SEMESTERS SPENT	NUMBER OF COURSES IN THIS SEMESTER	Q1 how anxious	Q2 how anxious	Q2 less/same/more	Anxiety PRE	Anxiety POST	PRE categories	POST categories	PRE results	POST results	Changes in P	Changes in U	Q2 answers : why?
132	computer science	Natural and applied sciences	4	5	not at all	not at all	same	x	x	X	x	0P / 0U	0P / 0U	same	same	
536	computer science	Natural and applied sciences	6	6	a little bit	moderately	more	a c h	a c d h	1P 2U(t;c)	1P 3U (t;t;c)	Low P / Mild U	Low P / High U	same	increased	I wasn't anxious in the previous quiz I am always anxious before any
713	computer science	Natural and applied sciences	6	5	moderately	moderately	same	a b f h	d b f h	3P 1U(t)	3P 1U(t)	High P / Low U	High P / Low U	same	same	examination, got used to the feeling a
816	computer science	Natural and applied sciences	6	4	not at all	not at all	same	x	x	x	x	0P / 0U	0P / 0U	same	same	
875	Information technology	Natural and applied sciences	7	5	a little bit	a little bit	same	f	f	1P	1P	Low P / 0U	Low P / 0U	same	same	
257	biology	Natural and applied sciences	4	5	not at all	not at all	same	x	x	x	x	0P / 0U	0P / 0U	same	same	
984	biology	Natural and applied sciences	6	4	moderately	a little bit	less	b d f h	b f h	3P 1U(t)	3P	High P / Low U	High P / 0U	same	decreased	more experienced
718	physics	Natural and applied sciences	5	5	not at all	not at all	same	x	x	x	x	0P / 0U	0P / 0U	same	same	
332	mathematics	Natural and applied sciences	4	5	not at all	not at all	same	x	x	x	x	0P / 0U	0P / 0U	same	same	
559	economics	Business administration & Economics	6	4	a little bit	not at all	less	c	x	1U (c)	x	0P / Low U	0P / 0U	same	decreased	x
209	financial engineering	Business administration & Economics	8	4	not at all	a little bit	more	x	f g	x	1P pers	0P / 0U	Low P / 0U	increased	same	I ddnt worry last quiz
201	hotel management	Business administration & Economics	5	5	a little bit	not at all	less	b f g h	b f h	3P pers	3P	High P / 0U	High P / 0U	same	same	
766	banking and finance	Business administration & Economics	7	5	a little bit	not at all	less	f	x	1P	x	Low P / 0U	0P / 0U	decreased	same	x
373	basic education	Humanities	4	6	moderately	a little bit	less	d	g	1U (t)	pers	0P / Low U	0P / 0U	same	decreased	x
x	advertising and marketing	Humanities	x	x	a little bit	not at all	less	f	x	1P	x	Low P / 0U	0P / 0U	decreased	same	x
517	international affairs and diplomacy	Law and political science	9	4	moderately	a little bit	less	a d f h	a b f g h	2P 2U(t;t)	3P 1U (t) pers	Mild P / Mild U	High P / Low U	increased	decreased	x
288	mechanical engineering	Engineering	6	5	moderately	a little bit	less	b d g h	b h	2P 1U(t) pers	2P	Mild P / Low U	Mild P / 0U	same	decreased	I started to catch up with the instructor's style
613	mechanical engineering	Engineering	6	5	moderately	a little bit	less	d g	x	1U (t) pers	x	0P / Low U	0P / 0U	same	decreased	x
857	mechanical engineering	Engineering	6	1	moderately	a little bit	less	a d f g h	a f h	2P 2U(t;t) pers	2P 1U (t)	Mild P / Mild U	Mild P / Low U	same	decreased	last time I ddnt know we had a quiz