Left to Their Own Devices: On Using iPads Within a Flipped Classroom Approach to Support Student Autonomy and Engagement in Compulsory EFL Classes

Hiroyuki Nicholas Bovee

June 2021

This thesis is submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

Department of Educational Research,

Lancaster University, UK.

This thesis results entirely from my own work and has not been offered previously for any other degree or diploma.

Signature 

Left to Their Own Devices: On Using iPads Within a Flipped Classroom Approach to Support Student Autonomy and Engagement in Compulsory EFL Classes

Doctor of Philosophy, June 2021

Abstract

This study examines student engagement within the context of "flipped" English as a foreign language (EFL) classes that promoted active learning through the utilization of interactive iPad activities. These classes formed the core of a compulsory EFL program at a Japanese university. Despite increasing academic interest in both engagement and the flipped classroom, the two together have so far received little attention as a research topic in compulsory EFL contexts. The study begins with an examination of the ontological basis for the three engagement subtypes: behavioral, cognitive, and emotional. It is argued that the construct achieves greater theoretical coherence, in addition to value as a meaningful outcome in itself, by reconceptualizing emotional engagement as *relational engagement*. The empirical components of the study were conducted in four phases: (a) a quantitative comparison of engagement, autonomy-support, and outcome variables (n = 403), (b) an analysis of observed student behaviors (n = 54), (c) an interview-based investigation of student perceptions regarding engagement and autonomy (n = 21), and (d) an interview-based investigation of teacher perceptions regarding engagement and autonomy (n = 2). The quantitative data revealed that flipped classes resulted in higher engagement relative to conventional

teacher-fronted classes, with engagement in technology enhanced flipped-iPad classes rising moderately over the course of a semester. The observational data indicated more instances of student-student interactions in the flipped-iPad classes versus the flipped-textbook classes. However, contrary to assumptions, the per-student and per-group analyses presented a diversity of behaviors and frequencies of occurrence. Student interviews revealed correspondingly diverse views, indicating engagement with and through technology in all of the relations posited by Ihde's theory of technological mediation (embodied, hermeneutic, alterity, and background). Teacher interviews revealed how beliefs regarding both pedagogical goals and determinants of student success can influence perceptions of engagement and autonomy. The study concludes with a discussion of implications for theory and instruction.

Table of Contents

Acknowledgements

I would first like to express my gratitude to Kyushu Sangyo University for providing me with an uncommonly supportive research environment. Thanks also to my supervisor, Professor Jo Warin, for her patience and guidance over these many years. Finally, thank you to my wife Aya and daughter Anju. You make it easy for me to stay engaged every day with the Good, the True, and the Beautiful.

List of Figures and Tables

Figures

Tables

Chapter 1: Introduction and Background

> *Ithaka gave you the marvelous journey.*
>
> *Without her you would not have set out.*
>
> *She has nothing left to give you now.*
>
> —C. P. Cavafy, "Ithaka"

In this study, I examined student autonomy and engagement in English as a Foreign Language (EFL) classes at a medium-sized university in Japan. The study involved a small-scale intervention in which the instructional style was altered from a conventional teacher-fronted format to a "flipped classroom" in which student-centered group work was supported by one-on-one interactions with the teacher. In addition, the regular printed textbooks in these flipped classes were replaced with digital ones presented on iPads.

I examined the phenomena both quantitatively and qualitatively. In three classroom conditions (*conventional-textbook*, *flipped-textbook*, and *flipped-iPad*), I measured the differences in self-reported perceptions of engagement and how these quantities changed over time. I compared perceptions of classroom climate: autonomy-supportive versus controlling (autonomy being an innate human need that sustains self-motivation, which in turn activates engagement). I also compared learning outcomes in the three conditions, and how perceptions of engagement and classroom climate correlate with these outcomes. Based on classroom observations, I created a taxonomy of behavioral engagement and analyzed student

interactions with their peers and teacher. Finally, I took a deeper look at student and teacher perceptions of autonomy and engagement through one-on-one interviews. The overall goal of the study was to paint a broad picture of engagement and autonomy from multiple angles in order to provide teachers with information on how the flipped classroom, in conjunction with iPads, might be effectively employed in our educational context.

1.1 The significance of engagement

Of the numerous factors that influence learning outcomes, few would deny the importance of classwork. The classroom serves as the point of entry to a subject for many students, particularly in compulsory non-major courses where students may lack substantial interest in the subject matter. In such contexts, learning occurs largely as a result of how students engage with their classwork, and it is the responsibility of the teacher to make this happen.

Motivation is a necessary precursor of student engagement. Unfortunately, it can prove difficult to measure due to its opacity, not just to teachers, but to students themselves. Moreover, according to self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000b), arguably the most prominent motivational theory today, we would do well to renounce the common misconception that we can somehow directly motivate our students. The more relevant questions are: how can we as teachers create conditions that support the motivation already present in our students? And how do we

know in the moment if our efforts have been successful? The intervention in this study is an attempt to create a more autonomy-supportive classroom environment by removing motivational obstacles, and to use engagement as the construct by which we gauge our success in this endeavor.

Engagement is a construct that describes how and to what extent students direct attention toward an object. Although the engagement construct remains poorly defined, it can generally be thought of as the quality of intentional involvement in *something*. In education, this *something*—the object of engagement—is either an activity or the learning context more broadly. In short, engagement is the process by which students learn.

In this study, engagement is delimited by the scope of classroom activities. It is conceptualized as a bridge between motivations and learning outcomes (Reeve, 2012), and can therefore be considered the active expression of underlying motivational antecedents. The finer details of engagement are by no means easily observable, but in contrast to motivation, engagement is a more surface-level phenomenon that can be perceived by both students (through self-reflection) and their teachers with comparative ease. It therefore serves as the clearest in-the-moment indicator of the quantity and quality of the underlying motivation, providing useful information about instructional efficacy.

While the immediate benefits of engagement for teachers may not extend any further than its instrumentality, I believe the rabbit hole goes deeper.

In this study, I argue that engagement is more than a bridge linking motivation to learning outcomes. It is not merely a barometer of underlying motivational states that helps teachers guide their students toward desirable test scores. Rather, it is no less than the manifestation of our communion with reality, and as such, teachers should recognize that deep engagement in meaningful tasks is in itself a worthwhile goal, even in situations where the learning outcomes prove to be less than desirable. When students are engaged, they are living with more intention, meaning, and purpose. They are, in essence, more fully alive.

This is not to suggest that meaningful engagement and positive learning outcomes are mutually exclusive. We should of course strive for positive learning outcomes, but not at the expense of high-quality motivation and engagement. We must find a way to reprioritize our goals so that generating outcomes in the form of high-stakes testing is secondary to providing high-quality classroom experiences. To be sure, the carrot and stick model may produce desirable short-term results, but we should not expect such an approach to result in deeper learning or greater long-term well-being.

In certain educational contexts, obstacles such as prior student motivation, institutional structures, and cultural characteristics make this task more challenging. I will now describe one such challenging context—the one of this study.

1.2 Research context

I am an associate professor at Kyushu Sangyo University (KSU), a private four-year institution in Fukuoka, Japan. With some 10,500 students in nine departments, the university is the third largest of nine in the city. Its educational ethos is unabashedly practical and employment-oriented, with the majority of students obtaining employment locally upon graduation. As one of three tenured faculty members at the Language Education and Research Center (LERC), which provides courses in six languages to all departments at the university, I wear a number of different hats. As the head of instruction, I manage the curricula for some 250 English language courses at five proficiency levels, as well as the 50 English faculty who teach them. I am also the resident educational technologist, with my primary duty in this capacity being to administer our Moodle platform and much of the content within. Due to the viral pandemic, this role has grown in importance as our Moodle is now used by over 100 additional language teaching faculty to deliver lessons remotely. In addition, I provide guidance and support to teaching faculty in regards to their courses and individual research projects. The courses I teach range from remedial English, to translation, to instructional design.

The LERC is primarily responsible for providing compulsory English language courses to all first- and second-year students. The university lacks an English language major, and as a result, many students view their English courses as little more than an onerous requirement. Enthusiasm to study English is tepid at best. This is unsurprising

considering the notoriously poor quality of English language instruction at public schools; after six years of compulsory English in middle and high school with little to show for it, students are understandably reluctant to spend two more years studying it at university. Yet, this is the situation in which students find themselves, and teachers are obliged to put forth their best effort to provide students with high-quality instruction.

But if motivation is indeed something that already exists within every student as a consequence of being human, there is always cause for hope. It is the task of our teachers to reduce the thwarts to motivation that have accumulated and calcified over the prior six years of public schooling by creating an autonomy-supportive learning environment. The current study represents an attempt to achieve this by drastically altering the instructional approach.

1.3 Impetus for the study

I have been involved in a number of research projects over my twelve years at the LERC, many of them focused on student motivation (e.g., Fryer et al., 2014; Fryer & Bovee, 2016, 2018, 2020). Many of the projects have been large quantitative studies that statistically controlled for a number of key variables such as gender and prior proficiency level in English. Our most recent research has focused on the effects of short "edumercials" designed to motivationally nudge students toward taking a greater interest in learning English. If there is one cardinal principle that has resulted from our research program, it is that both curriculum design and

the instructional approach of individual teachers have measurable positive effects on the internal motivational states of even the most unmotivated students.

While this research approach has borne fruit, it has done so at the expense of including more in-depth student perspectives. The large amount of time and resources required to undertake a qualitative study, not to mention the language barrier, has undoubtedly deterred many teachers from even attempting one. Moreover, coaxing students to reflect upon their own motivations can pose an insurmountable challenge, particularly when the students lack a strong sense of personal investment in our courses.

However, it seemed to me that asking students to reflect on engagement itself instead of the underlying motivation would prove more feasible due to the comparatively surface-level nature of the phenomenon. I also felt that the relative accessibility of engagement would make the results actionable by other teachers at the LERC, and also that my Japanese language proficiency made me uniquely suited amongst my colleagues to conduct, transcribe, and analyze student interviews.

1.3.1 Digital textbooks and the flipped classroom

When the data for this study was collected in 2014, digital textbooks were considered to be the next big thing in educational technology. They were a fixture at academic conferences, promoted by enthusiastic teachers extolling the benefits of a paperless classroom. Tablet computers were piloted at a number of public schools across Japan, making frequent

appearances on the local news. My own interest in the potential of going digital at my institution led to the purchase of 60 iPads for classroom use. Research was conducted on iPad-based communicative speaking tests (Stewart & Bovee, 2016). Plans were drafted on how the LERC might issue tablet devices to all incoming students. The future was bright.

Around the same time, I encountered the flipped classroom approach (Bergmann & Sams, 2012a, 2012b), an instructional strategy that was marked by a similar buzz in the educational zeitgeist. The strategy involves restructuring classes so that lectures are delivered as videos watched by students at home, while class time is devoted to completing the "homework" with support from the teacher and classmates. Our language courses never took a lecture format to begin with, so the flipping in our context involved providing written Japanese explanations of classroom activities and allowing students to work through these at their own pace. We have since started calling this a "lab" approach to distinguish it from a typical flipped classroom. Regardless of its label, the objective remains the same: to devote class time to activities that promote social learning. This social aspect pertains not only to peer interactions, but opportunities for the teacher to provide more personalized autonomy-supportive instruction and feedback, the common adage being that the teacher should strive to be a "guide on the side" rather than a "sage on the stage".

The flipped classroom appeared to be a perfect match for our courses. This initial buzz led my colleague and I to conduct a small-scale pilot study (n =

40) in which we applied action research methods to customize the flipped classroom approach over a semester in our own classes (Bovee & Howarth, 2014). The study, which made use of portable audio players, conventional textbooks, and online lesson videos, resulted in a number of positive outcomes. Most notably, flipping doubled the amount of time we spent closely interacting with and providing feedback to our students.

Based on the success of this pilot study, I organized a full-scale efficacy study involving 14 teachers and 28 courses in the following year. This study relied on smartphones and printouts of instructions written in Japanese (again, no iPads). Surprisingly, a number of teachers found the approach so compelling that, after a number of weeks, they could not in good conscience continue teaching their control-group classes in the conventional way. While this unfortunately derailed the study, it sparked a grass-roots movement that led to the majority of teachers at the LERC adopting this approach for at least a portion of their class time. Anecdotal evidence from teachers has been unequivocally positive: less teacher-fronted instruction and more social interaction results in higher engagement for both students and teachers.

These two strands of research and practice at the LERC, one focusing on iPads and the other on the flipped classroom, naturally complemented each other. Thus arose the mission of the current study: to integrate the successes of the flipped classroom with the potential of the iPads. The set

of iPads purchased by the LERC presented me with a unique opportunity to put this idea into practice.

Since those early days, the fervor over both digital textbooks and the flipped classroom has abated. Digital textbooks have all but vanished, and teachers have largely abandoned the use of iPads in the classroom in favor of the ubiquitous smartphone. In contrast, the paper-based flipped classroom approach has become standardized at the LERC, continuing largely unchanged to the present day. My hope is that the central findings of this study resulting from the use of these technologies, both the iPad and the flipped classroom approach, will remain meaningful to teachers even when using different technologies in the classroom.

Chapter 2: Overview of the Study

This chapter provides a brief overview of the study. It covers the overall research questions, rationale for the study, components of the instructional interventions, and overall research design. The chapter concludes with an outline of the sequence of chapters.

2.1 Overall research questions

The study begins with a theoretical framing of engagement and the flipped classroom. The main theoretical questions addressed in chapter 4 can be stated as follows.

> *Why does the engagement construct consist of three subtypes, and why is this meaningful?*
>
> *How does the flipped classroom relate to the engagement construct and to various theories of second-language acquisition?*

The various empirical research questions addressed in the subsequent chapters can be abridged as follows.

> *To what degree did the flipped classroom and iPads affect student engagement, perceptions of autonomy-support, and outcomes?*
>
> *What was the character of student engagement as perceived by teachers and the students themselves, particularly in relation to the technologies of the flipped classroom and iPads?*

The more specific research questions addressed in each phase of the study can be found in the relevant chapters. However, the reader should keep in mind these overall questions in order to maintain a clear picture of the "narrative arc".

2.2 Research justification

Student motivation to engage in English language classes is thwarted by a number of factors. With the population of foreign residents in Fukuoka city under 3%, and with less than 4% of our student body hailing from overseas, Japanese students at KSU live in a predominantly monocultural and monolingual environment in which the utility of English is not readily apparent. Compounding this thwart is the fact that after six years of English classes at public schools, students are forced to contend with two more years of English at university. They are unable to select their teachers and have no choice but to pass these courses in order to graduate. It should therefore be no surprise that students start their courses with a low sense of autonomy and personal agency.

Within the classroom, conventional teacher-fronted instruction is likely to further degrade their sense of autonomy. A typical class has 25 to 30 students, making it difficult for the teacher to attend to students individually. Moreover, the majority of our expatriate English teachers have a limited command of the Japanese language. Instruction delivered in a foreign language is sure to add to students' cognitive load.

Finally, many students have difficulty maintaining focus on tasks that lack immediate feedback. An activity that does not get checked upon completion may be skipped, especially when the task is designed to be completed individually. While this problem is common in compulsory education, it only appears to be worsening as students become increasingly distracted by social media on their smartphones.

The iPad-supported flipped classroom approach in this study attempted to address these motivational thwarts. To offset the lack of autonomy in course selection, students were provided with autonomy in the ordering and pacing of classroom activities. Instructions written in Japanese aimed to lessen their cognitive load so that they could focus on engaging with content instead of becoming overwhelmed by English teacher-talk. Teachers were provided more opportunities to give instruction and feedback to students individually and in small groups. Increased group work allowed students to cooperate on tasks and engage in social learning. The iPads allowed students to receive immediate feedback on many activities, and also served as a window to the wider English-speaking world. In this way, through changing the class format, the intervention was designed to elicit a cultural paradigm shift in the classroom with an aim to positively impact student motivation and engagement.

While the study focuses primarily on engagement, it should be noted that the intervention is not believed to have acted directly upon it. This is because the character and quality of engagement is determined by its

underlying motivation—but this too is indirectly influenced by the intervention. It is all too easy to perceive internal states as being entirely conferred upon an individual by external causes. For instance, students may feel engaged in an *engaging class* and motivated by a *motivating teacher*. Yet, we are all keenly aware that some students remain chronically disengaged, even in the best of lessons, due to factors that lie seemingly outside of anyone's control. Although such students may feel that life events, the lesson, the subject, or the teacher is the cause of their disengagement, introspection would reveal their capacity to self-determine the degree to which they are motivated and subsequently engaged. Situational and environmental factors undoubtedly facilitate or hinder this capacity, and while we have little control over the mitigation of countless psychological and sociocultural thwarts, we do maintain significant control over our classroom environments. The goal of an autonomy-supportive learning environment is to reduce motivational thwarts within the classroom so that students can more readily *motivate themselves* to engage with their studies (i.e., an internal locus of causality) such that they eventually come to believe their efforts are the primary determinants of desired outcomes (i.e., an internal locus of control). Students inherently possess agency in this regard, and our responsibility as teachers is to facilitate the expression of this agency.

A foundational tenet of this perspective on motivation is the compatibilist notion of free will, which maintains that the thoughts and actions of an individual are neither strictly determined by external inputs nor entirely

governed by libertarian agency. Through supporting autonomy and reducing motivational thwarts, we can enhance our students' capacity for self-motivation and agentic learning. This is the ultimate goal of the instructional intervention.

Unfortunately, students with a low sense of autonomy and agency in regards to learning often have difficulty identifying and articulating the character of their motivations. Engagement was consequently chosen as the construct to investigate due to its comparative visibility and practicality for teachers. From the perspective of self-determination theory (see chapter 3), the intervention was an attempt to create an environment that reduced the numerous existing thwarts to student motivation (or more accurately, self-motivation) by more effectively supporting their innate psychosocial needs of competence, autonomy, and relatedness.

2.3 Intervention components

The instructional intervention in this study consisted of two components: (a) shifting from teacher-fronted instruction to a flipped classroom approach, and (b) replacing the standard printed textbooks with interactive digital textbooks presented on iPads. This is understood as the application of two technological enhancements to classroom instruction.

A simple definition of technology is elusive. In this study, it is broadly construed as, "…the application of organized knowledge to practical tasks by ordered systems of people and machines" (Barbour, 1992, p. 3). While few would deny that the iPad is a technology, the flipped classroom

approach, perhaps less intuitively, can also be considered a technology. More specifically, it is the exterior features of the flipped classroom, or the visible aspects of the instructional approach, that are collectively considered as such. I refer to this ensemble of exterior features as the *class format*.

2.3.1 Instructional approach

In the flipped classroom, students sat in groups of three or four for the majority of the class period, working together to complete the classwork at their own pace. Group members raised their hands when they were ready to demonstrate task completion to the teacher (e.g., performing a memorized dialogue with a partner), or to ask for help. As groups completed tasks, teachers circulated around the room, continuously interacting with groups and individuals. In flipped-textbook classes (without iPads), custom-made instruction sheets were stamped by the teacher to indicate successful activity completion. These sheets were collected by the teacher at the end of every class.

The conventional non-flipped classes included far more teacher-fronted instruction, though they did include occasional pair and group work. In general, teachers relied more on whole-class feedback and choral-repetition activities in which all students in the class recited words and phrases in unison. Students were ordinarily not held accountable in class for completing tasks, though the textbooks were collected and checked at the end of the semester by some teachers.

The three conditions that appear in the study are as follows:

- *conventional-textbook*: a standard teacher-fronted class with printed textbooks;
- *flipped-textbook:* a flipped classroom with printed textbooks and supportive instruction sheets; and
- *flipped-iPad*: a flipped classroom that used digital textbooks. Printed textbooks could be referenced as needed.

2.3.2 Instructional content

The digital textbook content used in the study was adapted for use on iPads from the Communication Spotlight series (Graham-Marr, 2009). Communication Spotlight differs from many EFL listening and speaking textbooks in its strong focus on suprasegmental (prosodic) features of English, such as stress (accent), pitch (intonation and tone), and word juncture (phonetic separation and merging of words). By doing so, it draws attention to a fundamental difference between English and Japanese pronunciation, namely their *isochrony*, or the way a language rhythmically divides time into equal portions (Nespor et al., 2011).

Syllables in a stress-timed language, such as English, vary in duration depending on whether it is stressed or unstressed. For example, in the word “communication” (/kəˌmyu nɪˈkeɪ ʃən/), the fourth syllable /keɪ/, which is stressed, is longer in duration than the others. However, in a mora-timed language, such as Japanese, each vowel or consonant-vowel syllable is equal in length. Thus, in the Japanese loan word “komyunikeeshon” (コミ

ュニケーション), each syllable takes roughly equal stress. However, the fourth syllable “kee” is a double vowel that is twice as long in duration as the others, making the word more similar to a six-syllable word in Japanese if considered in terms of timing units (i.e., ko myu ni ke e shon).

Although the isochronic differences between English and Japanese are understood intuitively by most English teachers, few teach it explicitly in their courses. The result is that after six years of English instruction at public schools, Japanese students have little awareness of the phonetic characteristic that most distinguishes the language from their native tongue. This is unfortunate considering the central role it plays in helping students get a feel for the rhythm of a language. Communication Spotlight attempts to redress this pedagogical oversight through activities that help students develop receptive and productive competence with the characteristic stress-timed rhythms of English.

The textbook activities were adapted for use on the Moodle learning management system (Version 2.4; 2012). Instructions and explanations not in the textbook were added as Japanese text to each activity. This textual support largely replaced the teacher-fronted instruction in the conventional-textbook classes. Most of the handwritten activities were replaced by Siri voice-to-text input, providing immediate feedback on pronunciation accuracy. Multiple choice and matching activities were similarly designed to provide immediate feedback upon making a selection.

A log of all submitted work was automatically saved in Moodle, where progress could be checked from the teacher dashboard.

2.3.3 Participants

A total of 403 students in 22 classes participated in phase one of this study (chapter 5). Classes were 15 to 25 students in size and were held once a week. All participating students were native Japanese speakers in their first year at the university. Although classes were mixed gender, the classes were over 75% male overall, with some classes having only one female student. The classes were selected for being representative of the most common type of compulsory English class; they were "middle-of-the-road" in terms of proficiency and motivation.

The classes were mixed-major, with students representing all seven university departments (economics, commerce, management, international studies, information science, engineering, and fine arts). As a result, students rarely met outside of English class, making it a challenge for them to develop strong social bonds within the time constraints of a 15-class semester.

The classes were taught by 13 different teachers. Ten of these teachers taught the control group classes in phase one (chapter 5) and were not required to do anything special for the study. They were selected simply based on the year and level of their classes. The three remaining teachers, one of which was myself, participated in an intervention involving a flipped classroom approach, with some classes using standard textbooks

and others using iPad-based digital textbooks. Three of these classes were subjected to classroom observation in phase two (chapter 6). Twenty-one students from these intervention classes were interviewed in phase three (chapter 7), and the two intervention teachers were interviewed in phase four (chapter 8). An overview of these phases is presented in the following section.

2.4 Overall research design

Chapter 4 situates the engagement construct and the interventions within a larger theoretical framework through which the rest of the study can be understood. The four subsequent empirical phases (chapters 5 to 8) employed different methods in order to examine engagement from multiple angles, and as such this study can be considered to have taken a mixed-methods approach that employed both quantitative and qualitative methods. Fredricks and McColskey (2012) describe the strengths and weaknesses of seven methods for studying engagement, three of which were employed in this study. These are described briefly below. (See chapters 5 to 8 for more details regarding the methods employed in each phase.)

2.4.1 The four phases

Phase one (chapter 5) took a statistical approach based on Likert scale surveys to measure and compare the quantity of engagement and its change over time in three different conditions: conventional-textbook, flipped-textbook, and flipped-iPad. Engagement measures were correlated

with learning outcomes (a proficiency test and two types of automated e-learning). Finally, differences were measured between the conditions in terms of outcomes and perceptions of classroom climate (autonomy-supportive versus controlling).

Phase two (chapter 6) was based on videorecorded classroom observations of behavioral engagement in flipped-textbook and flipped-iPad classes. The observations included the length of student-teacher interactions, physical movement of the teacher in the classroom, the distribution of student-teacher interactions per group, and the variety of different types of behaviors exhibited by students.

Phase three (chapter 7) relied on one-on-one interviews in which students reflected on their own engagement and feelings of autonomy in flipped-iPad classes, particularly in light of their prior experiences in conventional-textbook classes. Analysis of the transcribed interviews focused on how their engagement was mediated by technology (the iPads and the flipped classroom itself) when completing classwork.

Phase four (chapter 8) relied on one-on-one interviews with the two intervention teachers with an aim to understand how they perceived student engagement in their flipped-iPad classes. Analysis of the transcribed interviews focused on how perceptions of student engagement and autonomy may have been influenced by personal values regarding learning objectives, as well as attributional beliefs regarding engagement and disengagement.

Figure 2.1 depicts how the four phases of the study align with the three different classroom conditions.

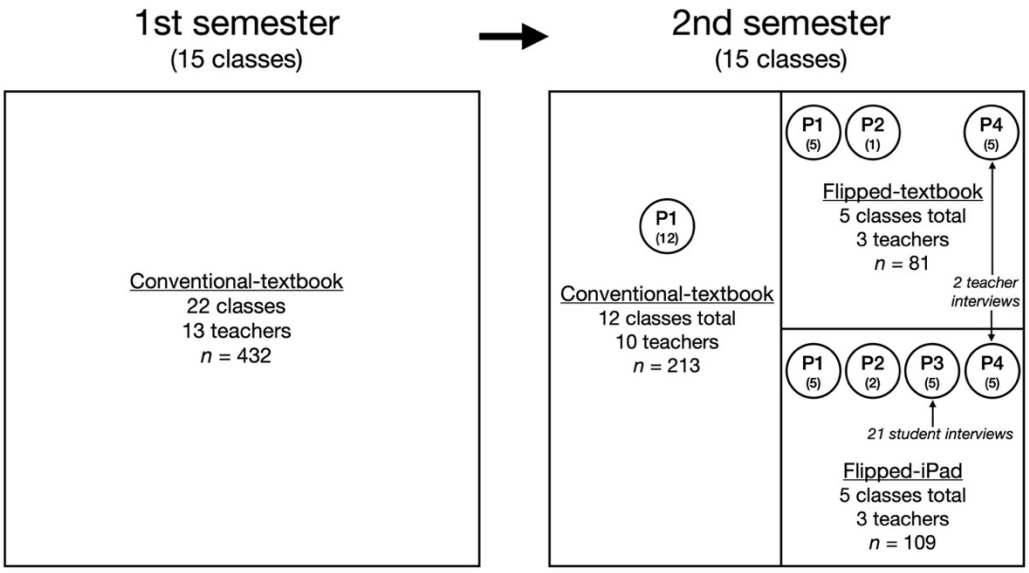


Figure 2.1 The classroom conditions associated with each phase of the study.

Note. P1 = phase one, P2 = phase two, etc. The number in parentheses indicates the number of classes involved in a phase.

2.4.2 Rationale for the four phases

The study was structured in the manner described above to obtain complementary findings that address different aspects of engagement. The phases were conducted sequentially in order of descending priority. Phase one (chapter 5) forms the cornerstone of the study; the subsequent phases investigating the character of engagement would have lost relevance if phase one had failed to demonstrate some potential for positive impact. Thus, the study was designed based on the premise that phase one would yield positive results.

Phase two (chapter 6) focused solely on student behaviors, the only aspect of engagement that is directly observable. It can therefore be considered the most "objective" phase of the study. Conversation practice is central to our listening and speaking classes. Observable behaviors were therefore considered to be of higher priority than the less visible forms of engagement investigated later. Phases three and four would have lost relevance if students had not been observed interacting with their teacher and with each other.

Phase three (chapter 7) examined the subjective experiences of the students themselves, addressing all three aspects, or *subtypes*, of engagement: *behavioral*, *cognitive*, and *relational*. This was important because not all subtypes necessarily arise simultaneously. For example, a student may be highly engaged behaviorally, but comparatively less engaged cognitively (Fredricks, 2014, pp. 11–14). Phase three also added a subjective perspective to the behaviors observed in phase two.

Phase four (chapter 8) was originally intended to mirror phase two, but as observations were not carried out systematically by the two interviewed teachers, their perceptions were based less on objective observations of student behaviors and more on their own values and rationalizations.

2.5 Ethical considerations

This section describes how I obtained consent from the participants (both students and teachers) as well as the process by which I informed the

university of the research and received informal approval from the dean of the LERC.

2.5.1 Participant consent

The participating teachers verbally informed their students about the study at the beginning of the semester. It was presented as a study about how a novel instructional approach might support classwork and learning. Students were not burdened with details about the theoretical basis of the study. As the intervention itself constituted the primary instructional approach of the course, students were unable to withdraw from the intervention without dropping the course entirely. No consent form was therefore presented at this time. For the study to proceed, I had to reconcile the conflicting principles of pursuing beneficent aims on one hand versus meeting student expectations on the other. The decision to proceed with the study was predicated on my conviction that the intervention would in fact exceed student expectations. In addition, the option of prematurely abandoning the intervention to revert to a conventional approach was always available.

Signed consent was obtained before the class observations in phase two (see Appendix One). Although all students were included in the class videorecordings in this phase, they were free to opt out of having their behaviors included in the analysis. Signed consent was also obtained from interviewed students and teachers in phases three and four (see Appendix Two and Appendix Three respectively).

2.5.2 Institutional approval

Prior to collecting any data, a "permission request for research" letter was signed by the LERC dean (see Appendix Four). However, this letter did not constitute formal approval as the university lacks a comprehensive research review process apart from the awarding of internal funds based on a yearly application. This is not uncommon in Japan, particularly at small and medium-sized private universities. In lieu of research oversight and ethical review, researchers are expected to take full responsibility for their own research by adhering to the ethics guidelines sanctioned by the Japan Society for the Promotion of Science (JSPS, 2014).

2.6 Research trustworthiness

In order to support the rigor and trustworthiness of my findings, I employed different strategies in each of the four research phases. Phase one relied on statistical analysis of Likert scale survey data. The procedures I applied to establish validity and reliability are detailed in chapter 5. In addition to these procedures, I sought to minimize procedural reactivity (distortions and biases resulting from the procedures used to elicit data) by informing students that the surveys were optional, anonymous, and had no bearing on their grades.

The subsequent three phases of the research relied on behavioral observations and interviews. Here, the processes of gathering and analyzing data were inherently more subjective, necessitating the adherence to a different set of quality criteria. These phases are examined

in the following sections, taking into consideration the most commonly prioritized criteria of credibility, transferability, dependability, and confirmability (Korstjens & Moser, 2018). The section concludes with an examination of reflexivity issues, including my role at the university and the use of bracketing over the course of the investigation.

2.6.1 Credibility

In the classroom observations of phase two, I sought to reduce both personal and procedural reactivity through the use of an unobtrusive video camera. Only a single teacher was present in the classroom, and there was no need to attend to the video camera apart from starting and stopping the recording. Although only one class per teacher was subject to analysis, a total of 19 classes were videorecorded over the semester, giving students time to acclimate to the presence of the video camera in the classroom. Although the resolution of the data was lower than would have been possible with in-person observations, the accuracy of the data was high due to the capability to replay video segments. Furthermore, the large amount of data collected for every student in the classroom (71–81 observations per student per class; 4,176 observations total) obviated the need for extrapolation and helped ensure accuracy in depicting behaviors over the class period.

In phase three, I conducted structured interviews, in part to compensate for the limited amount of time available for each student (15–20 minutes). Questions targeted the engagement subtypes, and follow-up questions

aimed to elicit details regarding the student's experiences (see Appendix Five). At times, I deliberately countered a student's comment with a contrasting idea. This served two purposes. First, it was used as an indicator of the degree of influence I had on the student's thoughts and opinions. (To my surprise, no students altered their opinions as a result.) Second, it provided a counterpoint upon which students could further organize and articulate their thoughts.

The structure of the study itself was similarly designed to provide students with a counterpoint upon which they could ground their experiences (by comparing and contrasting two different class formats). This structure in effect made the interviews a quasi "repeated measures" or "within subjects" approach to qualitative data collection, with the subjects themselves making a phenomenological comparison between two conditions.

Interviews were transcribed verbatim, and I thereafter reread them in detail to uncover themes within the framework of the three engagement subtypes. When this failed to manifest an appropriate level of insight, further analysis and theorizing eventually led to the inclusion of mediation theory and the development of a novel coding system that revealed previously undetected engagement in the form of mediational relationships involving technology.

Phase four introduced a layer of abstraction that resulted from having two teachers reflect on and interpret their students' classroom engagement.

Interviews were unstructured and longer (69 and 95 minutes), allowing for prolonged engagement that was not possible in phase three. Only one of the teachers (Byron) complied with a request to keep a written record of their perceptions regarding student engagement over second semester. This written record was referred to during the interview and submitted to me afterwards.

Member checking was carried out with both participating teachers by providing them with an opportunity to give feedback on the quotes I selected for phase four and my initial analysis. Neither requested that any changes be made. Both teachers declined an offer to read their own fully transcribed interview.

2.6.2 Transferability

To assess the degree to which the findings of this study may be applicable in different educational contexts, I refer the reader to the following sections: *1.2 Research context*, *2.2 Research justification*, and *2.3 Intervention components*. I also suggest reading the student comments in chapter 7 closely to infer similarities and differences to research participants in a different context. My personal conjecture is that the cultural homogeneity of Japan, coupled with the fact that English is a compulsory subject at nearly all universities, may make the findings applicable beyond the current research context. The revised and expanded theory itself may also be applicable to other engagement research that focuses on technological mediation.

2.6.3 Dependability and confirmability

Kept on file are the original datasets for phases one and two, along with the original transcriptions for phases three and four. Written notes and initial attempts at coding document my thought processes prior to the inclusion of mediation theory in phase three. The transcripts on file are coded based on my final coding scheme. My initial research proposal, followed by numerous notes and email exchanges with my research advisor, chronicle the development of the research over time.

2.6.4 Reflexivity

In this section, I provide an account of some of the key ways in which I reflexively examined the influence of my social identity on eliciting data, as well as the ways in which I employed bracketing as a strategy to hermeneutically reinterpret prior assumptions and judgements during the course of the research.

2.6.4.1 Positionality statement

There are two aspects of my social identity that I leveraged in this study: my leadership role at the LERC and my half-Japanese ethnic background. I refrained from informing students of the former, while I used the latter to my advantage.

In general, only faculty and staff are aware of my role at the LERC. I am known to most of my students as simply their teacher and nothing more. While I strive to maintain this "role anonymity" in all of my classes, I

remained especially cautious during the intervention in order to prevent students from ascribing to me a certain status that could unnecessarily distort their motivations and perceptions.

As for my background, students are usually surprised to hear that I was born in Tokyo to a Japanese mother. Although I refrained from telling this to students for many years, I have more recently begun to take advantage of the fact that it can be leveraged to quickly establish a degree of trust, circumventing their initial tendency to otherize expatriate teachers. I feel this aspect of my social identity helped me conduct student interviews more effectively in phase three.

Since I both oversaw the interventions and participated in them, the influence of my role an insider-researcher should not be overlooked. Students were naturally aware that I was conducting research in their classes, but to my eye, they remained largely indifferent to this fact while engaged in classwork. However, contrary to expectations, many students displayed an eagerness to be interviewed at the end of the intervention, perhaps out of a personal desire to assist me with the project.

The other two participating teachers were similarly eager to commit to the study. They undoubtedly wanted to contribute to something that could have a lasting impact, but as with the students, I sensed that their primary motivation was to help me. The fact that I was "in the trenches" with them for the entire intervention was, in hindsight, critical for maintaining interest and emotional investment in the project over several

months. In chapter 8, I reflect further upon my position as an insider-researcher within the context of phase four.

2.6.4.2 Bracketing

Although there is considerable inconsistency in how bracketing is applied to qualitative research, it essentially refers to an ongoing acknowledgement of preconceptions and perspectives held by a researcher. This refers not only to positionality, but to shifting perspectives on theories and findings over the course of an investigation. For instance, much of the variability in student engagement was not captured by the narrow scope of Likert scale survey items in phase one, reinforcing my assumption at the time that engagement was moderately uniform in each class. I bracketed this assumption in order to faithfully conduct the class observations in phase two, and to my surprise discovered the presence of an extraordinarily wide variability in engagement of which I was previously unaware. Despite subsequent reevaluation of phase one failing to prompt any modifications—the results of the statistical analysis are accurate as far they go—this newfound awareness reoriented my perspective on the phenomenon of engagement, allowing me to remain more open to the diversity of experiences expressed in the phase three student interviews.

At other times, bracketing that involved a "second engagement", or a revisiting of the data from a new perspective (Fischer, 2009) resulted in substantial modifications. For example, through bracketing my earlier face

value interpretations of student perceptions, it became clear to me that perhaps students lacked complete awareness of their engagement experiences or were unable to convey them directly. This realization led to the inclusion of an additional analytical dimension in the form of mediation theory (sections *3.4 Mediation theory*, and *7.5.1 Multistability*). In a similar fashion, upon bracketing my initial assumption that experienced teachers would be able to accurately identify student engagement, phase four turned the reflexive lens on the teachers themselves to become an investigation into how deeply held beliefs may have influenced their perceptions (sections *8.4.1 Beliefs and values: perceptions of the iPad, the flipped classroom, and student autonomy,* and *8.4.2 Causal attributions of disengagement*).

In phase three, this process of bracketing preconceptions and revising interpretations resulted in the identification of three superordinate themes: multistability, autonomy, and culture (section *7.5 Discussion*). In phase four, it primarily resulted in the identification of causal attributions of disengagement through the lens of attribution theory (section *8.4.2 Causal attributions of disengagement*). Most notably in regards to theory, bracketing my initial assumption that the engagement construct was logically coherent led me to the quadrants of integral theory (chapter 4) and the realization that the conventional view focuses too narrowly on the notion that engagement is limited to the boundaries of the individual self, thus failing to recognize that emotional engagement is primarily an expression of relational exchange.

2.7 Sequence of chapters

The current overview chapter is followed by a literature review (chapter 3) and an ontological analysis of the engagement construct (chapter 4). Second-language acquisition theories and the flipped classroom approach are also examined through this ontological framework. The empirical research portion of this thesis is organized in manuscript format, with four semi-standalone chapters (chapters 5 to 8) representing the four phases of the study. Each chapter contains its own methods, results, and discussion section. The thesis concludes with a discussion of overall implications and contributions to knowledge (chapter 9).

Chapter 3: Literature Review

3.1 The engagement construct

Student engagement research draws from numerous theoretical traditions and can be grouped into three domains of investigation: dropout prevention theory (Finn & Owings, 2006), school reform (e.g., National Research Council and Institute of Medicine, 2003), and, as is the case with the current study, motivation theory (e.g., Furrer et al., 2014; E. A. Skinner, Kindermann, Connell, et al., 2009). These traditions have also been more broadly described as the behavioral, sociocultural, and cognitive perspectives (Kahu, 2011). It has a relatively short history—so short in fact that only two studies were found to use the term "engagement" in the mid-eighties (Mosher & MacGowan, 1985). Since then, but particularly over the past two decades, student engagement has attracted a substantial amount of interest as a research topic due to its central role in increasing course satisfaction, promoting academic achievement, reducing dropout rates, and improving the overall quality of learning in formal education (Fredricks, 2011; Klem & Connell, 2004).

While few would disagree with the claim that engagement is highly relevant to learning, studies remain hindered by a lack of definitional clarity, with scholars often failing to question the conceptual validity of the existing models they apply (Reschly & Christenson, 2012; Sinatra et al., 2015). A decade ago, Appleton, Christenson, and Furlong (2008) identified some nineteen different general conceptualizations of engagement in the

extant research. These include general student engagement (e.g., Chapman, 2019; James P. Connell & Wellborn, 1991; Yazzie-Mintz, 2007), engagement in schoolwork (National Research Council and Institute of Medicine, 2004), academic engagement (Libbey, 2004), and school engagement (Fredricks et al., 2004; Furlong et al., 2003; Jimerson et al., 2003). Others have offered critiques of how this overly broad definition of the construct has promoted its misuse. For example, Trowler (2015) analyzed how institutions of higher education have capitalized on the vagueness and "chaotic" construal of engagement to support hidden policy agendas. In a similar vein, Zepke (2014) criticized its widespread acceptance as "academic orthodoxy", claiming it implicitly focuses on the average learner while glossing over contextual and individual differences. Others still have pointed out the conceptual confusion that arises from aspects of engagement being excluded or ignored, for example the absence of a clear "object" or focus of student engagement in much of the literature (Ashwin & McVitty, 2015).

At the very least, this definitional imprecision has heretofore made the engagement construct far less useful in research than the well-established motivational constructs to which it is closely related. Some scholars have attempted to address this issue by proposing nuanced, less formulaic conceptual frameworks. One noteworthy example is the social-ecological framework of Lawson and Lawson (2013), which calls on scholars to model integrative, population-specific conceptions of engagement framed by the

contextual aspects of population demography, school ecology, and surrounding social geography.

Despite the criticisms, there is broad agreement on three key aspects of engagement: (a) it is malleable (i.e., it is amenable to interventions and changes in learning contexts) (Connell, 1990; Finn & Rock, 1997), (b) it leads directly to learning (E. A. Skinner & Pitzer, 2012), and (c) it is theoretically distinct from motivation (Filsecker & Kerres, 2014; Finn & Zimmer, 2012; Martin, 2012; Reeve & Tseng, 2011; Wang & Degol, 2014).

Furthermore, many scholars endorse the conceptualization of engagement as a multifaceted meta-construct that consists of three *subtypes* (alternatively referred to as dimensions, indicators, or forms), which are: (a) behavioral engagement, (b) cognitive engagement, and (c) emotional (affective) engagement (e.g., Appleton et al., 2008; Fredricks et al., 2004; Furlong & Christenson, 2008). Some scholars include only two of the three (e.g., Finn, 1989) or subdivide a subtype (e.g., Appleton et al., 2006, 2008; Reschly & Christenson, 2006), or add a new subtype resulting in a total of four (e.g., Filsecker & Kerres, 2014; Linnenbrink-Garcia et al., 2011; Reeve & Tseng, 2011), or offer up to eleven "lower order" subtypes that are more granular in their description (e.g., Martin, 2007). Nevertheless, it is these three subtypes and their variants that appear most frequently in the fragmented literature. They are, in a sense, the core theoretical concepts that unify the field, albeit to a limited degree. Each subtype warrants a brief description.

3.1.1 Subtypes

Behavioral engagement refers to observable actions such as the level of participation, task involvement, and pro-social conduct in class activities. Compliance, attention, effort, and persistence are key indicators. *Cognitive engagement* refers to investment, thoughtfulness, and willingness to exert the mental effort required of an activity. *Emotional (affective) engagement* includes positive and negative reactions to teachers, classmates, classes, and academic work. It reflects an individual's sense of belonging and identification with a class or group (Fredricks, 2014). (Since the focus of engagement in the current study is limited to the domain of the classroom, these definitions intentionally exclude other contexts such as extracurricular activities and family life.)

Although this tripartite conceptualization may make intuitive sense, the subtypes are defined somewhat inconsistently in the literature. For example, the distinction between behavioral and cognitive engagement can be unclear; behavioral engagement for one scholar may be defined as the operationalization of cognitive engagement by another (Reschly & Christenson, 2012). Nonetheless, while the characteristics of behavioral and cognitive engagement may be attributed to different subtypes depending on the scholar, the issue is essentially one of inconsistent labeling, with the core concepts themselves remaining relatively stable across studies.

Emotional engagement is an altogether different story as the concept suffers from a significant misunderstanding regarding its underlying character. For this reason, the lack of consistency in the way it is defined by scholars extends far beyond a problem of inconsistent labeling. In my view, the focus on emotional engagement is misplaced, with the underlying phenomena of social connectedness deserving greater conceptual priority.

In chapter 4, I offer my reappraisal of emotional engagement, arguing that a reconceptualization of the subtype as *relational engagement* is not only more useful, but also more ontologically accurate. I support and expand upon this heterodox perspective based on an ontological and epistemological model at the core of integral theory (Wilber, 1995, 2001).

3.2 Engagement in relation to motivation

Motivation, like engagement, has been conceptualized in numerous different ways. Kleinginna and Kleinginna (1981) identified and categorized over one hundred different definitions of motivation into ten categories (e.g., phenomenological, physiological, energizing, and functional). Yet, in a basic sense, motivation simply refers to forces and processes that give behavior its energy and direction. According to Reeve (2014), "Energy implies that behavior has strength—that it is relatively strong, intense, and persistent. Direction implies that behavior has purpose—that it is aimed or guided toward achieving some particular goal or outcome" (p. 8). Such outcomes within formal education are some degree of competence (i.e., academic achievement), typically measured by test

scores and grades. Engagement is the outward manifestation of motivation that connects motivation to outcomes. While motivations tend to be rather inscrutable, even to the individual possessing it, engagement is comparatively more public.

3.2.1 Self-determination theory

Motivations are energized by both external events and internal motives. While external events first took the limelight in the 1930s with Skinner's studies on operant conditioning (B. F. Skinner, 1938), the importance of internal motives have come to be increasingly recognized in recent decades.

Self-determination theory, a prominent macrotheory of motivation that prioritizes internal motives, has been applied to explain a wide range of human behaviors and internal mental states over the past forty years of its development (Deci & Ryan, 1985; Ryan & Deci, 2000b; Vansteenkiste et al., 2010). The starting premise of the theory is that all humans possess an inherent tendency to seek psychological growth. It maintains that humans have innate psychosocial needs that, like physiological needs, must be satisfied in order to operate at an optimal level and maintain a state of well-being (Deci & Ryan, 2000). These three needs are: (a) competence (the need to effectively interact with the environment in pursuit of a goal), (b) autonomy (the need to experience engagement as originating from oneself), and (c) relatedness (the need to have interpersonal connections). Numerous studies in a wide variety of contexts have demonstrated that

motivation quality is largely predicted by the degree to which these needs are satisfied, generating commensurate engagement and outcomes (Van den Broeck et al., 2016).

Self-determination theory is uncommon among psychological theories in that it fully recognizes the role of social contexts in supporting or thwarting the inner motivational resources that already exist within all students. The most important task of the teacher is to create social contexts that nurture these motivational resources so that they foster high-quality engagement (Niemiec & Ryan, 2009; Reeve & Halusic, 2009). The relationship between the components of this model can be schematically represented as:

context → psychosocial needs → motivation → engagement → outcomes

One must keep in mind, however, that the relationship is far less linear in the real world, with each component interacting with others via complex feedback loops.

Motivation is theorized to exist along a continuum, with amotivation and intrinsic motivation located at the poles and four types of extrinsic motivation in the middle (figure 3.1) (Deci & Ryan, 1985, 1991; Rigby et al., 1992; Ryan & Deci, 2000a, 2000b). The different types of motivation are defined by their perceived locus of causality, or the degree to which an individual feels they are the author of their actions. The four forms of extrinsic motivation can be distinguished from one another by their degree of autonomy, ranging from external regulation (not autonomous) to

integrated regulation (fully autonomous). Understanding these types of motivation is important because the more autonomous the motivation is, the more effort an individual will put forth toward engaging in an activity. This in turn results in higher quality outcomes (Ryan & Connell, 1989). Moreover, this relationship underscores just how important it is for teachers to support students' innate psychosocial need for autonomy.

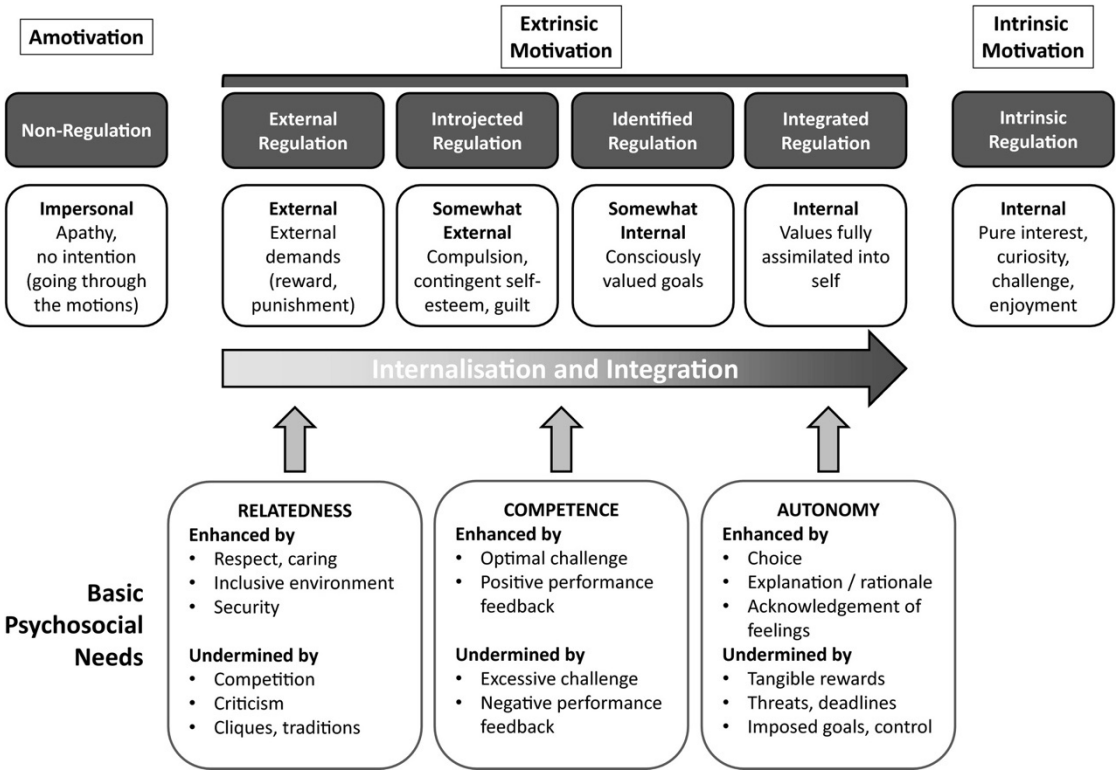


Figure 3.1 The motivation continuum and basic (innate) psychosocial needs in self-determination theory.

Note. From Cook & Artino (2016). Licensed under CC BY-NC-ND 4.0.

A common misconception is that autonomy is synonymous with independence or freedom. While this may be true in its colloquial sense, this is not how the term is used in the theory. A sense of autonomy comes from doing things willingly, either because one values it or because one finds it intrinsically interesting. It does not necessarily result from the

removal of rules and constraints. A good example of this is the willingness to ask for help; if help is sought willingly, then it is done with a sense of personal agency and autonomy. Thus, the goal for teachers should be to help students find the willingness to engage in their studies through providing the necessary structure and autonomy-support.

Recent psychological research is largely supportive of self-determination theory principles. However, its conceptualization of autonomy remains somewhat controversial, with some researchers directing criticism toward particular aspects of the theory. For example, Schwartz (2000) claims that current trends in psychology overemphasize self-determination and the need for autonomy while downplaying their negative impact on our human need for interdependence. Some have suggested that autonomy matters less in collectivist cultures, such as in Asia. For example, the adage, "The nail that sticks out gets hammered down," is famously said to encapsulate the Japanese cultural value of social conformity. Yet, an increasing body of cross-cultural research suggests that the psychosocial need to act with a sense of agency without feeling controlled or coerced is a human universal, albeit understood and expressed in slightly different ways depending on the culture (Nalipay et al., 2020).

Some researchers have placed greater emphasis on other aspects of motivation such as self-efficacy (the belief in one's competence to produce an effect) (Bandura, 1977, 2006), and the influence of goal-setting (Locke, 1968; Locke & Latham, 2002). However, I am in agreement with Meyer

and Gagne (2008), who assert that self-determination theory is currently the most comprehensive unifying theory in which to situate engagement. If autonomy needs are indeed fundamental to supporting motivation, and if the flipped classroom primarily supports these autonomy needs, then it is important to understand how autonomy, motivation, and engagement fit into this larger conceptual framework.

3.3 The flipped classroom

The flipped classroom is an approach to formal education that requires students to engage with the direct-learning portion of the course as homework, while class time is dominated by student-centered tasks accompanied by little to no teacher-fronted instruction. Reducing the need for teacher-fronting allows teachers to work more closely with individuals and small groups on classwork that encourages active participation. Since the approach commonly relies on technology to deliver the homework lessons (typically as online videos), it is typically characterized as a type of blended learning, which distinguishes it from other types of technology-mediated instruction that lack a face-to-face component (e.g., distance learning).

The approach shares many features with other student-centered approaches such as peer instruction, reverse instruction, inverted classroom, 24/7 teaching, and just-in-time teaching, which are similarly designed to encourage greater student engagement by reducing teacher-fronted instruction and restructuring class time to promote self-paced

learning (Bergmann & Sams, 2012a; Novak et al., 1999). Most recently, an instructional approach that emphasizes the self-paced aspect of this style of instruction, known as the Modern Classrooms Project (https://www.modernclassrooms.org), has started to gain traction.

Although the success of Khan Academy (https://www.khanacademy.org) has helped popularize the video-supported style of flipping, the approach is often defined in broader terms. As high school science teacher and flip advocate Brian Bennett states on his blog:

> Video itself will not help kids achieve more in your class. The flipped classroom is about *making connections with learners and differentiating your instruction*. If videos are a part of that multi-faceted plan, great. If they are not, still great. *The flipped class is an ideology, not a methodology* [emphases added] (2011).

A pedagogy that is based on making connections (i.e., increasing interactions) and differentiating instruction (i.e., accommodating individual student needs) is not unique to the flipped classroom. For example, the idea of mastery learning (Bloom et al., 1971) briefly enjoyed popularity in the 1970s before interest waned due to the financial and logistical difficulties associated with implementing differentiated instruction (Horton, 1979). Today, many are finding it easier to actualize student-centered pedagogies in a flipped format now that user-friendly technological tools to support the approach are readily available.

The model has rapidly gained popularity in the past decade. Between January 2012 and May 2014, membership in the Flipped Learning Network, a non-profit organization that serves as an information hub for those interested in flipped learning, increased from 2,500 to 25,000 members (Yarbro et al., 2014). In a survey conducted by the same organization, 80% of respondents reported an improvement in their students' attitudes towards learning, while 90% reported an increase in their own job satisfaction. Sixty-six percent reported increases in standardized test scores. Bill Gates, one of several high-profile supporters of the model, has stated, "…having a lot of kids sit in the lecture class will be viewed at some point as an antiquated thing" (Young, 2012).

Despite its prominence in the educational zeitgeist, only 16% of teachers in the United States were flipping their courses in 2015 (Stephen, 2017). Thus, the flipped classroom remains somewhat of a counter-cultural movement within formal education.

It must be remembered that the flipped classroom is not a systematic teaching method, but a broad approach that seeks to increase opportunities for student engagement in active learning, and—from the teacher's perspective—personalized and differentiated instruction. In this spirit, I sought to investigate how the approach might be designed to best serve the needs of the students in my specific learning context.

3.3.1 Prior studies

Flipped classroom research has grown rapidly over the past decade, though much of it is marked by confirmation biases and methodological inconsistencies (Talbert, 2018). High-quality generalizable research remains a rarity, perhaps due in part to its ambiguous definition and lack of a rigorous research framework. Any research conducted must necessarily be based on a particular interpretation of the pedagogical approach, making findings difficult to generalize beyond specific research contexts.

Nevertheless, some empirical research has demonstrated positive impacts in terms of achievement, motivation, engagement, and interactions (see Zainuddin & Halili, 2016). A recent systematic literature review by Akçayır & Akçayır (2018) found that 52% of the 71 included studies reported improvements in learning outcomes. A number of the studies also reported improvements in student satisfaction (18%), engagement (14%), and self-confidence (7%). Twenty percent of the studies reported an increase in interaction opportunities during class. Furthermore, some studies have reported that the flipped classroom helped students develop better attitudes toward learning (e.g., Fautch, 2015; Hung, 2015).

Within EFL, a recent systematic review found that fewer than half of the 43 studies from 2010 to 2018 provided empirical data, suggesting a lack of rigor in the subfield (Turan & Akdag-Cimen, 2020). Rigor notwithstanding, 21 of the studies reported flipping to be equally or more

effective than a conventional approach, while no studies reported a decrease in effectiveness. The most commonly reported benefit in the literature is an increase in student engagement (e.g., Jensen et al., 2015; Röhl et al., 2013).

Student and teacher satisfaction with the flipped classroom is generally high. However, some studies have reported student dissatisfaction with the quality of learning in a flipped classroom despite feeling satisfied with the increase in peer interactions stimulated by it (Crouch & Mazur, 2001; Frederickson et al., 2005; Strayer, 2012). Others have found dubious benefits in terms of student achievement and satisfaction, as well as considerable drawbacks for teachers (Lape et al., 2014). Such results are likely to be influenced by factors such as: the quality of instructional materials provided for individual learning, the level of the course and the type of learning associated with it, student motivation, class size, student-teacher and student-student rapport, and flipping without a perceived need. Despite some conflicting evidence, far more studies have reported positive outcomes than negative.

3.3.2 Causal mechanisms

The positive effects of the flipped model are typically attributed to the reduction of teacher-centered instruction, in which students play a passive role, and a respective increase in more "active" student-centered instruction (Huba & Freed, 2000; Jensen et al., 2015; Michael, 2006). When measured by criterion-referenced pre- and post-tests separated by

two to four months of instruction, active learning has resulted in improved academic achievement in science, mathematics, and engineering classes (e.g., Chaplin, 2009; Freeman et al., 2007; Knight & Wood, 2005). As in flipped classroom research, improvements in student engagement and attitudes toward learning have been reported (Akinoğlu & Tandoğan, 2007; O'Dowd & Aguilar-Roca, 2009).

Pre-training and *priming* are terms that have been used to describe the mechanisms by which the flipped model allows students to engage effectively in active learning. Bodie, Powers, and Fitch-Hauser (2006) described the process in terms of repeated exposure to a stimulus serving to prepare, or prime, students for the in-class tasks. Other research based on cognitive load theory (Chandler & Sweller, 1991) has found that pre-training via the flipped model fosters active learning because it requires students to use fewer cognitive resources during class (Ayres, 2006; Mayer, 2009; Musallam, 2010). In other words, students can use class time to apply the knowledge they have previously acquired.

Peer instruction has also been found to be instrumental in fostering active learning (Berrett, 2012; Mazur, 1996). The flipped classroom increases the amount of time available in class for one-on-one interactions, both amongst students and between students and the teacher. Papadopoulos and Roman (2010) found that with their flipped approach, 75% of their students helped others during class. Warter, Perez, and Dong (2012)

reported that 70% of their students found the flipped classroom to be more interactive than a traditional one.

These interactions allow for more instances of personalized feedback that are potentially of higher quality than is possible in a teacher-centered instructional approach. In a traditional class, Voerman, Meijer, Korthagen, and Simons (2012) found a 3:1 ratio of positive to negative feedback to be ideal for fostering learning. The same researchers found progress feedback, which emphasizes what has already been achieved, to be less effective than discrepancy feedback, which emphasizes what is yet to be learned. In addition, Burnett and Mandel (2010) discovered that "general, non-targeted praise" was most commonly used in primary school classrooms. They found this form of feedback to be ineffective because it does not target an individual's successful completion of a task, and suggested that an increase in targeted effort feedback may have a positive psychological effect on students. It seems reasonable to assume that these ideals would be more readily attained in a flipped classroom due to the resulting increase in opportunities for personalized interactions.

Within language education, the flipped model has been analyzed in terms of Bloom's taxonomy (Marshall & DeCapua, 2013). Learning processes at the lower levels of the taxonomy (e.g, remembering and understanding) are relegated to the individual learning space, allowing students to focus in the classroom on higher-order thinking skills that apply the knowledge they have acquired (e.g., applying, analyzing, and creating). This

perspective is similar to the cognitive load perspective taken by the pre-training investigators, but is repackaged in terms more familiar to language educators. The authors also note that the increase in available class time can allow students to interact more frequently with a native speaker of the target language, usually the teacher. This is particularly important in oral proficiency classes.

3.3.3 Digital technology use

Flipped classroom studies generally deemphasize the role played by digital technologies, portraying them as pedagogically neutral tools that have negligible influence on the learning experience. Instructional methods are believed to play a far more central role in this capacity (R. E. Clark, 1994).

Other subfields of educational research assume that digital technologies are not pedagogically neutral. For example, one meta-analysis includes 232 studies that compared technology-mediated distance education to classroom instruction (Bernard et al., 2004). In contrast to flipped classroom research, the comparative studies in the meta-analysis are predicated on the notion that characteristics of mediating technologies are paramount in influencing learning experiences and learning outcomes. Bernard et al. (2004) critiques this approach to research, stating that, "...continuing to compare distance education with the classroom, without attempting to answer the attendant concerns of 'why' and 'under what conditions,' is wasted time and effort" (p. 416).

Both of these perspectives have value. In a more balanced view, technologies are not pedagogically neutral, but their characteristics do not entirely dictate the manner in which students interact with them. Technologies simultaneously affect students and are affected by students. In the following section, I introduce a theory that attempts to reconcile these opposing perspectives on technological mediation.

3.4 Mediation theory

In phase three of the study, student perceptions were analyzed through the lens of mediation theory, based on the philosophical work of Don Ihde. Ihde's philosophy takes a close look at the ways in which technological artifacts influence how we relate to the world. Classical philosophy of technology tends to either romanticize technology or otherwise reify it as a fixed monolithic force that is external to us. In contrast, Ihde takes the perspective of "mutual constitution", wherein subject and object are always intertwined and constituted via their interrelation. This interrelation is dynamic, and defines every aspect of how we perceive and relate to the world, or in other words, how we *engage* with reality. Three key elements of mediation theory are described in the following sections.

3.4.1 The non-neutrality of technology

Ihde contends that technologies are inherently non-neutral; since they are intentionally designed to serve a specific purpose, they selectively amplify that aspect of our experience. Such amplifications are accompanied by unavoidable experiential reductions. He provides the example of a pair of

glasses, which amplify our ability to see, but which also reduce our field of vision with their frame (Ihde, 1990, p. 49). This perspective can be characterized as both socially and technologically deterministic: we act upon technology (in its design and use), but technology also simultaneously acts upon us. Reductions, or "side effects" can be perceived as advantageous as well. For example, the reduction of visual cues when using a telephone may be desirable for individuals who do not wish to be seen while conversing.

This concept of non-neutrality in educational contexts remains contentious. The views of social-constructivists (Vygotsky, 1962) naturally tend to align more closely with social determinism (i.e., we act upon technology). Technological tools, in this view, are neutral and have little influence on learning. It is instead how these tools are used, for example through instructional design, which determines the quality of learning (R. E. Clark, 1983, 1994). At the opposite end of the spectrum, studies comparing a technology-use condition with a non-technology-use condition implicitly advocate the idea that technology is a causal agent whose characteristics directly affect the quality of learning (Bernard et al., 2004). Ihde's theorem integrates both perspectives. Independent of Ihde, Postman (1993) theorizes along the same lines. He extends a familiar adage as follows:

> To a man with a pencil, everything looks like a list. To a man with a camera, everything looks like an image. To a man with a computer,

> everything looks like data. And to a man with a grade sheet, everything looks like a number. (p. 14)

In this fashion, attributes of technology play a fundamental role in shaping our experiences; we simultaneously use technology and are used by it. This "used by" quality inherent to the non-neutrality of technology is particularly important to consider at the planning stage of a flipped classroom because it can provide clues on how one might take advantage of the desirable amplifications—and compensate for the undesirable reductions—that are likely to result from any technology one adopts.

Despite the prevailing view that a flipped classroom should emphasize pedagogy over technology, the fact remains that almost all modern flipped classrooms rely on technology to some extent. Therefore, an identification of the potential uses and effects of the technologies used seems only prudent. To maximize the chances for success of any endeavor, one should choose the right tools for the job and understand the potential effects of those tools.

3.4.2 Human-technology relations

Ihde proposes four fundamental ways in which we relate to and through technological artifacts. They are as follows:

In *embodiment relations*, technology acts as a physical extension of sensory perception in the way that a pair of glasses amplifies our natural ability to see. Technology is therefore "embodied" in that it forms a unity to some

degree with our physical body, and it is usually designed to improve upon something we have the natural capacity to do.

In *hermeneutic relations*, technology represents the world in some way, and this representation must then be interpreted by us. Unlike embodiment relations, it does not directly augment sensory perception. For example, a thermometer provides us with a representation of temperature, but we do not feel the temperature with our skin. In this relation, technology forms a unity with the world, conveying information about it that requires interpretation.

In *alterity relations*, we relate to the world not *via* technology, but directly with technology itself. The world in this case exists in the background. An example of this is the way we interact with ATM machines.

In *background relations*, a technology contributes to the context for our relation to the world, but without us being consciously aware of its presence. For example, we may not notice the presence of an air conditioner that automatically maintains the temperature of a room—until it stops working. The four technological relations are summarized in table 3.1.

Relation type	Role of technology	Example	Schematic representation
Embodiment	We interact through it	Glasses	(human - technology) → world
Hermeneutic	We read it	Thermometer	human → (technology - world)
Alterity	We interact with it	ATM machine	human → technology (world)
Background	We are unconsciously affected by it	Air conditioner	human (technology / world)

Table 3.1 The four types of technological relations in mediation theory.

3.4.3 Multistability

In the opening scene of the 1980 film *The Gods Must be Crazy*, a Coca-Cola bottle gets tossed out of an airplane and lands unbroken in the Kalahari Desert. The tribe that discovers it finds numerous practical uses for the bottle, obviously none of which involve drinking Coca-Cola! This illustrates the concept of *multistability*, which suggests that all technologies are inextricably bound to a cultural context and therefore have no innate "essence". Never do technologies exist in isolation; interpretation and usage define what they are.

3.5 Research gaps

In terms of theory construction, research has typically taken a "top down" approach, relying on empirical evidence to validate the engagement subtypes. In this study, I take a "bottom up" approach, challenging the conventional view by taking a philosophical perspective to examine the underlying ontology of the subtypes.

In terms of empirical studies, the application of the engagement construct within the context of a flipped classroom in a compulsory EFL setting has not been investigated to date. No EFL study has applied the construct to analyze student interviews regarding the flipped classroom. By investigating this issue through the lens of mediation theory, my aim is to bring a fresh perspective on the flipped classroom, one that regards the mediating technologies (both the iPads and the flipped classroom itself) as pedagogically non-neutral. In contrast to the standard perspective on flipped classroom research, the approach I take regards both the students and the technologies in use as existing in a mutually constitutive relationship that manifests as engagement.

3.6 Reflections

At the outset of the study, I adopted a comparatively simple theoretical framing. I regarded the three conventional engagement subtypes (behavioral, cognitive, and emotional) as established concepts within the field and sought only to apply them as they are ordinarily construed. However, as I continued to read the literature on engagement, I noticed that the three subtypes were considered foundational by many scholars, based less on conclusive evidence and more on the sheer volume of prior research (and perhaps their own intuitions). I regard this as an expression of both confirmation bias and *argumentum ad populum*, wherein a plausible concept gains credibility within an academic community as it accrues social capital.

In cases where a concept is objectively testable it may become the subject of empirical criticism, though that alone may not significantly alter its level of acceptance by academics, particularly in the social sciences. (A good case in point is the hesitancy within academia to endorse disruptive critiques of the Vocabulary Knowledge Scale [e.g., Bruton, 2009; Stewart, Batty, & Bovee, 2012], one of the most widely used instruments for assessing second language vocabulary knowledge.) In the case of the emotional engagement subtype, adherence to orthodoxy is more forgivable given that our intuitions fail to reliably align with the underlying ontology. This alignment problem became clear once I turned to the philosophical first principles postulated by integral theory, reasoning up from basic assumptions about our fundamental perspectives on reality and identifying inconsistences regarding how the subtypes are commonly understood (chapter 4).

This new theoretical framework, in which emotional engagement is reconceptualized as *relational engagement*, was used to analyze student interviews in phase three (chapter 7). Despite the theoretical amendment, my approach to content analysis initially remained straightforward. I was still parsing the interview data through the lens of three engagement subtypes in a comparatively shallow manner, considering student comments at face value—an approach that revealed few insights beyond the obvious. At this point, I turned to philosophy once again and incorporated concepts from mediation theory, which allowed me to conduct

a deeper analysis of how students engaged with and through technology within the context of these three engagement subtypes.

In this manner, I started with a single macrotheory of motivation and engagement and augmented it over the course of the investigation. This was accomplished through the integration of additional theoretical perspectives that served to make the theory both logically coherent and more useful for research involving technological mediation. Although my reliance on multiple theories may at first seem unwieldy, I believe they fit together logically and were essential for addressing the questions in the study.

3.7 Summary

In this chapter, I first introduced the engagement construct and identified what I consider to be a fundamental misunderstanding regarding the subtype most commonly known as emotional engagement. Second, I described the relationship of engagement to motivation and outcomes from the perspective of self-determination theory. Third, I described the underlying ethos of the flipped classroom, summarized a number of outcome-focused efficacy studies, and explained the mechanisms by which the approach is believed to work. I then explained how, in contrast with technology-mediated distance education research, flipped classroom research generally portrays technologies as being pedagogically neutral. Fourth, I provided an overview of mediation theory, which regards all technologies as non-neutral, though they are defined by their use within a

cultural context. I concluded the chapter by identifying the gaps in the literature addressed by this study.

Having introduced the main theoretical frameworks, I will in the following chapter situate theory and practice within a larger meta-theoretical framework in order to critically examine the engagement construct from an ontological perspective.

Chapter 4: Meta-Theoretical Framework

In the previous chapter, we saw that the field of engagement research remains considerably more fragmented than the closely related field of motivation. Much of this fragmentation arises from a lack of consensus on the definition of the construct itself. Despite this lack of consensus, scholars generally agree that engagement can be considered from the perspective of three distinct but interrelated sub-constructs, or engagement *subtypes*: behavioral engagement, cognitive engagement, and emotional engagement.

In this chapter, I situate engagement and motivation theories, as well as theories of second-language acquisition, in a broader meta-theoretical framework known as *integral theory*. This "zoomed-out" perspective sheds light on the reasons why engagement theories have been particularly resistant to cohesion, and I offer my views on why I believe *relational engagement* is a more ontologically sound way of reconceptualizing the emotional engagement subtype. This argument is followed by a description of how the research design and context of the current study can be situated within the integral model.

4.1 Introduction

In 1995, philosopher Ken Wilber proposed a meta-theoretical framework in which all domains of knowledge could be taxonomized and understood in relation to one another. At the core of the framework is the idea that any event, moment, or *occasion*—a target of analysis that has been bracketed

by certain spatiotemporal boundaries—can be viewed from four irreducible perspectives, represented graphically as quadrants. The fundamental distinctions depicted by the quadrants are: (a) the interior and exterior perspectives, and (b) the individual and collective perspectives. The left-hand quadrants represent *interior states* that can only be understood through interpretation, while the right-hand quadrants represent *exterior features* that can be observed objectively through sensory input or extensions thereof. These perspectives apply to the *individual* in the upper quadrants, while they apply to the *collective*, or groups of individuals, in the lower quadrants (figure 4.1).

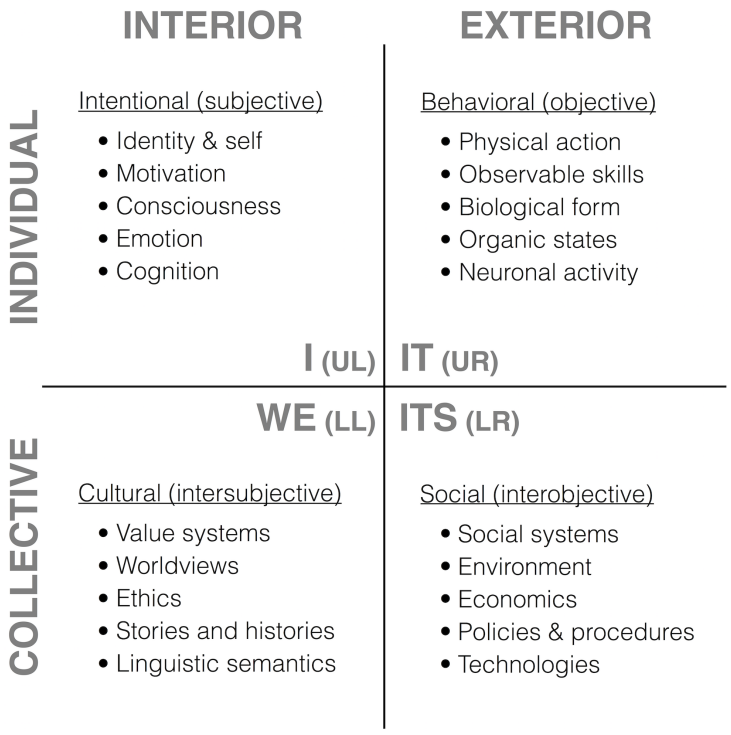


Figure 4.1 The four-quadrant model of integral theory.

4.2 Quadrants: the core of the integral model

We will now take a closer look at the four-quadrant integral model. The upper-left quadrant in the model (UL) represents the interior of the individual. This is the domain of subjective consciousness, the seat of our felt self-sense, intentionality, and cognition. Perspectives that reflect this quadrant use the first-person pronoun "I". The upper-right quadrant (UR) represents the exterior of the individual. This includes the objectively observable behaviors of the individual, as well as the neurological correlates to the UL internal states (such neurological states are "external" in the sense that they can be objectively observed via brain scans). The third-person pronoun "it" is typically used to refer to this quadrant. The lower-left quadrant (LL) represents the interior of the collective, or the meanings, values, perceptions, and worldviews shared by a group of individuals (i.e., two or more people). It is, put simply, the *culture* of a group, or the intersubjective patterns in consciousness. As with the UL, the LL is hidden from a third-person perspective, and can be directly perceived only by those individuals who experience it from the inside (an *emic* view). These experiences are referred to with the second-person pronoun "we". Finally, the lower-right quadrant (LR) involves the external forms and social systems that correlate to the LL communal culture (an *etic* view). The pronoun typically associated with this quadrant is "its" (the plural of "it").

4.3 The integral model as epistemological and ontological bedrock

Though commonsensical in many respects, the novelty of the quadrants arises from the recognition that every occasion can be viewed from four distinct perspectives, and that failure to include the perspectives of all four quadrants necessarily results in a partial understanding of an occasion. In addition, the quadrants represent not only four irreducible *perspectives* on reality (e.g., objectivist, subjectivist, and constructionist epistemologies), but also four *dimensions* of reality (e.g., realist and relativist ontologies).[1] The existence of these four dimensions, condensed to three, has been recognized by numerous philosophers through the ages as the fundamental properties of being, commonly referred to as truth (UR), beauty (UL), and goodness (LL).

4.3.1 The good, the true, and the beautiful

Philosophy is replete with trichotomies. Wilber claims that the most fundamental of these, which he refers to as the Big Three, represents basic human perspectives that are reflected in all natural languages: first, second, and third person; or I, We, and It. We have seen that these perspectives yield the UL, LL, and UR quadrants respectively. However, the quadrants represent only the most recent reformulation of the *transcendentals*, or fundamental properties of being, perhaps the most

[1] Historically, the UR and LR quadrants have been collapsed into a single perspective on objective reality. The integral model splits this domain into two parts in order to more accurately reflect the idea that LR exterior systems are in fact legitimate aspects of every occasion that can be regarded independently of the UR.

well-known of these being Plato's the Good, the True and the Beautiful. The Good is grounded in morality, which arises in the LL interior of a collective; the True refers to "it" propositions, or objective UR and LR exteriors; and the Beautiful, or aesthetic sensibility, arises in the eye of the beholder in the UL interior of an individual. Many other philosophers have proposed similar tripartite divisions as ontological frameworks of human experience. Some of these are listed in table 4.1.

	UL subjective	LL intersubjective	UR objective & LR interobjective
Aristotelian sciences	Productive	Practical	Theoretical
Plato's transcendent forms	Beauty	Goodness	Truth
Popper's three worlds	Subjective	Cultural	Objective
Habermas' validity claims	Truthfulness	Justness	Truth
Kant's three critiques	Judgement	Practical reason	Pure reason
Steiner's anthroposophy	Thinking	Feeling	Willing

Table 4.1 "Big Three" ontological trichotomies viewed through the integral model.

As perspectives, the quadrants can be regarded as epistemological lenses through which we can consider any particular phenomenon. But as dimensions, they can be regarded as facets of reality that actually exist in an ontological sense. The theory maintains that the quadrants represent fundamental dimensions of our universe that define all self-organizing systems, all the way down to cells, atoms, and subatomic particles. While the philosophical arguments to support this claim are beyond the scope of this study, they ultimately terminate in an appeal to intuition, making

this a *primitive notion* within the theory—a concept that cannot be defined in terms of previously defined concepts. (Skeptics can take solace in the fact that all theories that attempt to explain the interrelationship between consciousness and form, the interior and exterior, are at their root equally mysterious.)

In contrast to the predominant physicalist notion that interior states (left-hand quadrants) arise out of physical substrates (right-hand quadrants), integral theory maintains that all four quadrants co-arise, and that no single quadrant in any self-organizing system can exist for long without the other three. Interiors clearly cannot exist without exteriors, but perhaps less intuitively, exteriors also cannot exist without interiors (or so the theory maintains). Furthermore, individuals must exist within communities of similar individuals; no man is an island entire of itself. For example, even a homesteader who lives completely off-grid must to some degree rely on LR technologies and LL values and knowledge in order to survive.

Thus, if one accepts the premise that all human-centered occasions co-arise in these four correlative realities, and that no quadrant can be reduced to another, then the quadrants represent the ontological and epistemological bedrock of reality. While this view may superficially resemble mind-body ontological dualism, it differs in that the physical is not presented as giving rise to the mental, or vice versa. Instead, a co-arising occasion does so simultaneously in all quadrants, and what may

appear to be a dualistic causal relationship between quadrants is, in more accurate terms, a causal relationship amongst four-quadrant occasions.

The problematic notion that the quadrants are sequentially ordered in some way, with one necessarily giving rise to another, suggests a value hierarchy based on whichever quadrant is prejudiced over the others. One form of this has been famously depicted in Thomas Huxley's steam whistle epiphenomenalism. Huxley draws the analogy that, like the whistle of a locomotive, which is functionally irrelevant to the work of the engine, our subjective qualia play no causal role in affecting physical events. Views of this sort have typically led to the balkanization of human knowledge in each quadrant into mutually incompatible domains. I will examine this phenomenon in more detail in the following section.

4.3.2 A fragmented perspective on reality

The integral model is particularly useful in helping us understand why different epistemologies exist, and why they often seem incompatible with one another. Investigations of the human condition have historically taken one of these four perspectives, reducing the totality of an occasion to a single quadrant. This reductionistic partial mapping of phenomena that elevates one aspect of reality over all others is referred to as *quadrant absolutism* (Wilber, 2007, p. 224). Quotes from prominent theorists that exemplify a dominant perspective in each quadrant are shown in figure 4.2.

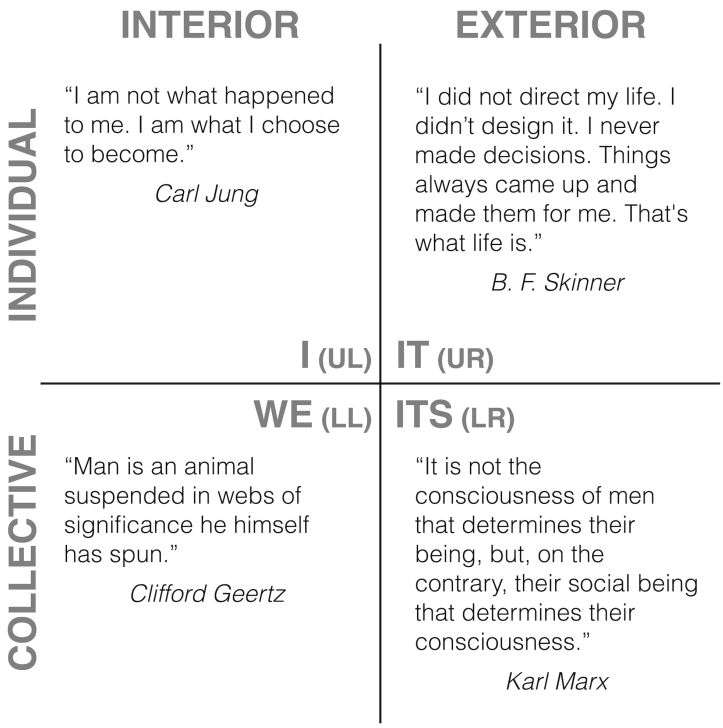


Figure 4.2 Representative perspectives of each quadrant.

We can see from these quotes that the perspective from each quadrant fundamentally differs from the remaining three. In the UL, it is the individual's intentions that shape reality; in the UR, reality is shaped by behavioral conditioning; in the LL, cultural beliefs are the primary driving force; and in the LR, societal structures supersede all other causal factors. In short, the theorists aligned with the left-hand quadrants ask, "What does it mean?" while those aligned with the right ask, "What does it do?" Each quadrant provides a partially correct view of the phenomenon under investigation.

Many disciplines are based on single-quadrant paradigms which are reductionist or absolutist to varying degrees. For example, the dominant paradigm in Western medicine regards the human body as analogous to a

machine. When something goes awry in this machine, it is fixed through physical, UR-quadrant interventions such as drugs and surgery. Or, in the case of physical therapy, patients may exercise or physically manipulate their bodies in some way in order to treat the problem. Interventions that rely on affecting the UL interior states, such as guided imagery, or that enlist the help of LL cultures, such as group therapy, are apt to fall under the category of alternative medicine.

A position of strong relativism has become nearly impossible to maintain amidst the ascendance of scientism. With medicine as a prime example, science has proven to be tremendously beneficial to humanity, making it challenging for philosophical perspectives aligned with the left-hand quadrants to strongly deny the existence of the right. (Left-hand quadrant absolutism of this sort does in fact survive today in the form of some New Age movements and organized religions such as Christian Science.) As a result, the ascendance of scientism has increased the prevalence of right-hand quadrant absolutism (the reduction of left-hand quadrants to the right), a view which considers the existence of interior states to be a kind of epiphenomenon that is to some degree less real than the observable UR and LR quadrant correlates. This perspective was succinctly stated by linguist William Freeman Twaddell more than 70 years ago:

> Whatever our attitude toward mind, spirit, soul, etc., as realities, we must agree that the scientist proceeds as though there were no such things, as though all his information were acquired through

> processes of his physiological nervous system. Insofar as he occupies himself with psychical, nonmaterial forces, the scientist is not a scientist. The scientific method is quite simply the convention that mind does not exist… (1935, p. 57)

It is this elevation of scientism that has compelled many scholars working in left-hand quadrant domains to co-opt scientific approaches in order to gain respectability within a wider community of practice dominated by right-hand quadrant paradigms (Rozin, 2001). The integral model represents an attempt to reintegrate the left-hand quadrants to provide a more balanced and inclusive perspective on human existence. And by committing to acknowledge the presence of all four quadrants in our lives, we strive to be attuned with reality more fully and authentically than is possible with the more myopic intuitions that so often undergird our perspectives.

4.4 The integral model applied to education

By its nature, education lends itself to a more inclusive multi-quadrant approach than do many other endeavors, particularly those aligned with the right-hand quadrants. In figure 4.3, a selection of phenomena within formal education have been mapped onto the quadrants.

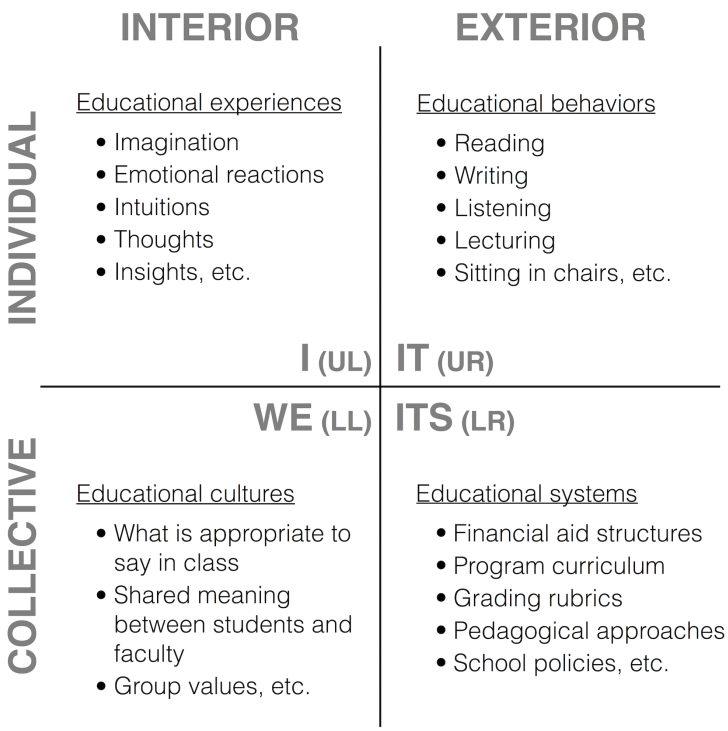


Figure 4.3 The integral model in education.

Teachers may find the model somewhat prosaic since it reflects the daily realities of their profession. It may, however, prove useful as a heuristic device that helps focus attention on all four quadrants in every educational situation without inadvertently sidelining key perspectives. As stated by integral theorist Sean Esbjörn-Hargens:

> By recognizing that every moment in the classroom contains these four dimensions, you, as a teacher or student, can begin to consciously interact with these aspects for a deeper communion with reality and a fuller capacity for responsiveness (2010, p. 63).

We now turn to the domain of the current study, the educational sub-field of second-language acquisition (SLA). As with education more broadly, SLA theories encompass a wider range of perspectives than do many other

sets of theories. Although the mechanistic single-quadrant approach to medical treatment has demonstrated its worth when it comes to addressing physical maladies, education and learning are complex human phenomena for which the importance of both exteriors and interiors are more obvious. As a result, educational theories have historically drawn from a wide range of disciplines representing a diversity of perspectives (e.g., psychology, behaviorism, anthropology, and sociology).

The study of SLA is particularly suited to a multi-quadrant approach due to the nature of language itself. We use language to communicate thoughts and engage with a culture. It shapes our thoughts and defines our worldviews. It is an integral part of what makes us human. Therefore, all four quadrants—UL cognition, UR behavior (e.g., speaking and writing), LL cultural meanings (e.g., semantics and pragmatics), and LR linguistic forms (e.g., morphology and syntax)—are central to the practice of learning a second language.

Although it may be easier to intuitively grasp the relevance of all four quadrants to SLA than to many other fields (such as medicine), this naturally holistic characteristic of the subfield has not precluded theorists from emphasizing the relative importance of a single quadrant throughout the 20th century.

4.4.1 Theories of second-language acquisition

Brown (2000) identifies three categories of theories and models in SLA: *innatist*, *cognitive*, and *constructivist*. To Brown's classification I have

added a fourth category of *structuralist* theories. Brown groups LR structuralism with UR behaviorism based on their historical association and the fact that they share many features, but it is useful to consider them separately since, in my view, they represent distinct perspectives representing different quadrants. These four categories can be mapped onto the integral model. In the following sections, I provide a brief overview of the origins of SLA theories as they relate to the perspective of each quadrant, moving counterclockwise starting with structuralist theories in the LR. This overview will provide a historical context and ontological framework through which the technology-enhanced flipped classroom approach of this study can be understood.

4.4.1.1 Structuralist theories: the LR quadrant perspective

The fundamental tenets of structuralism, which were originally published in the early 20th century (Saussure, 1960), emphasized the importance of relationships amongst linguistic units for defining the structure of a language. Morphological and phonemic similarities and contrasts are what gave form to a language, allowing the interlocutor to appropriately distinguish and use linguistic units in conversation. In the LR structuralist view, as with UR behaviorism, the left-hand quadrants are largely reduced to the right. Language is conceptualized in purely linguistic terms, deemphasizing psychological and cultural factors. In the structuralist view, it therefore follows that learners should take a behavioral conditioning approach to build proper language habits.

Although structuralism is often grouped together with behaviorism, its emphasis on comparing linguistic forms and its treatment of language as static entities led to the discipline of comparative linguistics and, in SLA, the application of theoretical models such as the contrastive analysis hypothesis (Lado, 1957). Such approaches are based on having learners compare surface features of the target language with their first language in order to build awareness of the structural similarities and differences, albeit not always in strictly reductionistic ways. A language that is structurally similar to the learner's native tongue is easier to learn due to more positive and less negative transference. The following quote exemplifies this view of language acquisition.

> The change that has to take place in the language behavior of a foreign language student can be equated to the differences between the structure of the student's native language and culture and that of the target language and culture (Banathy et al., 1966, p. 37).

4.4.1.2 Innatist theories: the UR quadrant perspective

Innatist theories derive from the behaviorism schools of linguistics that arose in the 1940s and 50s. In the UR, theorists such as Bloomfield, Sapir, Osgood, and Skinner championed non-mentalistic theories of language acquisition. Skinner actively denied the reality of an individual as the cause of language production, and famously referred to ideas and attributions of meaning as "explanatory fictions" (B. F. Skinner, 1957, p. 6).

Although such purely behavioristic UR quadrant paradigms became untenable as our knowledge of SLA processes increased, their legacy continues in the form of innatist theories, exemplified by the input hypothesis or monitor model (Krashen, 1982). The central claim in this paradigm is that large amounts of comprehensible input will naturally result in language acquisition through entirely subconscious processes. Moreover, elements of language are acquired in an invariable hierarchical progression (natural order hypothesis). Thus, explicit instruction has a negligible effect on acquisition, implying that our capacity to acquire new languages is wholly intrinsic to our biology. This is the mechanistic UR quadrant perspective on SLA.

4.4.1.3 Cognitive theories: the UL quadrant perspective

Along with the establishment of cognitive psychology as a formal discipline in the mid-twentieth century arose new theories of SLA that critiqued the leading behavioristic theories. This movement, now referred to as the cognitive revolution, was sparked by Noam Chomsky with his sharp criticism of Skinner's behavioristic perspective on language (Chomsky, 1959). The generative-transformational school of linguistics that arose from Chomsky's influence posited that language acquisition involves an innate linguistic structure, common to all humans, that supersedes stimulus-response behavioral conditioning. Cognition, in his view, could not be reduced to surface-level mediational processes. Scholars in this field emphasized the "why" and "how" over empirically measurable "what" questions. For generative linguists and cognitive psychologists,

explanation took precedence over description, and it is this paradigm that led to the development of cognitive theories of SLA.

One influential cognitive theory in SLA is the attention-processing model (McLaughlin, 1978) which posits that we intentionally pay *attention* to the language forms being acquired, either *focally* or *peripherally* (both are considered to be in conscious awareness in this model). At first, one must engage with the language in a capacity limited or *controlled* manner wherein a very small number of discrete linguistic elements are attended to at any one moment. As one's knowledge and skill increase over time, these temporarily controlled processes become *automatized*, or restructured into units that can be more efficiently utilized. Cognitive theories of this sort emphasize the role of UL quadrant intentionality. In contrast to UR quadrant behavioristic theories, conscious attention to form (i.e., grammar) and function is considered crucial for acquiring new knowledge and skills. This attention to form may at first glance seem similar to that in LR quadrant contrastive analysis, but the difference lies in the processes by which the forms are learned. The LR emphasizes habit formation to learn surface structures, while the UL emphasizes rule formation through top-down instruction to induce innate linguistic structures.

4.4.1.4 Constructivist theories: the LL quadrant perspective

Although constructivist and social constructivist theories on learning were pioneered by Piaget and Vygotsky in the early 20th century, they were not

incorporated into SLA theories until the 1980s. In constructivism, social identities and dynamic interactions among individuals are considered the most important variables in terms of learning. The interaction hypothesis (Long, 1985) posits that *modified interactions* to negotiate meaning are central to SLA. Slowing down speech, checking for comprehension, asking for clarification, and paraphrasing are all ways in which speech may be modified in order to negotiate meaning with an interlocutor. The theory argues that the target language must be used for its intended purpose in a social context in order for acquisition to occur effectively. In Long's view, a language class should not focus on activities that are divorced from social context, whether it be comparing linguistic structures (LR), drilling and repetition to automatize behaviors (UR), or activating deep structures with a focus-on-form cognitive approach (UL quadrant). The ideal class should instead focus on socially mediated interpersonal communication, with the teacher and learners responding to situations dynamically to keep the learner in the zone of proximal development (Vygotsky, 1978).

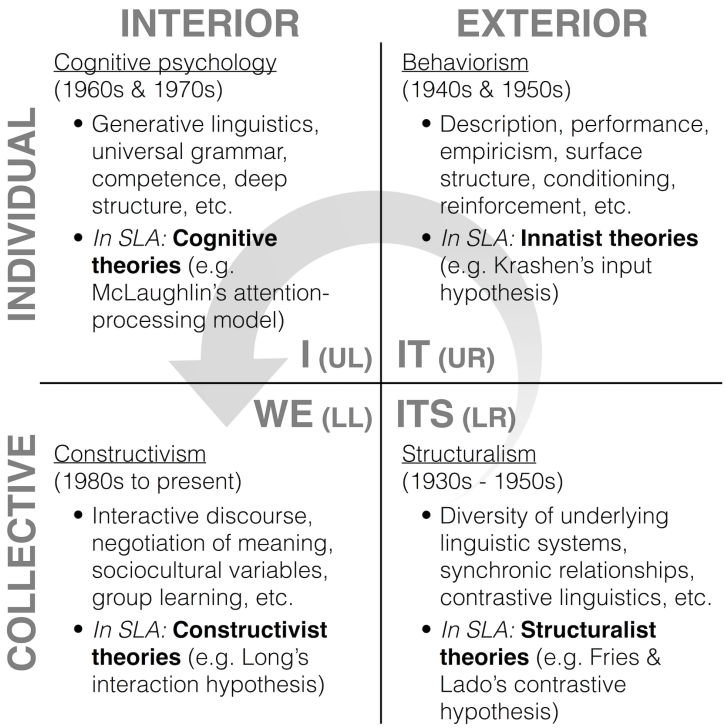


Figure 4.4 An integral perspective on second-language acquisition theories.

Note. The arrow indicates historical progression.

4.4.2 Universal compatibility of the flipped classroom

The key concept that differentiates this four-quadrant view of SLA from the conventional view is that no single perspective is necessarily better or more accurate than the other three. Instead, each perspective is regarded as a partial truth, like a mountain that looks different depending on the position from which it is being viewed.

The flipped classroom may appear to naturally lend itself to constructivist pedagogies (e.g., group work facilitating the co-creation of knowledge). However, its central aim is to support student autonomy and engagement regardless of the underlying mechanisms of knowledge acquisition. It should therefore not be strongly associated with any particular theory of

teaching and learning as it can support instruction that is informed by any of the four quadrants. Even a behavioristic approach to language learning could be embedded within an instructional approach that promotes a high degree of student autonomy and social support.

The assumption that adopting a particular instructional approach automatically results in a specific kind of learning can result in low quality instruction. For example, teachers often associate behaviorism with authoritarian approaches, and constructivism with more autonomy-supportive approaches. In addition to collaborative group work, the flipped courses in the current study also included an eclectic mix of top-down grammar instruction (UL), drill practice (UR), and structural contrasts with Japanese (LR). By keeping the overall aim of the flipped classroom in mind, educators may be able to take advantage of a more diverse range of activities informed by multiple quadrants.

In the following section, we will consider how the three engagement subtypes fit into the integral model, and how the concept of relational engagement aligns more logically with this ontological map than does emotional engagement.

4.5 Reframing engagement within the integral model

Over two millennia ago, Plato understood human behaviors to be driven by three hierarchical motives which he called *appetitive* (biological needs, or UR quadrant), *competitive* (social standards, or LL quadrant), and *calculating* (reasoning, or UL quadrant). This "tripartite soul" was reduced

to a mind/body dichotomy by the time of the Enlightenment, eventually leading to numerous grand theories of motivation that attributed motives to will (e.g., Descartes), instinct (e.g., Darwin), and drive (e.g., Freud). Contemporary perspectives recognize that motives have multiple causes, including environmental, neurological, hormonal, cognitive, social, cultural, and genetic. Thus, the resurgence of motivation research in the 1990s has led to a rediscovery of something known by the ancient Greeks—that aspects of motivation span the quadrants of the integral model (though the majority of the focus currently lies with the UL interior aspects).

What then is engagement when viewed through the lens of integral theory? In the previous chapter, we saw that according to self-determination theory, all humans possess the innate psychosocial needs of competence, autonomy, and relatedness. The degree to which these needs are fulfilled largely determines the quality of motivation that compels an individual to engage with their environment behaviorally, cognitively, and emotionally. Of these three subtypes, definitional consensus in the literature remains the most elusive for emotional engagement.

The following sections provide an argument for why emotion should not be considered an engagement subtype, why the concept of *relational engagement* as the third subtype allows for a more coherent depiction of the engagement construct, and how these subtypes can be viewed through the quadrants of integral theory.

4.5.1 The case against emotional engagement

Emotion is a transitory, interior and exterior phenomenon that helps us adapt to significant life events. In response to events that are beneficial for our well-being, we feel pleasant emotions, and in response to threatening or harmful events, we feel unpleasant emotions. Both pleasant and unpleasant emotions can motivate us to engage or disengage with an object.

While emotion can serve as a pragmatic indicator of student engagement, it is poorly suited for inclusion in our model as an engagement subtype because several of its characteristics make it conceptually incongruous with behavioral and cognitive engagement. Four of these characteristics are described in the following sections.

4.5.1.1 Emotion has a valence

In many models of emotion classification (e.g., circumplex models), emotions are depicted as having two dimensions: arousal and valence. This is depicted in figure 4.5, where the vertical axis represents emotional arousal (activation-deactivation) and the horizontal axis represents emotional valence (displeasure-pleasure).

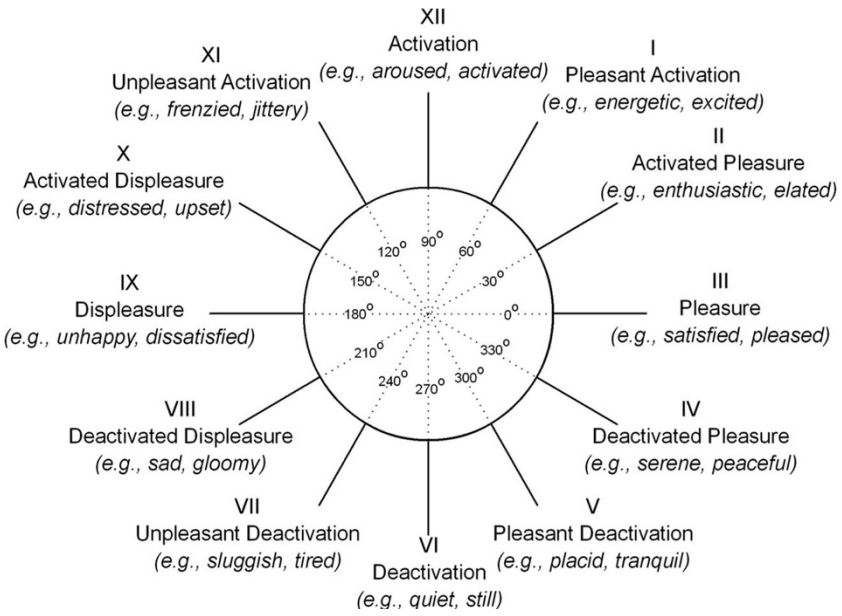


Figure 4.5 The 12-point affect circumplex model.

Reprinted with permission from Yik, Russell, and Steiger (2011).

Although emotional arousal is analogous to engagement level (measured in phase one), engagement is not typically portrayed as having an intrinsically negative to positive valence. Instead, the pleasing or displeasing character of any particular form of engagement is a function of the emotions associated with it, and the perceived "goodness" of engagement is dependent upon personal relevance and value, which is largely culturally determined.

4.5.1.2 Emotion is a multiquadrant phenomenon

Situating the engagement subtypes within the integral model helps reveal other conceptual issues that undermine the notion of emotional engagement. While behavioral engagement is considered an observable phenomenon that is external to an individual (UR quadrant), and cognitive engagement is an unobservable phenomenon that is internal to an

individual (UL quadrant), the UL manifestation of emotions, or *feelings*, represent but one aspect of emotion. As with the engagement construct as a whole, emotion is a complex multiquadrant phenomenon with correlated biological (e.g., physiological activation or bodily arousal, such as increased heart rate), subjective (e.g., phenomenological awareness, such as a feeling of joy), and social-expressive (e.g., facial expressions, such as a smile) components (Izard, 1993). In other words, unlike the behavioral and cognitive engagement subtypes which are limited to a single quadrant, the components that constitute emotion span multiple quadrants.

4.5.1.3 Emotion functions as motivation and feedback

Emotion is thought to possess a motivational aspect in that it provides an individual with a motive to engage with a particular object, with some researchers claiming that emotions serve as the primary motivational system (Izard, 1991; Tomkins, 1962, 1963). As with motivation, emotion is typically associated with energy and intensity rather than information and direction—the latter being a hallmark of engagement. For example, although the emotion of fear is what motivates an individual to flee from a lion (with the fleeing representing behavioral engagement, or *motivation in action*), fear can also be considered to be the motivation itself. Whether one views emotion as functionally equivalent to motivation or more akin to a motive that stimulates motivation, there remains considerable overlap between these two concepts.

Emotion can also be considered a readout mechanism regarding our personal adaptation, providing an ongoing progress report on whether our motives have been satisfied or frustrated (Reeve, 2014, p. 303). That is to say, they provide us with information about whether we have achieved or failed to achieve our desired goals. In the prior example, the emotion of fear either stimulated motivation, or was itself the initial motivation to flee from the lion. A subsequent increase or decrease in the intensity of the emotion functions as a readout on the state of personal safety, motivating the individual to continue fleeing, stop, or fight. It is this emotional readout resulting from engagement that is thought to feed back into motivation to energize subsequent actions. These motivational and feedback aspects of emotion conflict with prevailing views of engagement.

4.5.1.4 Emotion arises spontaneously

Emotions, at least those that derive from biological processes, are thought to arise spontaneously and unconsciously in response to a significant situational event, (Ekman, 1992; Izard, 1989). While true that processes of emotional regulation allow us to exert a degree of conscious control over our emotions, they remain fundamentally reactions which arise involuntarily without the exertion of conscious effort. For example, an individual who can effectively regulate feelings of anger will nevertheless briefly experience the emotion before it is regulated. Emotional regulation is the power of motivation being brought to bear on an emotion (motivation → engagement → emotion). The regulated state of an emotion in such instances may in fact be incongruent with its fundamental, biologically

determined adaptive function (e.g., the cognitive modification of negative emotions associated with physical pain).

Although we often engage with a particular object with hope that it will result in positive feelings in the proximal or distal future, this does not suggest that the emotion itself is produced intentionally. The generated emotion is separate from the mental, physical, and social processes we engage in to produce it. In other words, the experience of engagement is the causal event that produces an emotion. For example, a "joyous" experience is perceived to engender a feeling of "joy". Rarely does one simply "decide to feel joy" without relying on an affectively-charged causal event to produce it.

Conversely, engagement is not depicted as arising spontaneously in current models. Rather, it is an intentional act that is, by definition, preceded by motivation and directed toward an object.

This distinction between the spontaneity of emotion and intentionality of engagement supports the notion that emotion should not be considered a form of engagement. As the adage goes, you can lead a horse to water, but you can't make it drink—but you *can* frighten it!

4.5.2 Reconceptualizing emotional engagement as relational engagement

Some of the primary characteristics of so-called emotional engagement in an educational context are a feeling of belongingness, safety, comfort, and pride in the class or school (Maddox & Prinz, 2003; Osterman, 2000).

Davis, Chang, Andrzejewski, and Poirier (2014) suggest that in most research, emotional engagement is shown to manifest as a result of positive experiences of social connectedness (e.g., Fredricks et al., 2004; Furlong et al., 2003; Jimerson et al., 2003), not only with peers (Buhs & Ladd, 2001; French & Conrad, 2001) but also with the teacher (Goodenow, 1993; Greenwood et al., 2002; Murray & Greenberg, 2001; Wentzel, 1997).

Evidence from emotion research has supported the view that emotions themselves are socially constructed (e.g., Barrett, 2012). Parkinson (1996) argues that emotions "...mediate transactions between people rather than simply exerting effects on private consciousness." This claim is consistent with the finding that over three quarters of over 600 categorized descriptions of anger, fear, happiness, love, and sadness centered on social relationships (Shaver et al., 1992). Appraisal theory (e.g, Lazarus, 1991; Smith & Lazarus, 1993) posits that an event must be personally relevant for it to produce an emotion, and apart from very basic emotions that are rooted in our physiological needs (e.g., breathing, water, food, sex, sleep, homeostasis, and excretion), personal relevance is largely determined by the larger cultural value systems in within which we exist. From a developmental perspective, meta-analyses of neuroimaging studies have found emotions to be inconsistently localized in distinct brain regions, lending strong support to a psychological constructionist view of emotional development (e.g., Lindquist et al., 2012).

The literature thus lends clear support to the understanding that shared beliefs and values determine what we perceive to be personally relevant (or *good*: see section 4.3.1), and that this in turn shapes the character of our emotions. In short, human relationships matter to us more than almost anything else, and even outside of the classroom, it appears that emotion primarily serves a communicative function that is shaped by interpersonal, institutional, and cultural contexts.

Based on this argument, I agree with the suggestion put forth by Davis, Chang, Andrzejewski, and Poirier (2014) that the emotional engagement subtype should be reconceptualized as *relational engagement*, which can be defined within education as *the quantity and quality of students' interactions in the classroom and school community*. However, I disagree with their view that relational engagement serves as a proxy for the supposedly more foundational emotional engagement. My claim is the opposite—that relational engagement is in fact foundational, with emotions representing one of the main ways in which this underlying relational engagement manifests within the individual; emotion serves as a proxy for relational engagement, not the other way around. From this perspective, relational engagement can be considered a valid engagement subtype which is conceptually congruous with behavioral and cognitive engagement.

4.5.3 Orienting the engagement subtypes within the integral model

By replacing emotional with relational engagement, a single subtype can be aligned with each quadrant of the Big Three domains of the integral model: behavioral engagement in the UR, cognitive engagement in the UL, and relational engagement in the LL. Framed in this way, the engagement subtypes constitute three ways in which individuals engage with the three fundamental domains of reality: it, I, and we; or the exterior of the individual, interior of the individual, and interior of the collective. This framing aligns each subtype with a single quadrant and eliminates conceptual overlap. That is to say, behavioral engagement refers to *the behavior itself* (not to the phenomenology of it), and cognitive engagement refers to *the cognition itself* (not to the behavioral expression of it).

The intersubjective quality of relational engagement may make it a more challenging concept to intuit. In a functional sense, relational engagement can be considered the "quantity and quality of students' interactions" as defined in the previous section. However, the deeper ontology underpinning relational engagement is, "...the sharing of subjective states by two or more individuals" (Scheff et al., 2015). It arises when a plurality of UL interiors come to a mutual understanding based on exchanged and understood information (e.g., feelings, perceptions, thoughts, and linguistic meanings). This occurs in the intersubjective "we space" of the LL quadrant. As a collective phenomenon, it cannot be reduced to the UL interior of an individual, nor can it be fully understood by observing UR exterior behavior. Rather, it is the participatory act of coming into mutual

resonance with one another—of accessing each other's minds to see what the other person sees. And like the other two engagement subtypes, relational engagement refers to *the arising of an instance of the phenomenon itself*, and not its behavioral or cognitive correlates.

Relational engagement is therefore a more ontologically sound representation of the subtype most commonly known as emotional engagement. Since emotions are largely social in nature, they frequently indicate the quantity and quality of relational engagement that produced them. Thus, although emotional engagement can serve as a viable proxy for the underlying relational engagement, the two should not be considered one in the same.

4.5.4 Engagement represents communion with reality

Mapping engagement onto the integral model is simultaneously both trivial and profound. Few teachers would deny the reality of these three types of engagement; behaviors, thoughts, and relationships are so fundamental to our being that questioning such axiomatic truths can seem an exercise in academic hair-splitting. However, underlying this self-evident truth is what I believe is a more profound realization, which is that engagement describes the ways in which we commune with ontologically real dimensions of reality. Thus, on the surface level, we may encourage student engagement for the instrumental purpose of learning course content, but on a more metaphysical level, we are encouraging students to have a deeper, more authentic experience of reality. As Wilber

(2001) put it, "Truth, in the broadest sense, means being attuned with the real. To be authentically in touch with the true, and the good and the beautiful" (p. 157).

4.5.5 Motivation, engagement, and class format within the integral model

In figure 4.6, psychosocial needs, motivation, engagement, and class format (the exterior features of the instructional approach) have been mapped onto the integral quadrants as a model of classroom learning. The innate psychosocial needs of competence, autonomy, and relatedness are located in the UL. The satisfaction of these needs determines the quality of motivation, also in the UL (the four types of extrinsic motivation are shown in the figure). This motivation then drives behavioral engagement in the UR, cognitive engagement in the UL, and relational engagement in the LL. The emotional responses resulting from the quality of engagement within these domains feeds back into the psychosocial needs in the UL.

The exterior features of the flipped classroom are represented in the LR as "class format". This forms the social context for student engagement and is believed to exert a strong influence on the other three quadrants.[2] For example, the influence of the LR on the LL contributes to the creation of a class culture that encourages social interaction. This ideally allows for higher quality student-student and student-teacher relational engagement

[2] It is important to keep in mind that describing one quadrant as influencing another is a convention used to frame and focus attention on one aspect (a single quadrant) of a four-quadrant occasion. Stated more accurately, one four-quadrant occasion exerts influence on another four-quadrant occasion.

and has knock-on effects for cognitive and behavioral engagement in the UL and UR. As we shall see throughout this study, the LR determines what students can and cannot do behaviorally, cognitively, and relationally (e.g., amplifications and reductions). It defines the boundaries of engagement within the classroom.

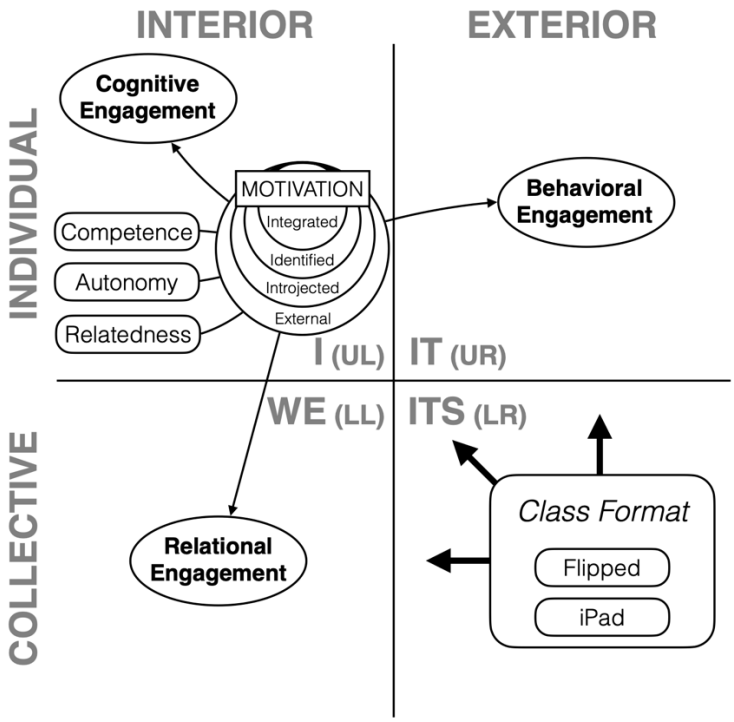


Figure 4.6 A model of student engagement in the classroom based on the quadrants of integral theory.

Let us examine figure 4.6 from the perspective of a student who feels motivated (UL) to participate in a class. How did this motivation arise? Clearly, the student has a brain and a physical body that allowed this motivation to arise (UR), but there is also the class culture (LL) which values participation. This culture arose in part due to the instructional approach of the class, most visibly the class format (LR). Motivation leads to engagement within their respective quadrants, and positive emotional

feedback from this engagement further supports the innate psychosocial needs.

We must take care not to reify the quadrants as ontological containers that exist on their own. Every occasion co-arises in all four quadrants, and sidelining any quadrant results in a fragmented view of the occasion. We can attribute student motivation solely to the willpower of the individual in the UL (e.g., students should strive to "push themselves"), physical state in the UR (e.g., some students are just "naturally motivated"), class culture in the LL (e.g., students feel a connection with the class), or class format in the LR (e.g., reduced lecturing creates more time for differentiated feedback). Any of these views would paint a correct but partial picture of student motivation.

It is also important to recall that engagement is intentional in character. Although each of the engagement subtypes has correlates in the other quadrants—for example cognitive engagement occurs within a particular cultural context and has an associated brain state—these correlates are themselves not necessarily intentional and should therefore not automatically be regarded as engagement. Therefore, the subtypes should not be defined as correlates of one another. This is the reason why a student can exhibit high behavioral engagement while experiencing negligible cognitive engagement, or vice versa.

4.6 Summary

In this chapter, I first introduced the quadrant model of integral theory and demonstrated how it represents four irreducible aspects of reality. Second, I demonstrated how the quadrants can be used to map different components of formal education and various approaches to SLA. The key points to emphasize here are: (a) all of the quadrants deserve consideration when designing an instructional approach, and (b) the class format (the exterior features of the flipped classroom approach) should be considered a technology in its own right that is compatible with any theory of SLA. Third, I presented my argument for why emotional engagement lacks theoretical consistency with the other two subtypes, and why it is better represented as relational engagement. I then oriented the engagement subtypes within the integral quadrants and explained how this reconceptualization elevates engagement beyond its instrumental functions. I concluded the chapter by mapping motivation, engagement, and class format onto the integral model.

In the next chapter, the first of four empirical phases in the study, I take a statistical approach to quantify engagement, autonomy-support, and outcomes.

Chapter 5: [Phase One] Engagement, Autonomy, and Outcomes

In this phase of the study, a quantitative approach was employed to analyze a number of measures across and within three classroom conditions. In each condition, teachers implemented a distinct instructional approach: *conventional-textbook* (a standard, largely teacher-fronted approach), *flipped-textbook* (a flipped classroom approach marked by little to no teacher-fronted instruction), and *flipped-iPad* (a flipped classroom approach that replaced the textbooks with digital textbooks on iPads). Questionnaires were administered to measure student perceptions of their own engagement, and also to measure perceptions of their teacher as being supportive or controlling of their autonomy needs. These variables are referred to respectively as *autonomy-support* and *control*. Completion rates on two types of e-learning homework (*SpotLine* and *myWord*), as well as assessment scores (referred to as *proficiency test*), were used as measures of learning outcomes. Each of these measures is described in greater detail in the methods section.

5.1 Research questions

The following research questions are addressed:

- RQ1: Do engagement, autonomy, and control measures correlate with the learning outcome variables (proficiency test scores and e-learning completion)?

- RQ2: Does classroom condition (conventional-textbook, flipped-textbook, flipped-iPad) have a differential effect on student engagement over time? (i.e., Which classroom condition is most effective in increasing overall student engagement levels over a period of one semester?)
- RQ3: Does classroom condition have a differential effect on perceptions regarding an autonomy-supportive learning climate?
- RQ4: Does classroom condition have a differential effect on perceptions regarding a controlling learning climate?
- RQ5: Does classroom condition have a differential effect on proficiency test gains?
- RQ6: Does classroom condition have a differential effect on SpotLine (textbook review) e-learning completion rates?
- RQ7: Does classroom condition have a differential effect on myWord (vocabulary review) e-learning completion rates?

5.2 Methods

This section includes only the methodological details that are relevant to this phase. See chapter 2 for an overview of the entire study.

5.2.1 Population and experimental groups

This phase was conducted over the second semester of a two-semester compulsory English language course. All participants ($N = 403$) were first-year students at the university representing all seven departments (economics, commerce, management, international studies, information

science, engineering, and fine arts). The participants were divided into three groups. Each group experienced a single instructional approach in the classroom over the 15-week semester.

The *conventional-textbook group* consisted of 213 students in 12 classes taught by 10 different teachers. The teachers of these classes were not instructed to alter their teaching style in any way. Based on numerous class observations I have conducted prior to this study, it is safe to assume that these classes were mainly conducted in a traditional teacher-fronted format, with the majority of class time devoted to individual or whole-class activities that closely conformed to the textbook content. Therefore, for the purposes of this study, this is regarded as the control group as it was composed of students who experienced a conventional instructional approach.

The *flipped-textbook group* consisted of 81 students in five classes taught by three different teachers. Teachers in this group were instructed to conduct their classes according to the flipped classroom approach described in section 2.3.1. The majority of class time was allocated to pair or group activities in which students interacted closely with their peers or teacher. The textbook activities were substantially modified to enable this student-centered approach, allowing for groups of students to work at their own pace with their teacher playing a supportive role.

The *flipped-iPad group* consisted of 109 students in five classes taught by three different teachers. In addition to conducting their classes according

to the flipped classroom approach, teachers were instructed to have students use an interactive iPad-based version of the textbook content. Thus, while the overall instructional approach was identical to that employed in the flipped-textbook group, activities were modified to an even greater degree to include activities that made use of speech-recognition capabilities on the iPad and pairwork for which progress was automatically recorded in Moodle.

5.2.2 Measures

The measures used in the analysis are described in the following sections. The first two sections describe questionnaire-based measures of student perceptions (engagement, autonomy-support/control). The final section describes the learning outcome measures.

5.2.2.1 Engagement

Engagement measures were derived from a questionnaire that asked students to rate their own behavioral and cognitive engagement. (Items that measure emotional/relational engagement were not included based on results of questionnaire validation conducted prior to this study.) The questionnaire was administered at two time points over the 15-week semester, once in week 3, and again in week 15. These are referred to in the analysis as the *pre* and *post* measures of engagement. The 11-item questionnaire employed a six-point Likert scale ranging from "totally disagree" to "totally agree". The five behavioral engagement items were adapted from a scale created by E. A. Skinner, Kindermann, and Furrer

(2009), while the six cognitive engagement items were adapted from a scale created by Wolters (2004). All items were worded positively. Prior to this study, the items were translated by one bilingual native speaker of English and back-translated by two bilingual native speakers of Japanese. Inconsistencies were settled through discussion (Brislin, 1980). The original English version of the items are presented in table 5.1.

Behavioral engagement
1. I try hard to do well in this class.
2. In this class, I work as hard as I can.
3. When I'm in this class, I participate in class discussions.
4. I pay attention in this class.
5. When I'm in this class, I listen very carefully.
Cognitive engagement
1. If what I am working on for this class is difficult to understand, I change the way I learn the material.
2. When doing work for this class, I try to relate what I'm learning to what I already know.
3. When I study for this class, I try to connect what I am learning with my own experiences.
4. Before I begin to study for this class, I think about what I want to get done.
5. When I'm working on the material for this class, I stop once in a while and go over what I have been doing.
6. As I study for this class, I keep track of how much I understand, not just if I am getting the right answers.

Table 5.1 Engagement questionnaire items.

5.2.2.2 Autonomy-support and control

Autonomy-support and control measures were derived from a questionnaire that asked students to rate the degree to which their teacher exhibited both autonomy-supportive and controlling behaviors. It was administered at a single time point during the semester, on week 14. The 10-item questionnaire employed a 7-point Likert scale ranging from

"totally disagree" to "totally agree". The autonomy-support items were adapted from the short form of the Learning Climate Questionnaire (LCQ) (Williams et al., 1994), while the control items were adapted from the Controlling Teacher Questionnaire (CTQ) (Jang et al., 2009). Each scale had five items, all of which were worded positively. Prior to this study, the items were translated by one bilingual native speaker of English and back-translated by two bilingual native speakers of Japanese. Inconsistencies were settled through discussion (Brislin, 1980). The original English version of the items are presented in table 5.2.

Autonomy-support
1. My teacher understands me.
2. My teacher conveys through words or actions that he believes I can do it if I try hard.
3. My teacher encourages me to ask questions.
4. My teacher listens to how I would like to do things.
5. My teacher tries to understand how I see things before suggesting a new way to do things.
Control
1. My teacher tries to control everything I do.
2. My teacher puts a lot of pressure on me.
3. My teacher is inflexible.
4. My teacher uses forceful language.
5. I feel that my teacher doesn't provide me with choices and options.

Table 5.2 Autonomy-support and control questionnaire items.

As was done in this study, the LCQ and CTQ are typically used together due to their measures representing a polarity between autonomy-supportive and controlling behaviors. Measures have been reliably found to negatively correlate with one another in the range of r = -.40. CTQ measures were originally subtracted from LCQ measures to produce a

single overall net score representing perceptions of autonomy-supportive teaching. However, this study follows the more recent trend to use each of these measures independently.

5.2.2.3 Proficiency test

Scores from the TOEIC Bridge (ETS, n.d.), a test of overall English proficiency, were used as a measure of learning outcomes. This one hour, 100-item test measures listening and reading ability, and is designed for low- to mid-level learners. Test scores, which range from 0 to 180, are norm-referenced based on the results from over 180,000 tests that are administered yearly to novice English learners around the world. "Mid-level" students, such as those who participated in this study, typically score in the range of 110–130, equivalent to about A1 (breakthrough or beginner) on the Common European Framework of Reference (Council of Europe, 2001). At the research institution, the TOEIC Bridge was administered to students twice a year: once in April as a placement test, and again in January of the following year after the final class. The test composed 20% of the final course assessment.

5.2.2.4 E-learning

Students at KSU were required to complete two types of e-learning homework before each class: SpotLine and myWord. Completion rates were regarded as outcome measures in this phase. In SpotLine, students reviewed textbook content that was covered in the previous class, while in myWord, they reviewed new vocabulary that they had studied over the

week. All e-learning activities were fully automated. As a diagnostic measure, teachers checked completion data weekly on the Moodle gradebook. Together, the two types of e-learning composed 20% of the final course assessment.

5.3 Results

This section begins by examining the correlational relationships between the various measures. Next, questionnaire-based engagement measures are compared across and within the three groups (three classroom conditions) through a mixed ANOVA. This is followed by a cross-group analysis of the autonomy-support and control measures resulting from the second questionnaire. In a similar fashion, cross-group analyses of the learning outcome measures are presented in the final two sections.

5.3.1 Overall correlations

A Spearman's rank-order correlation procedure was applied to assess the relationship between the questionnaire-based student perception measures (pre/post engagement, autonomy-supportive learning climate, controlling learning climate) and learning outcome measures (proficiency test score, SpotLine e-learning, myWord e-learning) in the three groups (conventional-textbook, flipped-textbook, flipped-iPad). Preliminary analysis showed the relationships to be generally monotonic (but nonlinear), as assessed by visual inspection of scatterplots. Correlations are presented flagged with significance values in table 5.3.

Conventional-textbook	1	2	3	4	5	6
1. Engagement (pre)						
2. Engagement (post)	.689**					
3. Autonomy-support	.322**	.230*				
4. Control	.032	-.128	-.288**			
5. Proficiency test	-.061	.047	.022	-.176		
6. E-learning (SpotLine)	.062	.143	.072	-.076	.073	
7. E-learning (myWord)	.080	.226*	.015	-.051	.063	.546**
Flipped-textbook						
1. Engagement (pre)						
2. Engagement (post)	.694**					
3. Autonomy-support	.536**	.473**				
4. Control	-.188	-.222	-.205			
5. Proficiency test	.149	.113	.058	-.173		
6. E-learning (SpotLine)	.012	.072	.160	.107	.062	
7. E-learning (myWord)	.216	.232	.287*	-.012	.315*	.402**
Flipped-iPad						
1. Engagement (pre)						
2. Engagement (post)	.706**					
3. Autonomy-support	.274**	.359**				
4. Control	-.108	-.227*	-.508**			
5. Proficiency test	.221*	.233*	-.020	-.062		
6. E-learning (SpotLine)	-.056	-.009	.437**	-.394**	.155	
7. E-learning (myWord)	-.013	-.030	.077	-.098	.037	.314**

Table 5.3 Correlation coefficients (Spearman's Rho) between student perceptions (1–4) and learning outcomes (5–7) for the conventional-textbook, flipped-textbook, and flipped-iPad groups.

Note. *p < .01, **p < .001, n = 231.

Weak to moderate positive correlations were found between post-engagement measures and autonomy-support measures across the three groups (row 3 x column 2). Autonomy-support measures were negatively correlated with control (perceptions of a controlling classroom climate) to a

moderate degree in the conventional-textbook group, and to a strong degree in the flipped-iPad group.

Few correlations were found between engagement measures and any of the learning outcome measures (rows 5–7 x column 2). A single weak positive correlation was found in relation to myWord completion rates in the conventional-textbook group (row 7, column 2). Weak to moderate correlations were found between autonomy-support measures and e-learning completion rates in the flipped-textbook and flipped-iPad group (rows 6–7, column 3). A moderate negative correlation was found between control measures and one of the e-learning completion rates in the flipped-iPad group (row 6, column 4).

5.3.2 Engagement measures

A mixed between-within-subjects ANOVA (Tabachnick & Fidell, 2007) with a 3 x 2 factorial design was conducted to assess the impact of the three conditions on self-reported in-class engagement, across two time periods (pre and post).

5.3.2.1 Confirmatory factor analysis

Prior to conducting means analysis, all questionnaire variables were included in a confirmatory factor analysis to assess their convergent and divergent validity, as well as their overall fit together. Fit for modelling was assessed employing Root Mean Square Error of Approximation (RMSEA) (Browne & Cudeck, 1992; Hu & Bentler, 1999), with values < .08

and < .05 held to indicate acceptable and good fit respectively, and the Confirmatory Fit Index (CFI) and Tucker-Lewis Index (TLI) (e.g., Marsh et al., 1988) with values > .90 and > .95 held to indicate acceptable and good fit respectively.

Although confirmatory factor analysis resulted in a moderate to good fit, the large confidence interval indicated poor divergent validity of the two measured constructs of behavioral and cognitive engagement: $\chi 2 = 101.68$ (42), CFI = .96, TLI = .95 and RMSEA = .06 (C.I. 90% = .049–.078). The questionnaire results were therefore used as a unidimensional measure in this phase, representing a measure of overall engagement.

5.3.2.2 Setup and assumption checks

Seventy-six cases representing students who failed to complete either the pre or post questionnaire were removed from the data set. One hundred cases were then randomly sampled from the conventional-textbook group in order to balance the design (repeated analyses with different random samples resulted in nearly identical results, suggesting that random sampling is a viable strategy for obtaining a subgroup that is representative of the conventional-textbook group as a whole). Five outliers were found in the engagement measures, as assessed by the Outlier Labeling Rule using a g-value of 2.2 (Hoaglin et al., 1986). All five outliers were removed from the analysis. Engagement measures were normally distributed for all three groups at both pre and post time points, as assessed by Shapiro-Wilk's test ($p > .05$) and by visual inspection of Q-Q

plots. Skewness and kurtosis values were within the -2 to +2 range that is considered acceptable for univariate distribution (George & Mallery, 2010). There was homogeneity of variances in the pre, but not the post engagement measures, as assessed by Levene's test of homogeneity of variances ($p > 0.5$). There was not homogeneity of covariances, as assessed by Box's test of equality of covariance matrices. This heteroscedasticity was determined to be unproblematic for the current study due to the robustness of ANOVA to balanced designs (Tabachnick & Fidell, 2007). Testing for sphericity was not required due to the presence of only two degrees of freedom (two time points) in the experimental design.

5.3.2.3 Main effects and interaction effects

In the mixed ANOVA, group (conventional-textbook, flipped-textbook, flipped-iPad) was the between-subjects factor, and time (pre, post) was the within-subjects factor. The main effect of the group factor showed that there was a statistically significant difference in engagement between classroom conditions, collapsed across time, $F(2, 271) = 3.473$, $p = .032$, $\eta_p^2 = .025$. The main effect of the time factor showed a statistically significant difference in engagement at the different time points, collapsed across the groups, $F(1, 271) = 7.80$, $p = .006$, $\eta_p^2 = .028$. In addition, the test revealed a statistically significant interaction between the group factor and time factor on engagement, $F(2, 271) = 3.124$, $p = .046$, $\eta_p^2 = .023$. These results are presented in table 5.4 and figure 5.1.

Source	*df*	*SS*	*MS*	*F*	*p*	η_p^2
			Between subjects			
Group	2	10.32	5.16	3.47	.032	.025
Error 1	271	402.75	1.49			
			Within subjects			
Time	1	2.50	2.50	7.80	.006	.028
Group x Time	2	2.00	1.00	3.12	.046	.023
Error 2	271	86.68	0.32			

Table 5.4 Analysis of variance results for group (classroom condition) and time variables.

Note. $n = 274$

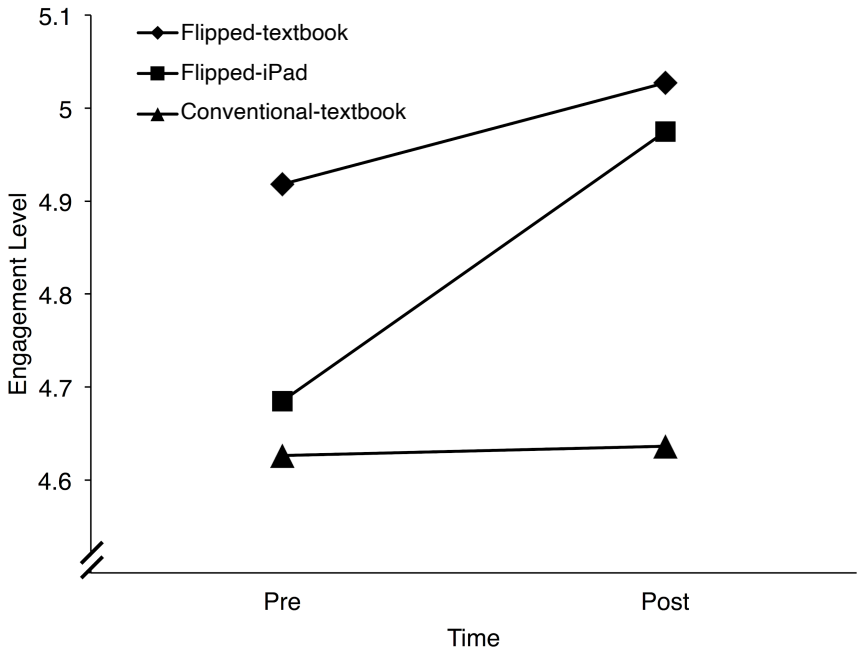


Figure 5.1 Student engagement level changes over one semester as a function of group (classroom condition).

Note. Engagement levels range from 1 to 6.

5.3.2.4 Simple main effect for group (between-subjects factor)

Follow-up one-way ANOVA tests revealed no statistically significant difference in engagement between groups at the pre time point, $p = .13$.

However, a statistically significant difference in engagement between groups was discovered at the post time point, $F(2, 271) = 4.92$, $p = .008$. Post-hoc analysis using Tukey's HSD indicated that engagement at the post time point was statistically significantly higher in both the flipped-textbook ($M = 0.39$, $SE = 0.14$, $p = .017$) and flipped-iPad groups ($M = 0.34$, $SE = 0.13$, $p = .028$) compared to the conventional-textbook (control) group. There was no statistically significant difference in engagement between the flipped-textbook and flipped-iPad groups at the post time point, $p = .928$. As one-tailed planned contrasts revealed very similar results, the slightly more conservative post hoc results are presented in table 5.5.

	Conventional-textbook (1) (n = 101)		Flipped-textbook (2) (n = 74)		Flipped-iPad (3) (n = 99)		
Time period	*M*	*SD*	*M*	*SD*	*M*	*SD*	Post hoc
Pre	4.62	1.04	4.92	1.00	4.68	0.89	1 = 2 = 3
Post	4.64	1.09	5.03	0.77	4.97	0.84	1 < 2, 3

Table 5.5 Mean student engagement levels for the three groups (classroom conditions) across two time periods.

5.3.2.5 Simple main effect for time (within-subjects factor)

Follow-up repeated measures ANOVA tests revealed no significant effect of time on engagement for the conventional-textbook (control) group, $p = .915$, or for the flipped-textbook group, $p = .176$. However, a statistically significant effect of time on engagement for the flipped-iPad group was discovered, with engagement higher at the post time point than at the pre time point, $F(1, 98) = 15.902$, $p < .0005$, $\eta_p^2 = .140$, $d = 0.335$ ($M = 0.29$, SE

= 0.089). (As this effect size is the largest amongst the results, Cohen's *d* is also reported here for purposes of later discussion.)

5.3.3 Autonomy-support and control measures

In order to determine if there were statistically significant differences between the responses on the autonomy-support and control questionnaire across the three groups, a series of two separate Kruskal-Wallis H tests were conducted—one for each construct (i.e., the autonomy-support and control constructs were analyzed independently).

5.3.3.1 Confirmatory factor analysis

Prior to conducting means analysis, all questionnaire variables were included in a confirmatory factor analysis to assess their convergent and divergent validity, as well as their overall fit together. The procedure was identical to that used for the engagement questionnaire. Confirmatory factor analysis resulted in an acceptable fit: $\chi^2 = 90.191$ (32), CFI = .96, TLI = .943 and RMSEA = .075 (C.I. 90% = .057 - .093).

5.3.3.2 Setup and assumption checks

The variables included in the analysis are students' self-reported perceptions of: (a) autonomy-supportive experience, and (b) controlling experience (not to be confused with the control group of this study). Seventy-eight cases that were missing one or more responses were removed from the data. Completion rates were found to be moderately to extremely skewed, as assessed by Shapiro-Wilk's test ($p < .0005$) and by

visual inspection of Q-Q plots. Square root, logarithmic, and reciprocal transformations failed to fit the data to a normal distribution. Therefore, as with e-learning (SpotLine and myWord) completion rate analysis, the nonparametric Kruskal-Wallis H test was performed on the autonomy-support and control data to determine if there was any variation between the conventional-textbook (n = 167), flipped-textbook (n = 67), and flipped-iPad (n = 91) groups.

5.3.3.3 Perceptions regarding and autonomy-supportive learning climate

Distributions resulting from the Kruskal-Wallis H test were similar for all groups, as assessed by visual boxplot inspection. Median response scores were statistically significantly different between groups, $\chi^2(2) = 8.586$, $p = .014$, $\eta^2 = 0.0265$.

Subsequently, pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. Adjusted p-values are presented. This post hoc analysis revealed statistically significant differences in autonomy-support response scores between flipped-textbook (Mdn = 4.80) and flipped-iPad (Mdn = 4.40) ($p = .018$, $\eta^2 = 0.0547$), as well as between flipped-textbook and conventional-textbook (Mdn = 4.60) ($p = .034$, $\eta^2 = 0.0368$), but not between flipped-iPad and conventional-textbook.

5.3.3.4 Perceptions regarding a controlling learning climate

An additional Kruskal-Wallis H test was performed to determine if there were differences in controlling questionnaire responses between the three

groups. Distributions were similar for all conditions, as assessed by visual boxplot inspection. Median response scores were statistically significantly different between groups, $\chi^2(2) = 20.628$, $p < .001$.

As before, pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. Adjusted *p*-values are presented. This post hoc analysis revealed statistically significant differences in controlling response scores between flipped-iPad (*Mdn* = 2.80) and flipped-textbook (*Mdn* = 2.000) ($p < .001$, $\eta^2 = 0.1314$), as well as flipped-iPad and conventional-textbook (*Mdn* = 2.20) ($p = .008$, $\eta^2 = 0.0803$), but not between flipped-textbook and conventional-textbook.

5.3.4 Learning outcome measures (proficiency test and e-learning)

A series of three statistical tests (a one-way ANOVA and two Kruskal-Wallis H tests) were conducted in order to determine if there were statistically significant differences amongst three outcome variables across the three groups. These variables are: (a) proficiency test pre/post change scores, (b) SpotLine (textbook review e-learning) completion rates, and (c) myWord (vocabulary review e-learning) completion rates. The same random sample of students comprising the conventional-textbook subgroup in the mixed ANOVA (section 5.3.2.2) were used in this analysis.

5.3.4.1 Proficiency test change scores

A one-way ANOVA was conducted to determine if the pre-post change scores were different between the three groups: conventional-textbook (*n* = 97), flipped-textbook (*n* = 73), and flipped-iPad (*n* = 98). These group

numbers resulted after six cases were removed from the data due to those students failing to take the post-test. No outliers were found in the proficiency test pre-post change scores, as assessed by the Outlier Labeling Rule using a g-value of 2.2 (Hoaglin et al., 1986). Change scores were normally distributed for all three groups, as assessed by Shapiro-Wilk's test ($p > .05$) and by visual inspection of Q-Q plots. Skewness and kurtosis values were within the -2 to +2 range that is considered acceptable for univariate distribution (George & Mallery, 2010). There was homogeneity of variances, as assessed by Levene's test of homogeneity of variances ($p > 0.5$).

Change scores increased in the conventional-textbook ($M = 13.44$, $SE = 1.03$), flipped-iPad ($M = 14.33$, $SE = 1.08$), and flipped-textbook ($M = 15.04$, $SE = 1.34$) groups, in that order, but the differences between these groups were not statistically significant, $F(2, 265) = 0.47$, $p = .623$.

5.3.4.2 E-learning completion rates (SpotLine)

Four cases were removed from the data based on completion rates of 0%. SpotLine completion rates were found to be extremely negatively skewed for all three groups, as assessed by Shapiro-Wilk's test ($p < .0005$) and by visual inspection of Q-Q plots. Square root, logarithmic, and reciprocal transformations failed to fit the data to a normal distribution. Therefore, the nonparametric Kruskal-Wallis H test (one-way ANOVA on ranks) was performed on the data in place of a standard one-way ANOVA to determine if there were differences in SpotLine completion rates between

the three groups: conventional-textbook (n = 101), flipped-textbook (n = 74), and flipped-iPad (n = 95). Distributions of completion rates were not similar for all groups, as assessed by visual boxplot inspection. The distributions of SpotLine completion rates were statistically significantly different between groups, $\chi^2(2) = 15.545$, $p < .001$, $\eta^2 = 0.0578$.

Subsequently, pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. Adjusted p-values are presented. This post hoc analysis revealed statistically significant differences in SpotLine completion rates between conventional-textbook (mean rank = 156.73) and flipped-iPad (mean rank = 119.88) (p = .001, η^2 = .07972), as well as conventional-textbook and flipped-textbook (mean rank = 126.57) (p = .013, η^2 = .08883), but not between flipped-iPad and flipped-textbook.

5.3.4.3 E-learning completion rates (myWord)

Fourteen cases were removed from the data based on their 0% completion rate. MyWord completion rates were found to be extremely negatively skewed for all three groups, as assessed by Shapiro-Wilk's test ($p < .0005$) and by visual inspection of Q-Q plots. Square root, logarithmic, and reciprocal transformations failed to fit the data to a normal distribution. Therefore, as with the SpotLine analysis, the nonparametric Kruskal-Wallis H test was performed on the myWord data to determine if there were differences in completion rates between the three groups: conventional-textbook (n = 98), flipped-textbook (n = 68), and flipped-iPad

(n = 94). Distributions of completion rates were not similar for all groups, as assessed by visual boxplot inspection. The distributions of myWord completion rates were not statistically significantly different between groups, $\chi^2(2) = 4.126$, $p = .127$.

5.4 Discussion

Each of the seven research questions are addressed below in the order they were first presented. This is followed by a more general discussion of the quantitative results.

5.4.1 Research question 1

Do engagement, autonomy, and control measures correlate with the learning outcome variables (proficiency test scores and e-learning completion)?

This preliminary analysis of relationships between the various measures revealed no strong relationships between engagement levels and learning outcomes in any of the groups. This result is a cause for concern since it suggests that classroom engagement accounts for little variability in the most visible indicators of learning. The lack of a clear relationship between engagement and proficiency test results is particularly troubling, as these test scores are the primary metric by which the performance of the English language program is assessed by the university.

Yet, every year, proficiency test scores do increase significantly between the pre and post tests, despite this apparent lack of connection to

engagement. This disparity may be explained in part by the engagement questionnaire itself, which measured situational engagement in the classroom rather than a broader engagement in the domain. It stands to reason that higher proficiency test scores have a closer relationship to the amount of time engaged in studies outside of class, and it may be that greater classroom engagement does not reliably lead to greater engagement on homework or other independent study (although this too would be a cause for concern).

The nature of the proficiency test and curriculum may also be a source of this disparity. While the test is designed to assess general English language listening and reading skills, the majority of class time is spent on developing listening and speaking skills that the test may not reliably measure. For example, the curriculum heavily emphasizes the development of conversation strategies (requesting clarification, adding follow-up comments, etc.) that are not assessed by the proficiency test. In this scenario, engagement with conversational activities in class may have an inverse relationship to engagement with independent study, with the latter being more important for improving test scores. A criterion-referenced test of the skills developed during class may show higher correlations with classroom engagement. However, further research is required to lend credibility to either of these explanations.

Post-engagement measures showed moderately strong correlations with autonomy-support measures in both of the flipped classroom groups

(flipped-textbook and flipped-iPad). Although these results do not reveal anything about the causal relationship of the two, the results appear to reflect the expected pattern in which the perception of autonomy plays a more significant role in affecting engagement when the teacher takes a more student-centered approach.

Measures of both autonomy-support and control showed moderately strong correlations with SpotLine e-learning completion rates, but only in the flipped-iPad group. However, as seen in the between-group comparisons, the conventional-textbook group completed SpotLine at a higher rate than the other two groups. Therefore, as with engagement, no strong conclusions can be drawn regarding the relationships between perceptions of autonomy-supportive and controlling teacher behaviors and the measured learning outcomes.

Despite the lack of strong correlations between measured student perceptions and learning outcomes, the measured perceptions themselves can be considered legitimate outcomes. That is to say, higher levels of perceived engagement and autonomy-support are likely to be beneficial for students, even if they do not translate to higher test scores. After all, the observed disconnect can be potentially ascribed to a number of confounding factors, but it is rather nonsensical to claim that students ought to be *less* engaged in class. The analysis in the remainder of this study will therefore be based on the rational assumption that higher levels of engagement and autonomy are in and of themselves desirable results of

classroom instruction, while the problem of connecting engagement and autonomy to learning outcomes will be set aside for future investigations.

5.4.2 Research question 2

Does classroom condition (conventional-textbook, flipped-textbook, flipped-iPad) have a differential effect on student engagement over time? (i.e., Which classroom condition is most effective in increasing overall student engagement levels over a period of one semester?)

Classroom condition was found to have a differential effect on student engagement over time. In other words, the interaction effects revealed that the rate of engagement increase over the semester did indeed depend upon the instructional approach. Main effects represent only the average effects of each factor which are known to vary between levels of the other factor (i.e., on average, engagement increased over time and differed between groups). For this reason, the main effects are considered subordinate to both the interaction effects and simple main effects in this analysis.

The analysis of simple main effect for condition compared the differences in engagement across the three groups at both the pre and post time points. Engagement levels were statistically equivalent at the beginning of the semester (pre), but engagement in the flipped-textbook and flipped-iPad groups were statistically higher than the conventional-textbook condition to a similar degree at the end of the semester (post). However, the simple main effect for time (which revealed changes over time in each group) revealed that engagement increased over the semester only for

students in the flipped-iPad condition. This disparity arises from the larger variance in the flipped-iPad values when compared to the flipped-iPad values when comparing across time.

Taking the results of both the between- and within-subjects simple main effects into account, we can confidently claim that the increase in engagement over time in only the flipped-iPad condition was significantly greater than the increases in engagement in the flipped-textbook and conventional-textbook conditions. The evidence also suggests that students in the flipped-textbook condition may have experienced overall higher engagement than the conventional-textbook condition, despite flipped-textbook engagement levels failing to increase significantly over the semester. It is important to recognize that these differences, though statistically significant, are exceedingly small in practical terms (table 5.4). At $p = .046$, the differences in engagement change over time, compared between groups, are very small. Flipped-iPad engagement increased only by an average of 0.29 points (on a six-point scale), and only 2.3% of the variability is attributable to interaction effects ($\eta_p^2 = .023$).

Analysis of simple main effects is always suggestive rather than definitive, and there is a lack of agreement amongst statisticians on its use (UCLA: Statistical Consulting Group, n.d.). Even in the best-case scenario, the relationships revealed through the analyses are not causal. These results should therefore be considered one small piece of the puzzle rather than a

grand conclusion regarding the effects of iPads or the flipped classroom on student engagement.

5.4.3 Research questions 3 and 4

Does classroom condition have a differential effect on perceptions regarding an autonomy-supportive learning climate?

Does classroom condition have a differential effect on perceptions regarding a controlling learning climate?

Classroom condition was found to have a differential effect on perceptions regarding both autonomy-supportive and controlling learning climates. Students in the flipped-iPad condition perceived their teachers as providing the lowest degree of autonomy-support and exhibiting the highest degree of controlling behavior compared to the flipped-textbook and conventional-textbook conditions. This result was contrary to expectations as one of the main reasons for implementing a flipped classroom with the iPads was to increase students' sense of autonomy. Reasons for this may be related to the fact that all student output from the iPad activities was automatically recorded in Moodle, increasing the sense that students were being forced to engage with the course content in a prescribed manner. However, it should be noted that for all three conditions, perceptions of autonomy-support were generally high (*Mdn* = 4.40-4.80 out of 7) and the sense of being controlled generally low (*Mdn* = 2.00-2.80 out of 7). Another interesting observation is that although autonomy-support was lowest in the flipped-iPad group, the strongest

correlations between engagement and autonomy-support were found in the flipped-iPad and flipped-textbook conditions. Thus, it may be the case that autonomy-support played a more central role in affecting engagement levels in the flipped-iPad condition despite the measured levels being lower.

5.4.4 Research question 5

Does classroom condition have a differential effect on proficiency test gains?

Proficiency test scores were not statistically different between groups. Various reasons for this result are discussed in the first part of this discussion.

5.4.5 Research questions 6 and 7

Does classroom condition have a differential effect on SpotLine (textbook review) e-learning completion rates?

Does classroom condition have a differential effect on myWord (vocabulary review) e-learning completion rates?

Classroom condition was found to have a differential effect on completion rates for SpotLine, but not for myWord. Students in the conventional-textbook group completed SpotLine at higher rates than students in the iPad and flipped conditions. This result was contrary to expectations because the flipped approach was anticipated to increase student engagement not only in regards to classwork, but also to independent study. This lower completion rate in the flipped-textbook and flipped-iPad

groups may be the direct result of reduced teacher-fronted instruction. It is likely that teachers in the conventional-textbook group spent more time reminding the class to complete their e-learning homework, or used the classroom projector to review the e-learning homework as a whole-class activity. Unfortunately, perceptions of the e-learning were not explored in the student interviews, making this an issue to be investigated in a future study.

5.5 Summary

The key findings of this phase are summarized below. The effect sizes for most of these findings are small, indicating that other factors that are unaccounted for in the study—such as rapport and various other teacher effects—are likely to have influenced the variables to a much larger degree. Still, these findings are useful when viewed in conjunction with findings from other sources of data.

1. Engagement was not correlated with any of the learning outcomes.

2. Engagement at the post time point was weakly to moderately positively correlated with autonomy-support.

3. Autonomy-support and control were respectively positively and negatively correlated with e-learning completion, but only in the flipped-iPad condition.

4. Engagement increased over the semester in the flipped-iPad condition.

5. Engagement in the flipped-textbook and flipped-iPad conditions was higher than in the conventional-textbook condition at the end of the semester.

6. Perceptions of autonomy-support were lowest in the flipped-iPad condition. Similarly, perceptions of a controlling climate were the highest in the flipped-iPad condition.

7. Proficiency test scores did not significantly differ between conditions.

8. Completion rates for SpotLine (textbook review) e-learning homework was highest in the conventional-textbook condition. This suggests that the measured engagement did not extend beyond in-class activities.

The relationships between the different groups are presented in table 5.6.

1. Engagement (pre)	1 = 2 = 3	5. Control	3 > 1, 2
2. Engagement (post)	2, 3 > 1	6. Proficiency test	1 = 2 = 3
3. Engagement (change)	3 > 1, 2	7. E-learning (SpotLine)	1 > 2, 3
4. Autonomy-support	1, 2 > 3	8. E-learning (myWord)	1 = 2 = 3

Table 5.6 Relationships between the measured values in the conventional-textbook, flipped-textbook, and flipped-iPad groups.

Note. 1 = conventional-textbook, 2 = flipped-textbook, 3 = flipped-iPad

Chapter 6: [Phase Two] Observations of Behavioral Engagement

This phase of the study describes how students (and to an extent, teachers) were behaviorally engaged in their classes. Videorecorded classes were used as evidence sources, making this the only phase of the study based on measures of objectively observable phenomena. A number of student behaviors were identified and quantified using an observation method that included the behaviors of every student in the classroom. This behavioral data was first used to describe what students were doing in class, and subsequently used to consider what these behavioral profiles reveal about their engagement.

6.1 Research questions

The following research questions are addressed:

- RQ1: How did the teacher make use of class time?
- RQ2: What behaviors were exhibited by students?
- RQ3: What were the average occurrence levels of each behavior?
- RQ4: How did behavioral occurrence levels vary between students?
- RQ5: How did average behavioral occurrence levels vary between classes?

6.2 Methods

Student behaviors were observed in three classes: one flipped-textbook

class and two flipped-iPad classes. They were taught by two different teachers: the flipped-textbook class and one of the flipped-iPad classes were taught by teacher 1 (myself), and the other flipped-iPad class was taught by teacher 2. Each class consisted of 18 students seated in groups of two to six. Students remained seated together with their group throughout the class period.

Although the students in the flipped-iPad classes primarily used the digital textbook, they were free to reference their regular textbook when they felt it was necessary.

6.2.1 Videorecording procedure

Direct classroom observations were not conducted due to scheduling conflicts. Instead, portable GoPro video cameras were used to record videos of class sessions. Although the GoPro is a camera designed for outdoor sports videography, it was found to be optimal for recording classes due to its unobtrusive size, wide-angle lens, long battery life, and ease of remote operation.

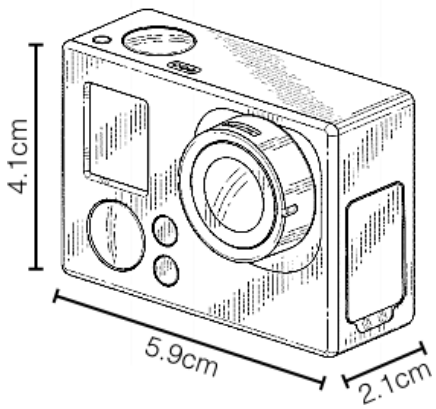


Figure 6.1 Dimensions of a GoPro camera.

The camera was attached to a metal hook and hung from the top edge of a whiteboard located behind the teacher's lectern. An iPad connected to the camera via Bluetooth functioned as both the viewfinder and the recording controller. Through the use of a wide-angle setting on the camera, the entirety of the 85 square meter classroom was included in the frame.

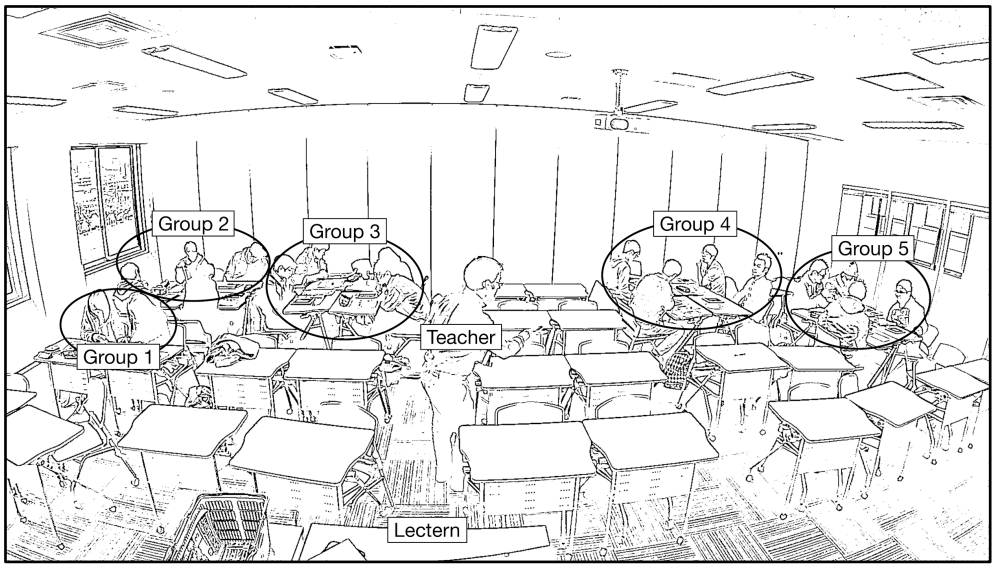


Figure 6.2 Typical class seating arrangement as captured by the camera.

A total of three flipped-textbook classes conducted by teacher 1 were videorecorded. The third class was selected for use in the analysis. Eight iPad classes conducted by teacher 1 and another eight iPad classes conducted by teacher 2 were videorecorded. The fifth classes for both teachers were selected for use in the analysis. The large number of recorded classes helped ensure that the behaviors of both students and teachers were not unduly influenced by the presence of a camera in the classroom. Approximately forty minutes of video (40 min x 3 classes), representing the core activity-based portion of the 90-minute class, was subjected to observation and analysis.

6.2.2 Observation procedure

A procedure for collecting data on student behaviors was specially designed in order to capitalize on the advantages of the videorecorded format. Unlike in-class observation, video observation allows the researcher to closely scrutinize student behaviors by pausing and replaying short segments of the video. The wide-angle lens of the GoPro allowed the behaviors of every student to be included in the frame. All-inclusive strategies of this sort are impractical when conducted in-person since they only allow for observation either at the individual level in great detail, or at the classroom level in far less detail. However, the advantages of video are tempered by one serious disadvantage: the inability to distinguish the content of what individual students are communicating verbally with their teacher and peers. In order to help compensate for this unavoidable loss of detail, the approach taken sought to gather behavioral data on every participating student with as much granularity as possible.

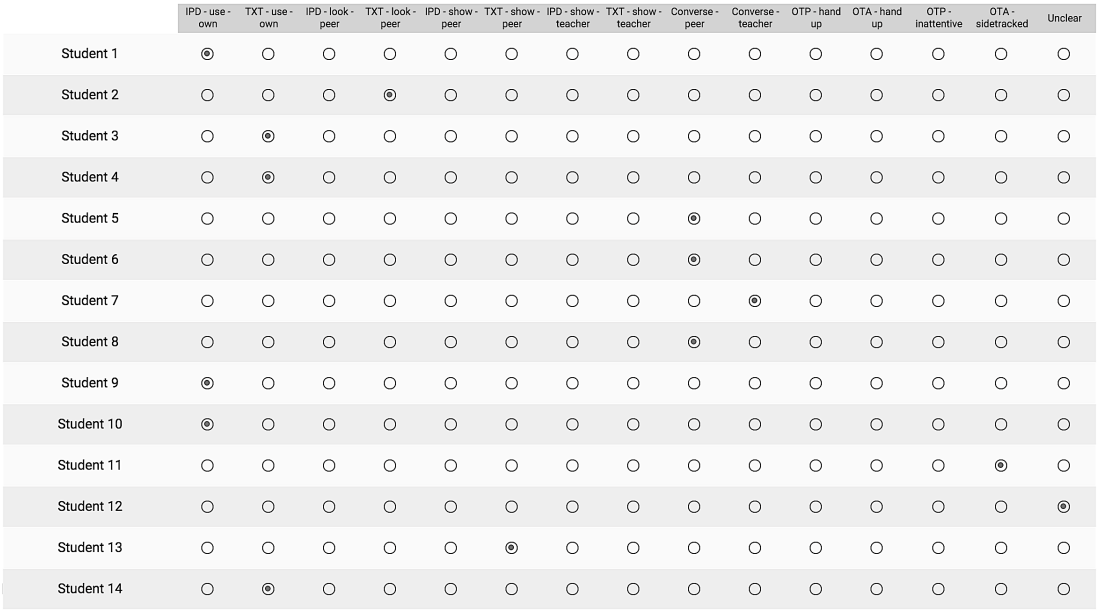
The procedure employed, which I call *video-based inclusive time-sampling*, is a modification of standard interval recording procedures. It is essentially a momentary time sampling approach which differs from the typical procedure in that it allows the observer to collect data on behaviors exhibited by every student in the class at every time interval. This was made possible with an observation tool that made use of a touchscreen device and online technologies. The procedure was as follows:

1. Record videos of the classes to be observed.

2. Watch the videos and make a comprehensive list of the types of behaviors exhibited by students.
3. Create the observation tool: a multiple-choice grid on Google Forms or a similar online questionnaire creation tool with the students in rows and behaviors in columns.
4. Rewatch the videos, pausing every 30 seconds to input the observed behaviors into the grid using a touchscreen device.

Behaviors that were difficult to interpret from a still image were reinspected by playing the video for five seconds after the predetermined observation time point. The behavior that was observed the most within that five second time frame was input into the grid. (For this reason, this procedure is more comparable to a momentary time sampling approach rather than a whole or partial interval time sampling approach.) A screen magnifier, often included as an assistive technology in many computers, was often used to zoom in on behaviors exhibited by individual students.

The observation tool in steps three and four above could accommodate up to 20 individual behaviors and an unlimited number of students. A touch-screen computer expedited the data input process. The user interface of the tool was customized, resting in scrollable input grid with a non-scrolling header listing the behaviors (figure 6.3).



	IPD - use - own	TXT - use - own	IPD - look - peer	TXT - look - peer	IPD - show - peer	TXT - show - peer	IPD - show - teacher	TXT - show - teacher	Converse - peer	Converse - teacher	OTP - hand up	OTA - hand up	OTP - inattentive	OTA - sidetracked	Unclear
Student 1	◉	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Student 2	○	○	○	◉	○	○	○	○	○	○	○	○	○	○	○
Student 3	○	◉	○	○	○	○	○	○	○	○	○	○	○	○	○
Student 4	○	◉	○	○	○	○	○	○	○	○	○	○	○	○	○
Student 5	○	○	○	○	○	○	○	○	◉	○	○	○	○	○	○
Student 6	○	○	○	○	○	○	○	○	◉	○	○	○	○	○	○
Student 7	○	○	○	○	○	○	○	○	○	◉	○	○	○	○	○
Student 8	○	○	○	○	○	○	○	○	◉	○	○	○	○	○	○
Student 9	◉	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Student 10	◉	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Student 11	○	○	○	○	○	○	○	○	○	○	○	○	○	◉	○
Student 12	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◉
Student 13	○	○	○	○	○	◉	○	○	○	○	○	○	○	○	○
Student 14	○	◉	○	○	○	○	○	○	○	○	○	○	○	○	○

Figure 6.3 Data input grid.

6.2.3 Data analysis

The data from the grid was automatically recorded in a spreadsheet. With behaviors observed in each of the three classes every 30 seconds over approximately 40 minutes, observations were recorded at the following number of time points:

1. Flipped-textbook 1: 71 time points
2. Flipped-iPad 1: 80 time points
3. Flipped-iPad 2: 81 time points

With 18 students in each class, this procedure resulted in a total of 4,176 individual behavioral observations across the three classes. Analysis consisted of straightforward tabulation and consolidation of the behavioral data. Since none of the students were left out of the observation, no extrapolation was necessary when creating a behavioral profile for each

class. A simple cross-class comparison was also carried out based on consolidated behavioral occurrence levels in order to gain insight into how behaviors compared across the different classroom contexts.

6.3 Results

Research question 1 is based on observations of the teacher, while research questions 2 to 5 are based on observations of the students.

6.3.1 Research question 1

How did the teacher make use of class time?

Before applying the observation procedure, the three videos were watched from beginning to end to obtain a general idea of the class format. All three classes were structured similarly. The first five minutes of class were spent on taking attendance and conducting other administrative matters. This was followed by about five minutes of teacher-fronted explanation of the lesson. The students then formed groups consisting of two to six members. The following 15 to 20 minutes were spent on group-based vocabulary quizzes, either on paper or on iPads. This was followed by roughly one hour of group activities (using only textbooks or textbooks together with iPads), with five to ten minutes at the end of the class allocated to whole-class announcements and clean-up.

6.3.1.1 Overall student-teacher interaction profiles

No teacher-fronted instruction was included in the lessons apart from a short overview of the lesson. Instead, the teacher circulated among the

student groups for the majority of class time. Table 6.1 lists the number of separate interactions the teacher had with students, the amount of time spent on student-teacher interactions, and the length of time spent on interactions.

	Flipped-textbook 1	Flipped-iPad 1	Flipped-iPad 2
	Observation characteristics		
Length of observation	60:00	68:00	65:00
Number of groups	6	5	4
	Per class student-teacher interaction totals		
Interaction count	40	36	24
Interaction time	46:20 (77%)	50:50 (75%)	52:40 (81%)
Non-interaction time	13:40 (23%)	17:10 (25%)	12:20 (19%)
	Per group student-teacher interactions		
Average interaction time	1:06	1:20	2:01
Minimum interaction time	< 00:10	< 00:10	< 00:10
Maximum interaction time	3:20	4:00	7:50

Table 6.1 Overall student-teacher interaction profiles for the observed classes.

Note. Times are listed in the format "minutes:seconds".

6.3.1.2 Teacher movement in the classroom

Figures 6.4 to 6.6 plot the location of the teacher in the classroom over the observation period at three-second intervals. The dots inside the rectangle frames represent locations where the teacher was interacting with students, and also where the teacher was standing at the front of the classroom.

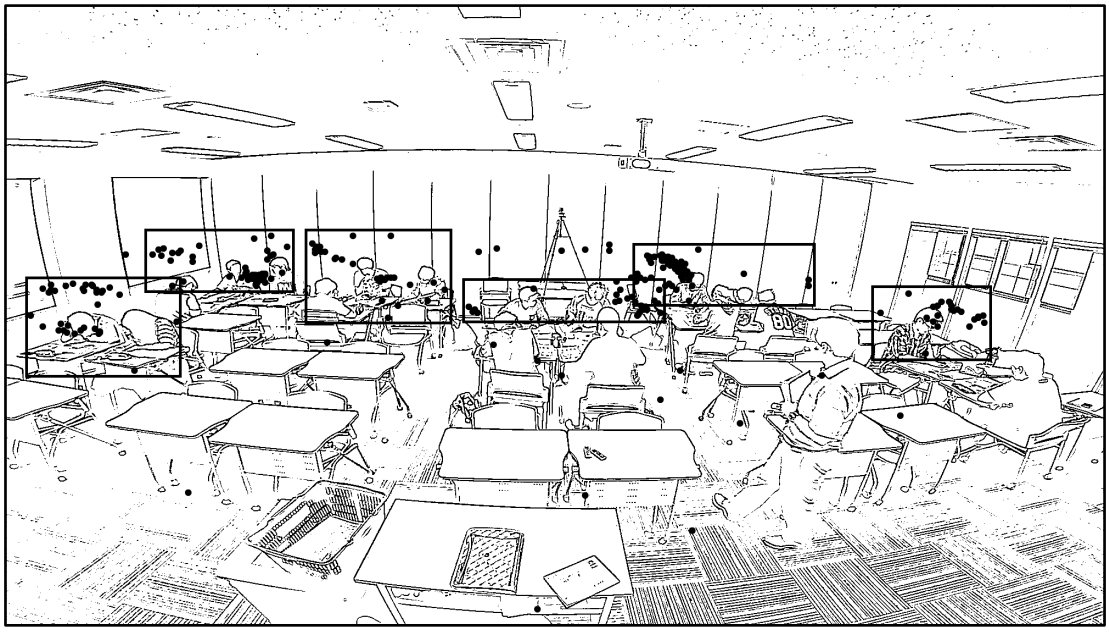


Figure 6.4 Teacher movement in the classroom (flipped-textbook 1).

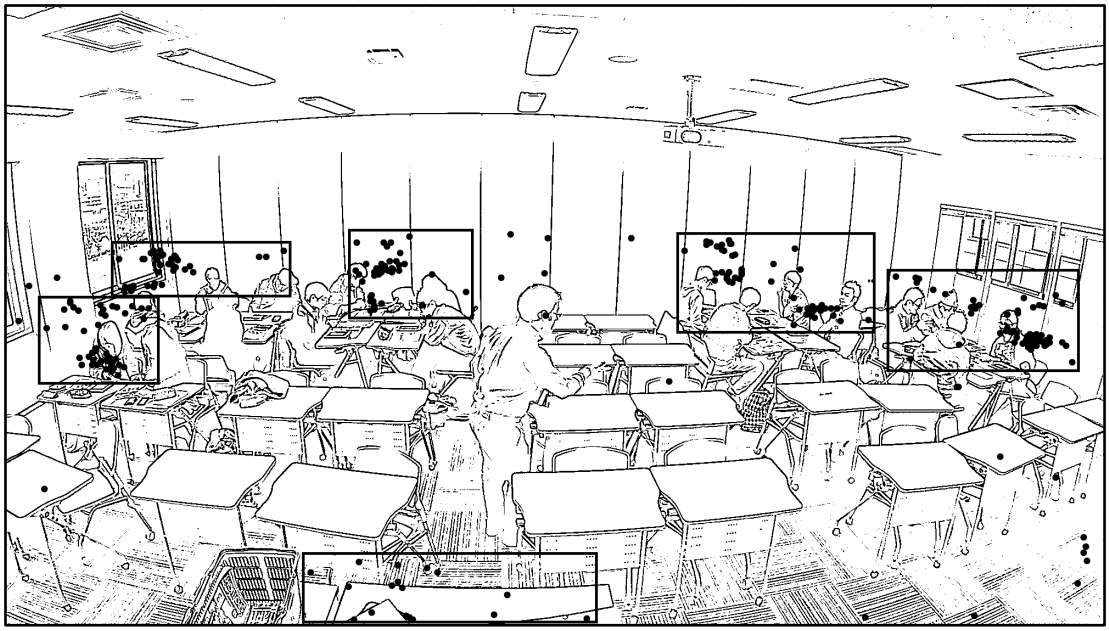


Figure 6.5 Teacher movement in the classroom (flipped-iPad 1).

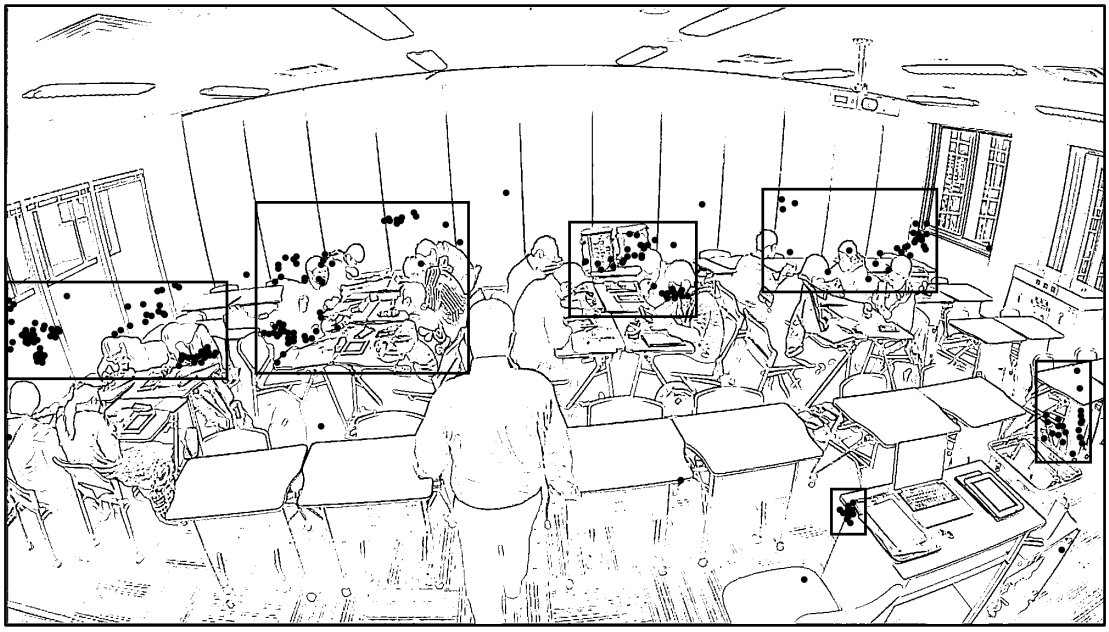


Figure 6.6 Teacher movement in the classroom (flipped-iPad 2).

These plots reveal three characteristics of the teacher's movement in class. Firstly, the majority of the dots fall within the rectangle frames. This corroborates the finding that 75–81% of the teacher's behaviors centered on directly interacting with students (table 6.1). Secondly, in the flipped-textbook class (figure 6.4), the teacher spent almost no time at the front of the class, while in the flipped-iPad classes (figure 6.5 and figure 6.6), roughly 40 to 80 seconds were spent at the front. Closer inspection of the videos revealed that much of this time was likely spent on handling technical issues with the iPads or Moodle. Clearly, none of these three classes relied on teacher-fronted instruction. Thirdly, the dots are not evenly distributed within each rectangle, suggesting that the teacher is interacting more closely with certain individuals in each group.

6.3.1.3 Quantity and consistency of student-teacher interactions over time

The following three figures display (a) the number of student-teacher interactions per group, and (b) the distribution of student-teacher interactions per group over time, with the observation period divided into four quarters (Q1 to Q4). On the y-axis are the group numbers with the total number of student-teacher interactions (or "group-teacher" interactions) written in parentheses. The numbers in the bars denote the percentage of student-teacher interactions that occurred within that quarter. For example, the topmost bar in figure 6.7 shows that group 2 interacted with the teacher eight times, and that these interactions were evenly distributed across the four quarters (i.e., two interactions per quarter).

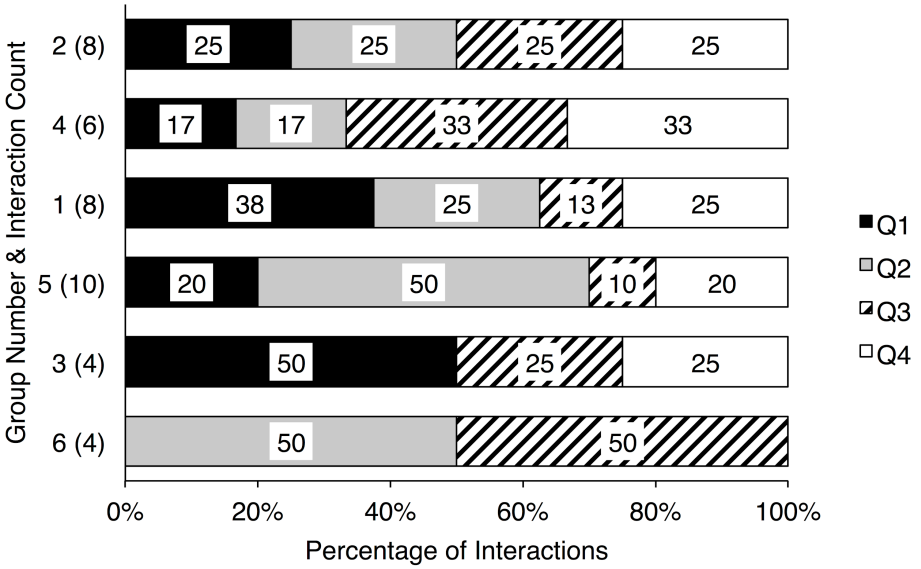


Figure 6.7 Count and distribution of student-teacher interactions by group over one class period (flipped-textbook 1).

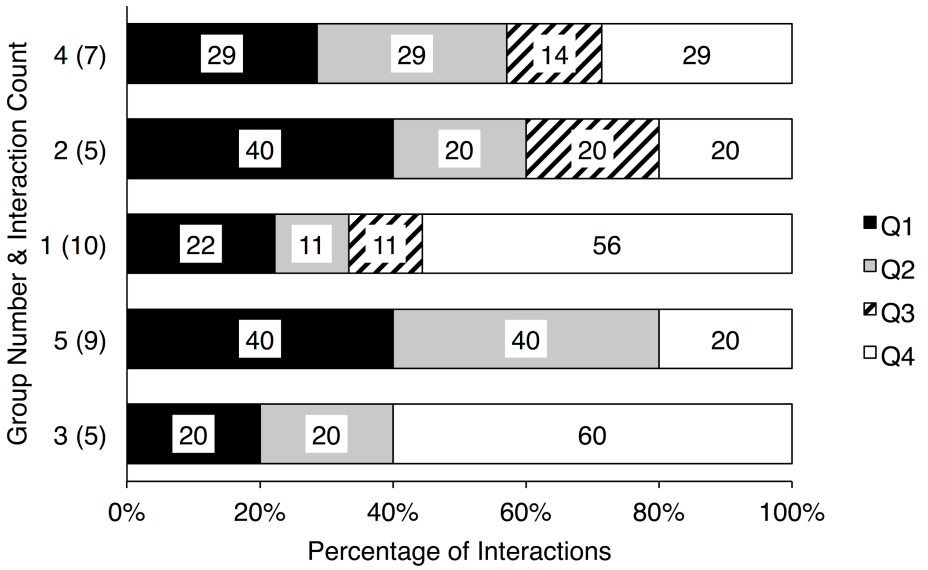


Figure 6.8 Count and distribution of student-teacher interactions by group over one class period (flipped-iPad 1).

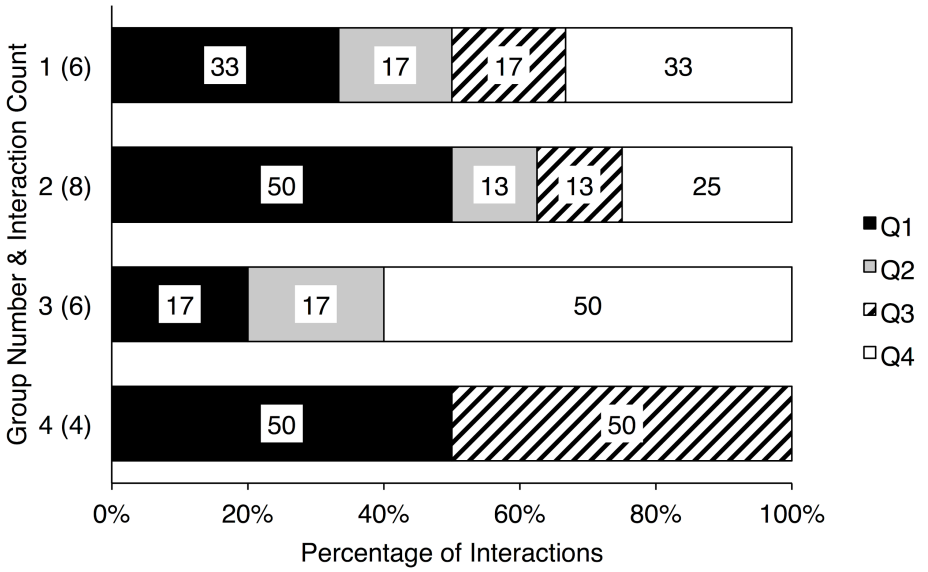


Figure 6.9 Count and distribution of student-teacher interactions by group over one class period (flipped-iPad 2).

The primary finding based on this data is that, even within a single class, the number of student-teacher interactions and the consistency of those interactions over time varies greatly amongst the groups. At the low extreme are group 6 (figure 6.7) and group 4 (figure 6.9). Both of these groups interacted with the teacher only four times during class, and for

half of the class time (two quarters), these groups did not interact with the teacher at all. This disparity in the quantity and consistency of interactions should be noted when considering the overall summary data in table 6.1.

6.3.2 Research question 2

What behaviors were exhibited by students?

Fourteen distinct student behaviors were found to be clearly observable in the flipped-iPad video footage (10 in flipped-textbook). These are listed in table 6.2.

Label	Description
Individual	
IPD - use - own (1)	Using iPad alone
TXT - use - own (2)	Using textbook alone
Student-student	
IPD - look - peer (3)	Using iPads together with classmate
TXT - look - peer (4)	Using textbooks together with classmate
IPD - show - peer (5)	Showing iPad to classmate
TXT - show - peer (6)	Showing textbook to classmate
Converse - peer (9)	Speaking with classmate (looking at listener)
Student-teacher	
IPD - show - teacher (7)	Showing iPad to teacher
TXT - show - teacher (8)	Showing textbook to teacher
Converse - teacher (10)	Speaking with teacher (looking at listener)
Off-task	
OTP - hand raised (11)	Hand raised: passive (no other visible behaviors)
OTA - hand raised (12)	Hand raised: active (simultaneously engaged in other behaviors)
OTP - inattentive (13)	Off-task: passive (no visible behaviors—just sitting)
OTA - sidetracked (14)	Off-task: active (engaged in unrelated behavior)
Unclear (15)	Not clearly discernable in the recorded video

Table 6.2 List of observed student behaviors.

6.3.3 Research question 3

What were the average occurrence levels of each behavior?

The average occurrence levels of the observed behaviors in the three conditions are presented in table 6.3.

	Flipped-textbook 1 (n = 18)		Flipped-iPad 1 (n = 18)		Flipped-iPad 2 (n = 18)	
	M	%	*M*	%	*M*	%
IPD - use - own (1)	n/a	n/a	6.58	36.5	6.83	37.9
TXT - use - own (2)	11.2	62.3	2.18	12.1	3.26	18.1
IPD - look - peer (3)	n/a	n/a	0.28	1.5	0.69	3.8
TXT - look - peer (4)	0.2	1.1	0.08	0.42	0.22	1.23
IPD - show - peer (5)	n/a	n/a	0.05	0.28	0.14	0.75
TXT - show - peer (6)	0	0	0	0	0.01	0.07
IPD - show - teacher (7)	n/a	n/a	0.13	0.69	0.1	0.55
TXT - show - teacher (8)	0.31	1.72	0.08	0.42	0.14	0.75
Converse - peer (9)	2.0	11.1	4.13	22.9	3.73	20.7
Converse - teacher (10)	1.96	10.9	2.4	13.3	1.07	5.97
OTP - hand raised (11)	0.38	3.46	0.08	0.42	0	0
OTA - hand raised (12)	0.24	1.33	0.1	0.56	0	0
OTP - inattentive (13)	1.38	7.67	1.08	5.97	1.04	5.76
OTA - sidetracked (14)	0.14	0.78	0.45	2.5	0.37	2.06
Unclear (15)	0.04	0.23	0.4	2.22	0.41	2.26

Table 6.3 Mean occurrence levels of the observed behaviors.

Note. M denotes the average number of students engaged in a specific behavior at any given time during the observation period.

6.3.4 Research question 4

How did behavioral occurrence levels vary between students?

Figures 6.10, 6.11, and 6.12 show the percentage of class time spent on five main behaviors for every student in the three conditions. Behaviors at the 1% level are not labelled with a percentage.

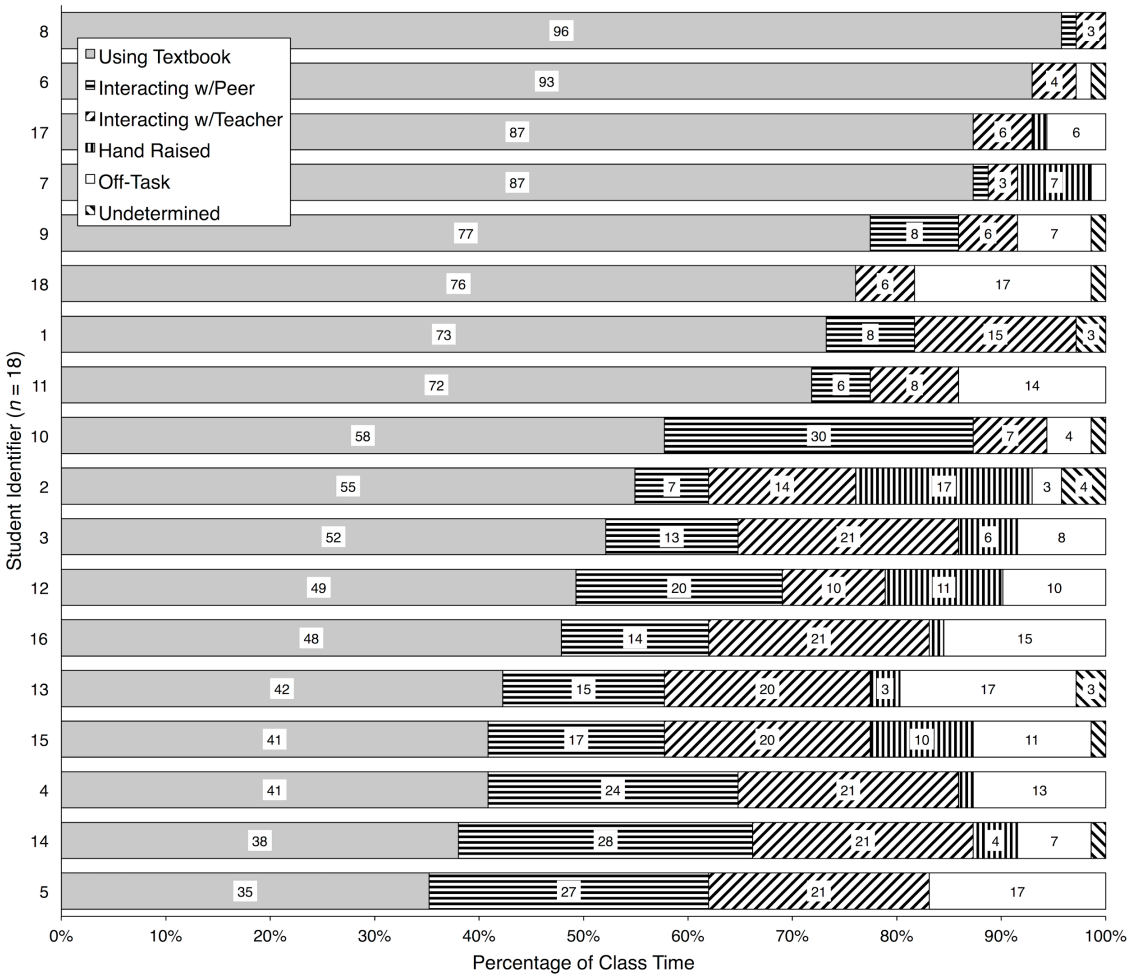


Figure 6.10 Percentage of time spent engaged in five main behaviors by each student (flipped-textbook 1).

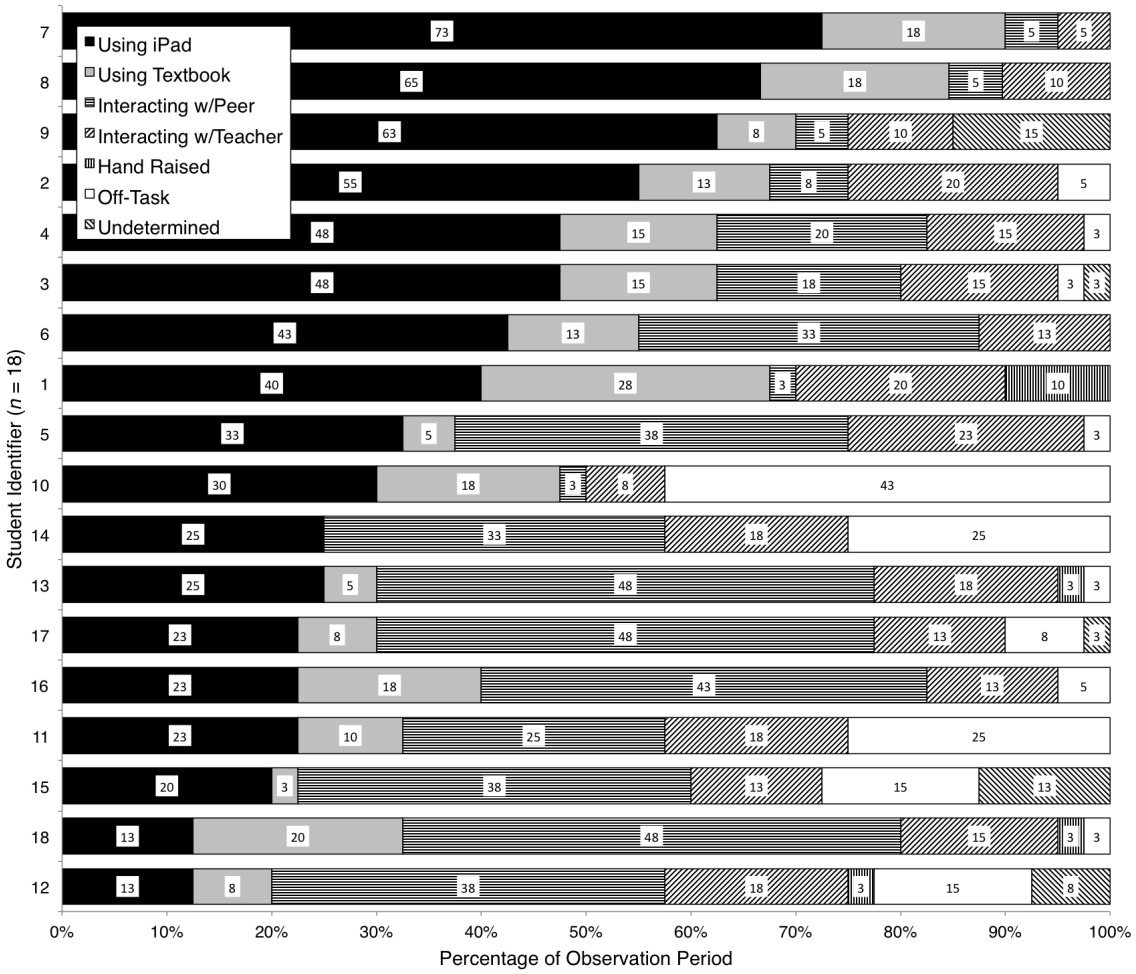


Figure 6.11 Percentage of time spent engaged in six main behaviors by each student (flipped-iPad 1).

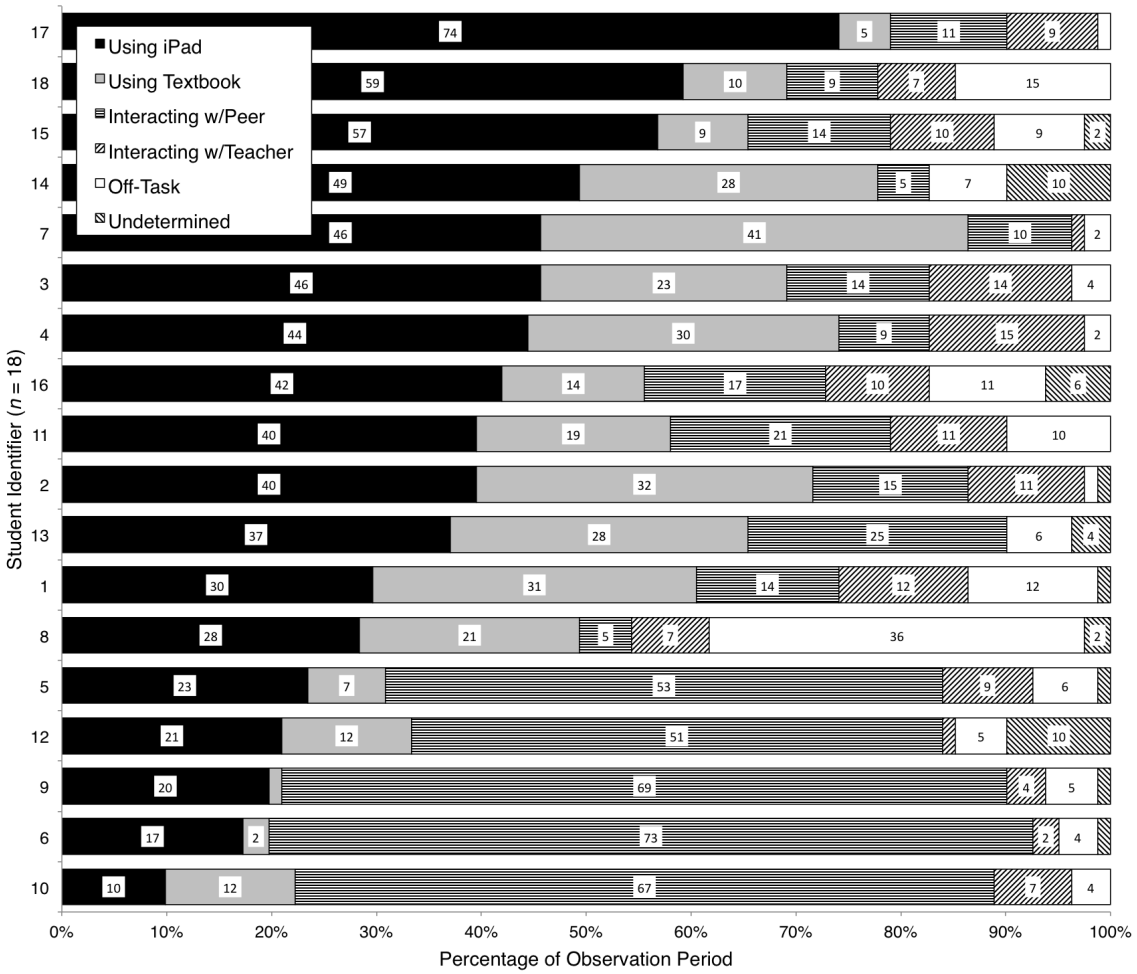


Figure 6.12 Percentage of time spent engaged in five main behaviors by each student (flipped-iPad 2).

6.3.5 Research question 5

How did average behavioral occurrence levels vary between classes?

Figure 6.13 depicts, for each condition, the percentage of class time spent on individual behaviors, student-student interactions, student-teacher interactions, and off-task behaviors.

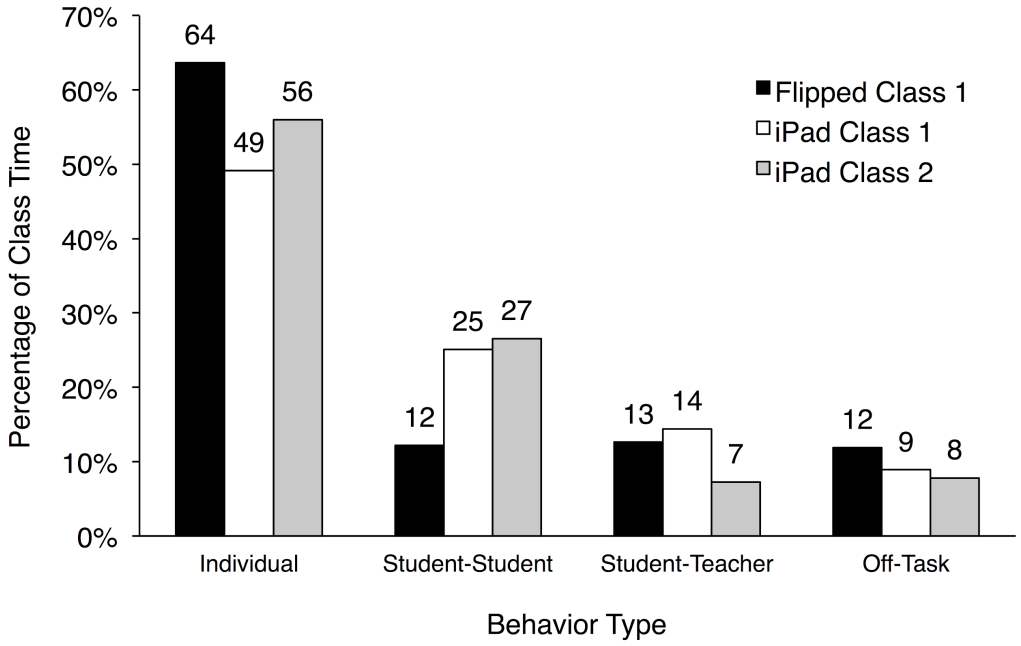


Figure 6.13 Mean percentage of time spent on four categories of behaviors. *Note*. The individual behaviors in each category are shown in table 6.2.

6.4 Discussion

6.4.1 Behavioral engagement averages by class

In table 6.1, we can see that the average number of interactions per group is nearly identical across the conditions (6.7, 7.2, and 6.0 interactions respectively over the observation period). Moreover, the total interaction and non-interaction times are comparable, suggesting that the different classroom conditions had a negligible effect on differentially supporting or hindering the quantity of student-teacher interactions. In fact, the only relevant factor in regards to the quantity of student-teacher interactions appears to be the number of groups in the class; it appears that as the number of groups decreased, the teacher was able to spend a longer time interacting with each group. This is an expected outcome.

From the observations of students, we can see in figure 6.13 that only 7–13% of the class time was spent on student-teacher interactions. This is surprisingly low considering one of the stated goals of the flipped classroom is to increase opportunities for student-teacher interaction.

However, the range of time spent on student-student interactions was 25–27% in the flipped-iPad classes, which is noticeably higher than the 12% in the flipped-textbook class (figure 6.13). The data in table 6.3 support this result, with the amount of on-task student-student conversations (Converse - peer) twice as high in the flipped-iPad classes. This suggests that although introducing iPads had little effect on the amount of student-teacher interactions, it did have a markedly positive effect on overall student-student interactions.[3]

The averages for the individual behaviors in table 6.3 show that except for the higher rate of student-student conversations in the flipped-iPad classes, the occurrence levels were similar across the conditions.

Despite our efforts to make classes more student-centered and social, 49–64% of class time was spent on individual work (figure 6.13). These numbers, while no doubt lower than in a conventional-textbook class,

[3] The apparent discrepancy between relative student-teacher behaviors by class in table 6.1 and figure 6.13 are likely due to the fact that the former relied on teacher observations of interactions with individuals and groups, while the latter relied on observations of individual students. The averaging of student behaviors in the latter case resulted in numerical discrepancies in terms of student-teacher interactions.

indicate that roughly half of the class time remained available for promoting social learning activities.

6.4.2 Behavioral engagement by group and by individual

The data by group and by individual reveals a wider diversity in how students engaged. Figures 6.7, 6.8, and 6.9 show that the teacher is not interacting with the groups equally over the class period. While student-teacher interactions are somewhat evenly distributed across time for many groups, some were skewed toward the end of class (figure 6.8, group 1). Some groups did not interact with the teacher at all for a quarter (figure 6.7, group 3; figure 6.9, group 3), while others did not interact with the teacher at all for half of the class (figure 6.7, group 6; figure 6.9, group 4).

Greater diversity still was revealed in the per-student data (figures 6.10, 6.11, and 6.12). For example, figure 6.11 reveals iPad usage ranging from 10% to 74% of the class time. Similarly, peer interactions ranged from 5% to 69%. One student was engaged in off-task behaviors for 43% of the class time. This diversity was entirely concealed when analyzing behaviors as averages by class, or by groups within a class.

There are likely to be at least two reasons for the high diversity in student behaviors. In figure 6.4, 6.5, and 6.6, we can see that although the teachers are moving around to each group, they may not be interacting with each group member equally. The dots are often clustered around certain students, while others have few or none. The other reason is that, as shown in table 6.2, each student-teacher interaction only lasts a minute or

two before the teacher moves on to the next group. While the teacher is engaged with a group, the less diligent students in the class may go off-task entirely (though this seems to apply to only 3–5 students in each class). In addition, some students were found to be spending a large percentage of class time using their iPad or textbook on their own. This may be a consequence of social anxiety and an unwillingness to participate in classwork with their peers.

6.5 Summary

In this phase, student behaviors in one flipped-textbook and two flipped-iPad classes were compared. A taxonomy of student behaviors was created based on videorecorded class observations. Profiles of duration and distribution of interactions was created. The main findings are summarized below:

1. The amount of time teachers spent interacting with students was similar across the three groups, with each interaction lasting roughly 1–2 minutes.

2. A total of 10–14 distinct student behaviors were observed. The per-student time spent on different behaviors varied greatly.

3. Students spent 7–13% of class time interacting with their teacher. This was lower than expected.

4. Students spent 25–27% of class time interacting with each other in the flipped-iPad classes. This was lower than expected, but higher than the 12% observed in the flipped-textbook class.

5. Students spent 49–64% of class time on solitary work. This was higher than expected.

6. The count and distribution of student-teacher interactions over one class period varied considerably by group. This suggests that some groups received more instructional feedback than others, and that this feedback was provided inconsistently to groups over the class period.

Chapter 7: [Phase Three] Student Perceptions of Engagement

In phase three, students in flipped-iPad classes were interviewed about their classroom engagement. The purpose of these interviews was to explore in detail the ways in which students perceived their own engagement, with a focus on exploring the experiential differences in classes marked by two contrasting approaches to instruction.

7.1 Research question

This phase was based on the following research question:

> With respect to the second semester flipped-iPad classes, in what ways did students experience their own behavioral, cognitive, and relational engagement?

Students were prompted to compare their experiences in second semester (S2) flipped-iPad classes with first semester (S1) conventional-textbook classes. Perceptions of autonomy and teacher support were also explored in relation to engagement.

7.2 Methods

Twenty-one students taught by three different teachers (of which I was one) were subjected to structured interviews. The selection process was a purposeful, criterion-based sampling (Palinkas et al., 2015) in that teachers were asked to select, based on their subjective assessment, an equal number of "good" (i.e., relatively engaged) and "mediocre" (i.e.,

relatively less engaged) students. The interviews were 15–20 minutes in length and were held in a private room at the university outside of class time. Each student was interviewed once, entirely in their native language of Japanese. Audio recordings of the interviews were transcribed verbatim in Japanese, using the transcription software HyperTranscribe (Version 1.6, 2013), resulting in a combined total of 99,829 characters of transcribed text (equivalent to approximately 50,000 words in English).

Analysis of the data followed a hybrid approach, employing both deductive and inductive processes. It was deductive in the sense that I broadly categorized student comments according to the three engagement subtypes. However, within each subtype I analyzed how students perceived their own engagement in a more inductive approach. In order to make this possible, the interview schedule sought to elicit specifics about how students perceived their engagement in regards to each subtype. (See Appendix Five for the complete interview schedule. Note that the questions addressing relational engagement are framed as *emotional engagement* as I had not yet recognized relational engagement as a subtype at the time of the interviews.) Although the questioning closely followed this schedule due to the limited time available for each interview, several small adjustments were made after noticing issues with some student responses during the first several interviews. These adjustments are noted in the interview schedule.

After transcribing the interviews, I read the completed transcripts in order to further familiarize myself with the content. I then coded the transcriptions using a multidimensional method that integrated four subcodes, all of which were applied as "first-cycle" compound codes. This method could be considered simultaneous coding (Miles et al., 2014) in that the codes were not added as nested subcodes apart from the initial categorization according to the engagement subtypes. In this manner, a single code was able to reveal a broader range of information than with thematic codes employed in more common multi-cycle coding methods.

The coding methods that resulted in the four subcodes are as follows:

1. Structural coding: categorizing comments according to the three engagement subtypes

2. In vivo coding: using the students' own words to describe their engagement within each subtype

3. Concept coding: my interpretation of how students related to technology (based on Ihde's mediation theory)

4. Evaluation coding: a binary better/worse assessment of their engagement in S2 in comparison with S1

The resulting compound codes took the following form. (The numbers, which correspond to the coding methods above, have been added here for clarification only.)

1 2 3 4

BHV/REL 慣れていなかった (ALT) −

According to this code, the student perceived their behavioral engagement (BHV) as being closely associated with their relational engagement (REL). The in vivo code is written in the original Japanese as it was spoken by the student (慣れていなかった, or “wasn’t accustomed to using”), followed by my classification of the student’s perceived relation with technology in parentheses (ALT refers to an “alterity relation”). Finally, this particular aspect of engagement was perceived to be worse in S2 than in S1, signified by the minus sign at the end of the code. The abbreviations used in the subcodes are:

Structural (subcode 1)	Concept (subcode 3)	Evaluation (subcode 4)
BHV (behavioral engagement)	BKG (background relation)	+ (S2 was better)
COG (cognitive engagement)	EMB (embodiment relation)	− (S2 was worse)
REL (relational engagement)	HRM (hermeneutic relation)	= (no difference)
	ALT (alterity relation)	

Table 7.1 Subcodes within each qualitative code.

Note. Subcode 2, not shown in the table, is the in vivo verbatim student comment.

Though the method may seem complex at first glance, one should consider that the second subcode (in vivo), written in Japanese, is the primary qualitative datum from which the other codes are derived. A single compound code could reveal both manifest “face value” meanings (particularly the evaluative subcode 4) and latent meanings which required greater interpretation (particularly the relations with technology

in subcode 3). I believe this approach was able to reveal both descriptive and inferential meanings more effectively than other approaches. Each coding method is described in the following sections.

7.2.1 Structural coding: identifying the engagement subtypes

Broadly categorizing elements of the interview based on words used in the research question (i.e., the engagement subtypes), is a process that can be considered structural coding (e.g., Guest et al., 2012). An issue that quickly became apparent while coding was the fact that students often appeared to be describing more than one engagement subtype in their responses; the demarcation between subtypes was frequently indistinct. A question about behavioral engagement, for example, prompted responses such as, "I think I did more work in class [in second semester] because I could enjoy working together with my friends." This response suggests that behavioral engagement was perceived as having been caused by an improvement in relational engagement. Figure 7.1 represents the phenomenological overlap of different subtypes:

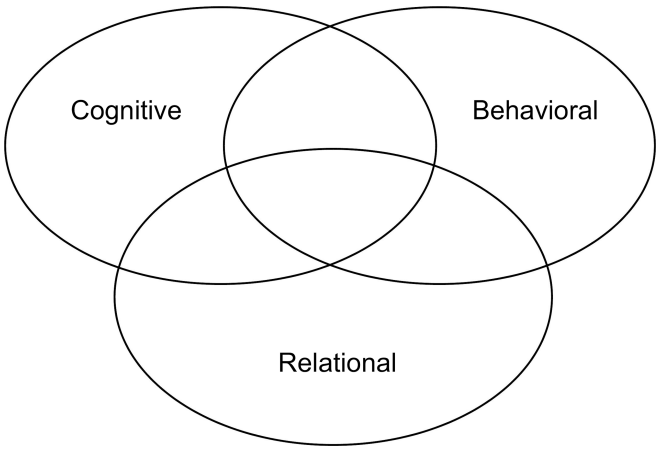


Figure 7.1 The phenomenological overlap of the engagement subtypes

It is possible to attribute a causal relationship between any of the engagement subtypes. For example, “I was able to effectively concentrate in class because I participated in group activities more,” suggests a perceived causal relation between behavioral and cognitive engagement. “I was able to effectively participate in group activities because I concentrated in class more,” suggests the opposite relationship between the two subtypes. Through this coding method, it was discovered that students generally made a cleaner distinction between relational engagement and the other engagement subtypes. In contrast, perceptions of behavioral and cognitive engagement were more tightly interwoven, making it impractical to separate the two in the analysis.

7.2.2 In vivo coding: understanding the student perspective

In vivo coding uses the language of the participants as the subcode itself (e.g., Charmaz, 2014). For this reason, it is alternatively known as “verbatim coding”, “literal coding”, “natural coding”, and “emic coding”. Within each of the structural subcodes (behavioral, cognitive, and relational), student comments on the character of their engagement were incorporated verbatim into the code. Since the interviews were conducted in Japanese, “verbatim” in this case refers to subcodes written in Japanese script. For example, this in vivo subcode about iPad use, “慣れていなかった”, was not translated into the English equivalent “wasn’t accustomed to using”. Instead, I retained the original Japanese phrasing in the code so as not to introduce a layer of abstraction and potential loss of nuance.

7.2.3 Concept coding: characterizing engagement within each subtype

The third subcode (which I also consider "first cycle" in that it does not seek to draw connections amongst codes) consisted of thematic analysis in the form of "concept coding" (e.g., Saldaña, 2015). It aimed to assign meanings at a more macro level to student responses regarding each of the three engagement subtypes. That is to say, the process was more "analytic" than purely descriptive coding, and more subjective on the part of the researcher than in vivo coding, with the ultimate goal to produce a taxonomy of concepts that constitute a "...'bigger picture' beyond the tangible and apparent" (Saldaña, 2015, p. 119). In this research, the goal was not to create a new taxonomy in the tradition of grounded theory, but to apply an existing taxonomy to see which categories were applicable to student perceptions of engagement. This was a deductive process that made use of mediation theory, a conceptual framework first proposed by Don Ihde (1990) that taxonomizes the various ways in which humans experience their relations with technology (see section 3.4). The subcodes, moving from a more transparent experience of technology to a more opaque one, are BKG (background), EMB (embodiment), HRM (hermeneutic), and ALT (alterity) (see table 3.1).

7.2.4 Evaluation coding: comparing the flipped iPad format to the traditional format

One strength of the phase 3 research design was that students were able to directly compare their experiences in two contrasting class

environments, and I interpreted student comments that took these differing experiences into account as being inherently more self-reflective and therefore more meaningful in terms of addressing the research question. Student judgements about the relative advantages and disadvantages of the flipped-iPad format were coded using a binary system that can be considered evaluation coding (e.g., Patton, 2008). The system used three symbols to represent students' comparative evaluations regarding their engagement in S2 flipped-iPad classes versus S1 conventional-textbook classes (+, -, and =). The reasons underlying their better/worse evaluations were typically revealed in the in vivo codes.

7.3 Themes

In chapter 4, I described how the visible aspects of different pedagogical approaches could be represented as structures within the LR (collective/exterior) quadrant of integral theory, and how these structures could potentially have far-reaching effects in terms of engagement in the remaining three quadrants. As I mentioned in the previous section, my initial intention was to have students reflect upon their experiences of each engagement subtype in order to examine each subtype separately. The interview schedule, which required me to systematically ask questions about each subtype, reflects this intention. However, through the process of coding the data, it became increasingly clear that students frequently prioritized one subtype over the others, and that this prioritized subtype, whether it be behavioral, cognitive, or relational, was often perceived to be

closely related to a different engagement subtype. Perceptions of behavioral and cognitive engagement were typically interwoven with each other, making it difficult to disentangle perceptions regarding each individual subtype. (In contrast, relational engagement, even when associated with another engagement subtype, was generally perceived to be more clearly delineated from behavioral and cognitive engagement.)

The seven main themes below represent student perceptions of how their engagement differed in the S1 conventional-textbook and S2 flipped-iPad classes. In order to target this information, the sections coded with the evaluative code "=" (signifying no difference in perceptions between first and second semester) were excluded from the analysis. The themes are organized by engagement subtype, with behavioral and cognitive engagement presented as a single combined theme. Analysis of student perceptions within each subtype centers on the characterization of technologies as either supporting or thwarting engagement. It incorporates the manifest quality of their engagement (what students did, thought, or felt), their evaluation of it (comparing S2 to S1), and my interpretation of how they related to technology (both the iPad and the flipped classroom).

1. Relational engagement
    a. Attributed to iPad
        i. iPad as a support to relational engagement with classmates (theme 1)
        ii. iPad as a thwart to relational engagement with classmates (theme 2)
    b. Attributed to class format
        i. Class format as a support to relational engagement with classmates (theme3)
        ii. Class format as a support to relational engagement with the teacher (theme 4)
2. Behavioral and cognitive engagement
    a. Attributed to iPad
        i. iPad as a support to behavioral and cognitive engagement (theme 5)
        ii. iPad as a thwart to behavioral and cognitive engagement (theme 6)
    b. Attributed to class format
        i. Class format as thwart to behavioral and cognitive engagement (theme 7)

Table 7.2 Main themes.

Furthermore, three major superordinate themes (multistability, autonomy, and culture) that span the seven main themes above were derived from the data. These are examined in the discussion section.

7.4 Findings

The technology referred to in the findings include not only the iPad, but the flipped classroom format itself, including activities and seating arrangements. Less visible aspects of the class format, such as time allocation and role of the teacher, are included in this definition of technology. (The rationale being, all of these aspects can be considered instruments or man-made technological artifacts that were designed with

the intention of addressing a problem.) Students expressed a diversity of opinions regarding the impact of technology on their classroom experience, and in almost all cases, perceptions regarding their engagement could be interpreted in relation to technology in some way. The findings are organized by theme in the following sections. (All quotes have been translated into English from the original Japanese.)

7.4.1 Relational engagement

Relational engagement was perceived by nearly all of the interviewed students to have been affected by either the iPad or the flipped classroom format. Whereas perceptions of behavioral and cognitive engagement often overlapped with an unclear delineation between the two, perceptions of relational engagement were more discrete. The following sections present student perceptions on: (a) iPad as a support to relational engagement with classmates, (b) iPad as a thwart to relational engagement with classmates, (c) class format as a support to relational engagement with classmates, and (d) class format as a support to relational engagement with the teacher. (Within the quoted excerpts, "I" = interviewer and "S" = student.)

7.4.1.1 iPad as a support to relational engagement with classmates

A recurrent theme was the role played by the iPad in facilitating student-student interactions during communicative activities. For many, this was seen as positive change:

I: Compared to first semester, did you feel you tried harder this semester? Or not really? Did you try harder in first semester?

S: It's hard to say. Well, I do think doing activities in groups with the iPad gave us a bit more opportunity to talk with each other. Working together with friends, we could point out each other's mistakes and help each other improve.

I: So you could point out errors in what your partner told you.

S: And also, after I'd say something, my partner would tell me it was easy to understand, hard to understand, could I say it again, and so on, and we could get better that way little by little.

I: But you could do that without an iPad, no?

S: That's true, but it's using the iPads in groups that made the difference. We didn't have that in first semester. I think it's because we had something to *mediate our interactions.* [emphasis added]

This student appears to value behavioral engagement, learning in general, and the centrality of relational engagement for successful learning ("...we could get better that way little by little." / "we could point out each other's mistakes and help each other improve"). He was unusually self-reflective on the role played by the iPad in his classroom interactions, even going so far as to use the word 仲介 (*chuukai*), or "mediate", to describe his relation with the device. This perception was unexpected since the iPad activities were not specifically designed to mediate interactions any differently from those in the printed textbook.

As we shall see later, many interactions with the iPad, whether experienced alone or with a partner, can be characterized as *alterity relations* in which the device itself is the "other"—the primary object with which the student interacts—or *hermeneutic relations* in which the device provides information that must be interpreted by the student. For a number of activities this was by design, as many of them required students to simply input their answers into the device or use it to access exemples of authentic language. However, this student's relation to the iPad was, to a degree, *embodied* in the sense that by lowering social barriers, the device served as a means of communicating to another student. That is to say, akin to glasses that *amplify* our visual capability, the iPad *amplified* his capability to interact with others with greater ease. As a shared focus of attention for a pair or group of students, it appeared to diminish social inhibition—a major thwart to student-student interactions in the classroom. Another student commented:

> I was the only girl in class, so it was quite difficult for me. When the teacher said, "Make pairs," I was always like, "Are you serious?" Second semester was easier. The tests were all crossword puzzles and such on the iPads. We could all work on them together, you know?

In addition to contending with foreign language anxiety and social anxiety that comes from interacting with unfamiliar students, this student was faced with the additional challenge of gender differences. The mediational

role played by the iPad appears to have helped her relationally engage in an all-male learning environment.

A female student in a different class commented on her experience studying with her male classmates in the following way:

> When we were listening to audio and inputting text [via speech-recognition software], no one else in my group could understand what was being said, but just by chance I could understand it that time. So when I said it, it was marked "correct", and we were all like, great!

In this way, activities that were designed for individual study were frequently repurposed to become highly social activities, echoing Ihde's concept of technological *multistability* in which technologies lack any definitive "essence", and are instead always "technologies-in-use" within a specific use context. In the case of these students, the *human→(technology-world)* hermeneutic relationship or *human→technology(world)* alterity relationship that characterizes the typical solitary activity was eclipsed by a more *(human-technology)→world* embodied relationship in which students interacted with their classmates *through* the iPad technology, with the technology itself becoming more transparent within the context of the relational exchange.

Although the technology does not directly augment "microperceptual" sensory perception in the way that glasses do, a technology which confers an ability to navigate a cultural worldspace still gives rise to a

"macroperceptual" shift in that it alters the inter-subjective cultural world (Ihde, 1990). The iPad thus allowed a number of students to "see" and interact with their classmates (i.e., behavioral engagement) in a "macroperceptual" sense by providing them with a tool for navigating the novel culture of the flipped classroom (i.e., relational engagement), as well as navigating the broader gender norms of Japanese culture.

As we saw in chapter 3, human-technology relations exist on a continuum from transparent to opaque (background to embodied to hermeneutic to alterity). The degree of technological transparency exists on a continuum *within* embodied relations as well. Many technologies, such as glasses, telephones, and hearing aids, are highly embodied, causing them to, in the words of Heidegger, "withdraw" from our awareness (i.e., become transparent) as we perceive the world through them. Others are less embodied (e.g., automobiles, a walking stick, or a bad phone connection), but still augment our sensory perceptions (microperceptions).

But a bright line need not be drawn at our senses. For example, while a paperback dictionary may lower inhibitions and allow one to communicate more effectively with someone in a foreign language, the physical and mental effort required to look up words prevents it from ever becoming highly embodied. An electronic dictionary that is less cumbersome may be more embodied, and an instant translation device that makes use of speech recognition technology may be even more embodied. Yet, all of

these technologies serve the same purpose, namely, to facilitate communication.

The same holds true for the way these students used iPads to help them navigate a social space, where the focus was primarily on the social interactions rather than the technology that mediated them.

In some cases however, the iPad may have mediated student-student interactions less due to the activities made possible by it, and more due to the novelty factor of using unfamiliar technology:

> S: It was a new way to have a class, so no one knew how to do it.
>
> I: Right.
>
> S: So we all taught each other. There were more interactions amongst classmates for this purpose.

Cooperation (relational and behavioral engagement) of this type centered on learning how to navigate the technology rather than engaging with the course content. This, along with the Hawthorne effect (the alteration of behavior due to an awareness of being observed), may have played a role in altering student engagement. Teachers must be mindful that any introduction of new technology, particularly in a research context, is vulnerable to these confounding influences, particularly since such influences are likely to fade over time. A longer-term intervention would likely be useful for helping reduce their effects.

7.4.1.2 iPad as a thwart to relational engagement with classmates

Not all students perceived the iPad as having a positive effect on student-student relational engagement:

> S: In first semester, there was a lot of communication amongst students and I thought that was good. But in second semester, it wasn't just us students in the class. There was also this device *between us* [emphasis added], and that allowed us to listen to audio with real pronunciation spoken by foreigners, so for listening to correct pronunciation, I think second semester was better. In second semester we started using the iPads, and compared to first semester, students didn't communicate as much. So that was a bit, you know…
>
> I: Students communicated less with each other?
>
> S: Yeah, there was less of that. *The device ended up becoming the focus of our attention.* [emphasis added]

Although this student uses language similar to that used by the first student in this section to describe the iPad ("this device between us"), it is not perceived as a mediating presence between himself and other students. The student appears to value the role of the iPad primarily as a source of information. For him, his relationship with the device is primarily *hermeneutic* in that it mediates his perception of the English language itself as the outside "world". The language exists "out there", and the device provides models of the language that can be interpreted by the

student for the purpose of improving oral proficiency. For this student, solitary behavioral engagement (listening to audio) appeared to be an important *amplification* made possible by the iPad, but while the iPad did seem to mediate his perceptions and interactions with the world (i.e., features of the English language at large), it was perceived as hindering his relational engagement by becoming a new focus of attention. His hesitant tone ("So that was a bit, you know…") suggested that although he values interactions with his peers, the iPad reduced his capability to engage with others in comparison to traditional textbooks.

The manner in which the iPads were used in groups was also perceived by some students as a thwart to interacting with peers:

> You can play the media on your own iPad, so you can finish the activities on your own. Before, without the iPad, we'd make groups of four and one person would be in charge of playing the audio on their phone, and we'd do the activity together. We'd communicate more, like "I'm done." "I'm not done." "Should I play it again?" With the iPads, the four people in a group would listen to the audio individually. And so when I was finished, I would talk to other people in the group who had also finished.

This idea that collaborative learning can be fostered by less access to technology, not more, echoes the findings of Sugata Mitra's famous Hole in the Wall experiments (Mitra et al., 2005; Mitra & Rana, 2001) and subsequent School in the Cloud initiatives (Mitra, 2019), where small

groups of children spontaneously learned through peer coaching using a single computer available to each group. Strategically limiting access to educational resources in order to encourage collaboration may be useful for students who revert to solitary study when collaboration is seen as undesirable.

When asked specifically about their perceptions of iPad use, a number of students were unable to clearly express why they felt it contributed to either the improvement or worsening of engagement, in several instances relying on the word 何となく (*nantonaku*), a word commonly used to communicate vagueness that roughly means "for no special reason" or "there's something about it" or "it's just how it was". In some cases where the students viewed it favorably, the technology may have been *embodied* to such a high degree that it became rather transparent in mediating interactions. In other parts of interviews, it became clear that some students may have been conflating the effects of the iPads with the effects of the flipped classroom format. Student perceptions of how this class format mediated their relational engagement with both their peers and their teacher are presented in the following section.

7.4.1.3 Class format (flipped classroom) as a support to relational engagement with classmates

In the case of relational engagement with classmates, many students failed to explicitly differentiate between the iPad and the flipped classroom format, referring to the S2 class as simply "the iPad classes". In many

instances, perceived relational engagement differences in S2 were initially attributed to the iPad, but as the interview progressed, it grew clear that the differences were perceived to have resulted more from the flipped classroom format. This was reflected most clearly in the perceptions of students who were taught by "Ned", the oldest and most experienced of the participating teachers (pseudonyms are reused in phase four). Of the three teachers who participated in this study (myself, Byron, and Ned), Ned taught in the most "traditional" teacher-fronted format in S1, exposing his students to the greatest contrast in learning environments between S1 and S2. The student comments that follow are by students who were in classes taught by this teacher.

A number of students talked about how the cooperative nature of the flipped format improved the social atmosphere of the class in S2:

> In general, the class atmosphere improved a bit. With the iPads, we did more pairwork and groupwork, so we had more opportunities to talk together. And we had a system where we would do crossword puzzle tests [on the iPad], and the group that finished first would get bonus points, so we would really try to help each other. I think the class atmosphere was good.

Other students focused on a sense of social recognition that came from contributing to the success of the group:

> When we were doing an activity where we would listen to audio and type it in [to the iPad], everyone else in the group couldn't quite get

it, but it just happened to be a word I'd heard before. So I told them and we got it right and everyone was like, "That's awesome!"

And others still focused more on their sense of social obligation to their group:

I: And what about the flipped classroom format in second semester? Did it change the way you related to your classmates in any way?

S: You mean by using the iPads?

I: Well, not just the iPads, but with other things like the group work.

S: Yeah, we didn't do everything all together as a class. We would do activities in pairs or groups, so I knew I couldn't drag down the entire group. We had to work together. I was able to concentrate more this way.

Despite greater relational engagement with their peers, the pair or group effort was often more directed toward simply completing the activity rather than learning:

So there'd be an activity on the iPad right, and all of our [group members'] answers had to match in order for us to move on. There were quite a lot of activities like this. So we were all like, "Is this right?" "No, this is the answer." We'd compare answers like this, so we grew a lot closer to each other in the process.

Similar views attributing improved relational engagement to the iPad-based activities were expressed by other students, but a more nuanced

reading revealed that the pairwork and groupwork aspects are really what allowed for the improvement. (Such comments were far less common from students in classes taught by myself and Byron, presumably because our S1 classes were comparatively less teacher-fronted and already included a fair amount of pairwork and groupwork activities.)

This increase in relational engagement also resulted in changes in student perceptions of specific individuals in the class:

> When I was placed in the same group as a student I didn't know very well—someone I'd never spoken with before—my perception of him changed a lot. I used to think he was kind of a slacker, but it turned out he studied a lot at home. He taught me a lot of new words and stuff. I was really surprised. He made me feel like I should study more.

At times, other students were perceived to have improved thanks to the changes in S2:

> Before we were using the iPads, my buddy—I guess I'd better not say his name—was the kind of guy who would just copy the answers, but after we started using them, he started to actually try to do the activities. I thought this was a good thing.

Interestingly, of all the seven themes presented in this study, getting students to reflect on their relational engagement specifically in regards to the class format proved to be the most challenging. Students initially

appeared perplexed by the questions, often answering by referring to activities on the iPad rather than other elements more specific to the flipped classroom format (e.g., group work, time allocation, use of supportive text in lieu of lectures, the altered role of the teacher, etc.). Thus, although students were articulate about the ways in which relational engagement improved, they struggled to make a connection between these improvements and the S2 changes in the classroom environment and class culture. This phenomenon will be discussed further in the discussion section of this chapter.

In addition to such improvements in student-student relational engagement, improvements in student-teacher relational engagement in the S2 flipped iPad classes were reported. Some representative comments are presented in the following section.

7.4.1.4 Class format (flipped classroom) as a support to relational engagement with the teacher

Students taught by myself and Byron did not report any notable differences in relational engagement from S1 to S2. In stark contrast, a number of students who were taught by Ned reported considerable improvements in relational engagement with their teacher. The following four representative quotes clearly reveal this perceptual shift:

1) In first semester, in terms of the textbook and the course content—and the class in general—our teacher just seemed overly strict. But in second semester, he would immediately come

and give me personal attention when I couldn't understand something, or when I needed pronunciation help. *It was that kind of environment.* [emphasis added] And we had game-like activities that we did in groups where our teacher really got us excited.

2) At first, my teacher came across as a curmudgeon who spoke only English in class. But I spoke to him more frequently in second semester and had more chances to personally connect with him. It made me think, "He's actually a pretty interesting guy."

3) S: Honestly, I was a bit scared of my teacher in first semester.

   I: You were scared?

   S: Yeah. The teacher ignored a lot of students who didn't understand what was going on. All the time, I saw students who didn't see eye to eye with the teacher. But in second semester, students had more opportunities to talk with each other, and one on one with our teacher. Other students told me as well that classes were more fun, and that our teacher came across as being much kinder. I had way more opportunities to talk with him, not only during class, but also after class and when I bumped into him in the hallways.

4) We were still freshmen in first semester, so that might have had something to do with it, but our teacher got angry at us quite

> often during class. But in second semester—maybe because we were more used to class, I can't really say—our teacher would praise us for our work way more frequently.

In all of these examples, we see students whose perceptions of their teacher changed as a result of the flipped classroom. We also get the sense that students were genuinely interested in connecting with their teacher, a perception that conflicts with their teacher's assumptions about his students' desires (seen in phase four). Several other students mentioned that in the teacher-fronted format of S1, the teacher would get upset when the class responded with silence. The flipped classroom format appears to have promoted relational engagement and reduced anxiety for both students and teacher alike.

While a handful of students expressed their feeling that the change in class "environment" provided them with more opportunities to interact with their teacher on a more personal level, most failed to specify what made the interactions possible. (This phenomenon was also seen in the previous section regarding class format as a support to relational engagement with classmates.) Compared to responses to questions specifically about the iPad, responses about the class format tended to be more hesitant, suggesting that reflecting on it required more effort.

When students did mention the flipped classroom format in regards to relational engagement, they typically focused on the iPads or group activities, and not on the reduction of teacher-fronted instruction and

other elements of the format. Even when they did focus on the physical changes in the classroom and the manner in which classes were conducted, little emphasis was placed on the nature of the new supportive role their teacher played within it and how that may have affected their relational engagement. Most commonly, responses focused on increased opportunities to interact with the teacher and the teacher being "nicer" to students, without perceptual shifts being attributed to any specific structural or cultural changes in the classroom.

Thus, in terms of relational engagement, students appeared to focus less on underlying principles of the flipped classroom and more on the readily visible surface-level features of it. If we accept my claim that the flipped classroom format should be considered a technology in its own right, we can characterize their relationship with the class format as a *background relation*. This type of relationship with technology is the most transparent of the four types proposed by mediation theory in that it provides the context for human actions and experiences, depicted schematically as *human (technology/world)*. The technology itself was not the focus of the students' experiences, nor were their experiences mediated directly by the technology. Instead, it contributed to the creation of an environment in which relational engagement occurred.

In the next section, we will examine how students experienced behavioral and cognitive engagement. In section 7.4.2.3, we will again see how their

relation with the class format was perceived to have affected engagement, but this time in a non-supportive manner.

7.4.2 Behavioral and cognitive engagement

When asked specifically about behavioral or cognitive engagement, student responses typically included both without focusing specifically on one or the other. One reason for this may be the fact that many of the course activities revolved around behavioral aspects of language acquisition (e.g., speaking), making it difficult to distinguish between external (behavioral) and internal (cognitive) engagement. Unless the course content specifically required students to think about elements of the English language more metacognitively, the "doing" was likely assumed to be equivalent to the "thinking". In regards to the course as a whole, however, students did appear to distinguish between the two types of engagement, where cognitive engagement was attributed to the ultimate goal of learning English and behavioral engagement was attributed to the classroom activities. We will see in the quotes that follow how some students emphasized one over the other. However, since clearly parsing these two engagement subtypes proved difficult, behavioral and cognitive engagement have been combined. The following sections present student views on (a) the iPad as a support to behavioral and cognitive engagement, (b) the iPad as a thwart to behavioral and cognitive engagement, and (c) the class format as a thwart to behavioral and cognitive engagement.

7.4.2.1 iPad as a support to behavioral and cognitive engagement

Depending on how they interacted with it, individual students often found the iPad to be simultaneously a support and a thwart to behavioral and cognitive engagement. This section focuses on the supportive aspects reported by students. A number of students remarked on the benefits of pronunciation activities using the speech-to-text functionality of Siri:

> When we used Siri, we had to actually say it out loud, very carefully, or we couldn't input any text at all. Compared to first semester, I had to be a lot more conscientious about it. In first semester, I could simply read whatever was written, and if my partner understood, that was good enough. Pronunciation didn't really matter so much. So for students who took it seriously, second semester was much better in terms of quality of learning.

Considering this was a listening and speaking course, such comments were encouraging. The biggest technological upgrade from S1 was this Siri speech-to-text input. Since many of the written activities in the textbook were converted to speaking activities on the iPad, students had many more opportunities to practice speaking in S2. It may not be Siri per-se that students found engaging, but the fact that Siri provided the structure and feedback that allowed them to speak more. In addition to the benefits of Siri, another student remarked on the more linear format of the iPad-based activities:

> In first semester we mostly wrote things out by hand. I do think you can learn from the act of writing, but using the iPad was better because we could practice our pronunciation. It was good that by using Siri on the iPad, our speech would be converted into text. Pronunciation practice is best when we say it out loud and train our ears. Also, with the textbook, we can see, flipping forward, units 7, 8, 9, and 10, right? So even if we're doing unit 7, we can get distracted by the text and pictures in units 8 or 9, making it hard to concentrate. With the iPad, when you're doing unit 7, that's all you see. There aren't really any extra words at the top and stuff. Even if there's a bit of that, it's all unit 7, so you can concentrate on just that. I thought this was a good thing about it.

In section 7.4.1.2, we saw that strategically restricting access to resources may be more beneficial for fostering relational engagement amongst students working together in a group. A similar notion is revealed here, where restricting access to other sections of the course content increased focus and concentration.

Although we saw that the flipped classroom format had an overall positive effect on relational engagement with the teacher, the iPad itself was perceived by some to have had the opposite effect, despite its benefits for cognitive engagement:

> I: Did you ask your teacher more questions?

> S: Honestly, probably not. If I didn't know something, I could just Google it on the iPad.

This reliance on the iPad instead of the teacher as a source of information suggests a shift to greater autonomy and more immediate access to resources at the expense of relational engagement with the teacher. The conflicting perceptions of the benefits of autonomy versus control are again seen in the following student's thoughts about the autonomy-limiting nature of the iPad activities:

> In first semester I mainly used the textbook, and when I did an activity with a partner, we would often do a pretty mediocre job. We didn't finish everything all the way to the end. But in second semester, there was a...how should I say it...a kind of pressure, and so we naturally ended up finishing. The teacher wasn't able to check each student's work during class in first semester either. With the iPad though, there was a [digital] record of everything we did, and the teacher would check everything, so I feel I was able to do a better job on the activities in second semester.

As with the student who preferred the more linear format of the iPad activities, this student preferred the feeling of being pressured by the teacher to complete the activities, albeit in an asynchronous manner more akin to homework. At first glance, this would seem to signify a preference for a more controlling class environment at the expense of reduced autonomy, but it is possible that students who saw this controlling

element in a positive light felt greater autonomy-support in other aspects of the class. Another student mentioned this tradeoff explicitly:

> I think second semester was less free because a record of all our work went into the system, but we since were in groups, we could study at our own pace, so I'm not sure which provided more freedom.

The tradeoff for this student is a decrease in autonomy (and an increase in control) in terms of the activities themselves, and an increase in autonomy (and a decrease in control) in terms of pacing, a result of the flipped classroom format more than the iPad itself.

Some academically inclined students attributed greater behavioral and cognitive engagement specifically to the greater autonomy afforded by the iPads:

> When we completed a single activity in the textbook, that was it. We were done with it, and we had to wait until the class moved on to the next section. But with the iPads, even though I couldn't move on to the next section until everyone in the group had finished, I could redo any section as many times as I wanted while I was waiting. That was good for reviewing.

Other less academically inclined students attributed behavioral engagement (in terms of activity completion) to greater autonomy:

> Everyone in class had to finish first, and we had to check our answers [in first semester]. Completion speed was an issue. If we were told to do a section, everyone had to do only that section before we move on together. So there was a lot of downtime if you finished early. I'd get sleepy during those times. With the iPad, I could move on to the next section by myself.

Although this student may have bent the rules of the class by ignoring his group members in order to complete the activities on his own, the sense of greater autonomy did appear to positively influence a behavioral aspect of the class he valued highly: completing the activities. For some students, an increase in autonomy appeared to have a broad positive influence on relational, behavioral, and cognitive engagement:

> Honestly, in first semester, I just went through the motions without really understanding much. Like, just passing the time until it was over. But in second semester, we were doing each section, repeating the audio, repeating conversations...we'd do this on the iPad several times because we would have time left over. And with my friends, using Siri, we were like, "Yeah, it responded correctly," or "No, it didn't respond correctly." I think I did a better job understanding things as I did them in second semester.

Students like this appeared to attribute greater engagement in all three engagement subtypes primarily to the iPad, with the increase in autonomy perceived as being a wholly positive change.

When student perceptions of behavioral and cognitive engagement are examined through mediation theory, we see that their relationship with the iPad is primarily an alterity relation (*human→technology(world)*), with a secondary hermeneutic element (*human→(technology-world)*). When students speak of behaviorally engaging with Siri, the device is clearly the object with which they are interacting, akin to the way in which we may engage with an ATM to withdraw money. They are using the iPad to achieve a goal, namely, to input the correct answer; there is no sense that students are looking "through" the iPad at something in the world as we saw with relational engagement.

However, in the sense of cognitive engagement, a more hermeneutic aspect is present in that students were required to interpret the output provided by Siri, and based on this feedback, adjust their spoken output on subsequent attempts. The reason why I believe we can refer to this hermeneutic aspect as "secondary" is that students unilaterally spoke of the activities, including Siri, in terms of completion (e.g., "I just wanted to get the answers and finish the activities." "The goal for me was simply to get through it.") or as a kind of puzzle abstracted from the meanings or communicative functions of the language. Thus, although some students did refer to the benefits for learning, it appears that the hermeneutic aspect was rather limited to the immediately visible surface features of the language being studied without representing something with more depth on the "world" side of the mediation.

Of course, the knowledge that language is a cultural tool is sure to exist within the students' awareness, but it appears to be less salient in the immediate classroom context than the morphosyntactic and phonological characteristics of the language itself. That said, using the iPad to Google answers could be considered a more authentic hermeneutic relation, as the English language information found online is representational of something in the world, and requires interpretation by the student in order for it to be applied to a classroom activity.

7.4.2.2 iPad as a thwart to behavioral and cognitive engagement

In 4.2.1, we saw how certain students found the more linear nature of the iPad activities to be beneficial for concentration. Perceptions were divided on this point, with other students believing the opposite to be true:

> I don't like to move on to the next thing if I don't understand something. I want to look up the information and do it right. But at times when I was like, "I should look at that again," it was harder to do that with iPad English, you know? It was easier to review and such with a textbook.

Similarly, some students found the textbooks to be easier to use for reviewing their work at home since the iPads had to be returned at the end of class:

> The iPad classes were faster-paced, but after class, I couldn't review what I'd done when I was studying at home. This was a drawback.

The textbook was better for reviewing, but I couldn't practice my pronunciation or other details. So if I think of it like this, they both had their drawbacks.

Although this issue might be revolved if each student owned an iPad, the ease of navigating a physical textbook seems difficult to improve upon for students who find this characteristic valuable.

Many students mentioned the inability to write out the answers by hand on the iPad, and how tapping, typing, and speaking their answers negatively affected cognitive engagement:

1) In first semester, I felt like I was really studying because I wrote everything out by hand. Second semester was mostly checking boxes and stuff, so I didn't really feel that.

2) From a long time ago, I guess I've been told to write things out. I've always been told to write out things I want to remember. It's like, using a pen is a requirement for studying. That's kind of how I feel.

3) When I'm writing things out by hand, I'll write out the letters, like "H" or "A" or whatever, and my hand and body will remember. With the iPad, it's about learning through typing. Everyone uses computers these days, so I think that's good. Because you type it in yourself, you can remember the words to an extent. But if you write it out longhand, you'll remember

> because you did everything by yourself. If you have someone who only studies on a computer and someone else who writes it out longhand, well, the one who has studied by writing it out will have an easier time using the computer. But it doesn't work the other way around. For someone who has only used a computer, when it comes to writing something out by hand, they won't learn it as well.

In all three of these quotes, we see how these students see handwriting as crucial for learning and retaining information. Despite the widespread use of keyboard text input on computers digital devices, this perception is likely to persist due to the importance of penmanship and calligraphy in Japanese culture. Japanese students are required to learn how to write 1,006 kanji characters in primary school and an additional 1,130 in middle school, with classes in brush calligraphy starting in the third grade. Even for adults, handwritten resumes are scrutinized by employers not only for their content, but for their aesthetics. The acceptance and normalization of a novel behavior that entirely replaces a behavior so fundamental to a culture may prove difficult unless it confers obvious benefits.

7.4.2.3 Class format as thwart to behavioral and cognitive engagement

Finally, we will examine student perceptions regarding the flipped classroom format as a thwart to behavioral and cognitive engagement. Although the flipped classroom was generally perceived to be supportive for relational engagement, many students felt the opposite to be true for

behavioral and cognitive engagement. A number of students felt that the more traditional class format in first semester provided a better learning environment:

> As for concentrating in class… With the iPads, everyone around me seemed to be having a blast, so if I think of it that way, maybe using a textbook was better for concentration, better for comprehension. Since everyone was having such a good time in the iPad classes, you know, with Siri and all, it was easier to study in first semester. I'm not saying the new way interfered a lot with my studying, but...

Although this student was hesitant about expressing his feelings, he appears to see the increase in relational engagement to have a detrimental effect on behavioral and cognitive engagement, mainly due to the increase in distractions. Another student echoed this sentiment more bluntly:

> If it weren't for the students around me, I'd say I concentrated more in second semester. But considering the class environment, I concentrated more in first semester.

Others mentioned that the more traditional class format was the more "proper" way to organize a class:

> I'm not saying the iPad classes weren't proper classes, but for me personally, properly sitting at my desk facing the front feels more like I'm having a class.

This student used the word ちゃんと (*chanto*), or "proper(ly)", an extremely common word with deep cultural roots in a culture where doing things in the "proper" or prescribed manner is held in high regard. As with the handwriting issue in the previous section, the culturally ingrained notion that "proper" classes are characterized by teacher-fronted instruction may be difficult to override with a radically different approach. When pressed to give their thoughts about why a teacher-fronted class was the more proper approach to classroom instruction, students said, "That's just how all my classes have been," a sentiment that echoes some reasons offered about why writing with a pen and paper was perceived to be more beneficial for learning.

We saw in sections 7.4.1.3 and 7.4.1.4 that student perspectives on the benefits of the class format for relational engagement tended to be rather vague, with the iPad often serving as a proxy for the class format. Often, more coaxing was required on my part to elicit reflection on the class format itself. Conversely, students tended to be more forthcoming when expressing negative views regarding the effects of class format on behavioral and cognitive engagement. In terms of mediation theory, this suggests that for students who perceive the flipped classroom as a thwart, the class format is less transparent. When compared with students who perceived the flipped classroom as being supportive of relational engagement, it could be said that students here are in less of a background relation with the class format (or perhaps in a background relation that is more foregrounded due to their negative perceptions of it).

7.5 Discussion

The current phase revealed the diverse ways students made sense of their in-class engagement. This diversity reflects the broad range of behaviors that were discovered in phase two, and together with that phase, sheds light on the heterogeneity of engagement that remained hidden in the quantitative analysis of phase one. Unlike the previous phases, the current phase focused specifically on student perceptions of engagement with and through technology (both the iPads and the flipped classroom).

The findings section of this chapter presented seven main themes derived from the interview data, representing various student views on how technology altered their quality of engagement (for better or for worse) from S1 to S2. In general, behavioral and cognitive engagement were perceived as being interconnected, while relational engagement was perceived as being separate from the other two subtypes. This reflects the quantitative results in phase one where factor analysis indicated poor divergent validity of behavioral and cognitive engagement, requiring the two to be measured together as a unidimensional construct.

In this section, I consolidate the findings of this phase into the following three superordinate themes that span the seven main themes: (a) multistability, (b) autonomy, and (c) culture.

7.5.1 Multistability

Student comments reflected all four of the relations with technology posited by mediation theory. These relations are summarized in table 7.3.

Type of relation	Technology	Engagement subtype
Background	Flipped classroom	Relational (when supportive)
Embodiment	iPad	Relational (novel use)
Hermeneutic	iPad	Behavioral/cognitive (secondary)
Alterity	iPad	Behavioral/cognitive (primary)

Table 7.3 Technological relations and their associated engagement subtypes.

Note. The types of relation are listed in order from most transparent to most opaque to the student.

The flipped classroom was the only technology that was perceived as having *created* a context or environment in which engagement occurred. As such, many students appeared to have experienced heightened relational engagement in S2—with both their classmates and their teacher. It can be said that students had a *background* relation to the flipped classroom only in cases where it was perceived to be supportive of relational engagement. In cases where it was perceived to be a thwart to behavioral and cognitive engagement, the background relation can be considered a dysfunctional one, analogous to a broken air conditioner that makes so much distracting noise that its drawbacks outweigh its benefits. As with a broken air conditioner, perhaps certain "repairs" could be made to the flipped classroom to allow such students to have a more supportive background relation with it.

Unlike the single type of technological relation associated with the flipped classroom, relations with the iPad appeared to span three different types, often simultaneously depending on its use. According to mediation theory,

a single technological artifact can have divergent meanings and identities depending on its use context, which is largely determined by culture. This ambiguity or *multistability* of technology was a prominent characteristic of the ways students engaged with the iPad. Of the three types, embodiment relations were the most unexpected since the use of the iPad as a mediator of relational engagement was not by design; it was, in a sense, repurposed to serve as a tool that facilitates social interaction, helping students manage their social anxiety and navigate cultural gender norms. For certain students, the mediating presence of the iPad itself (perhaps even more than the activities on it) allowed them to more fully engage with their classmates and teacher in a way that was not possible with a printed textbook.

The presence of hermeneutic and alterity relations was less surprising since students were expected to relate to the iPad in these ways based on the types of activities provided. However, it is interesting that a number of students appeared to relate to the iPad in two or even three different ways simultaneously. For example, students for whom technological relations were embodied in the context of navigating relational engagement also seemed to be in an alterity relation with the iPad in the context of the learning activity (presumably cognitive engagement). Specifically, in terms of behavioral and cognitive engagement, we saw examples of students who were primarily experiencing an alterity relation with the iPad, but who simultaneously experienced a secondary hermeneutic relation in terms of interpreting feedback on their spoken output.

This simultaneity of different relations is likely to occur more regularly as technological versatility increases. To use a term commonly used in research on digital technologies, a versatile tool such as the iPad is characterized by a wider range of *technological affordances*—material possibilities, permissions, and constraints enclosed by a technological artifact—which provide its users with opportunities to relate to the technology in more diverse ways (Hutchby, 2001). Computers, touchscreen devices, and other complex digital technologies are characterized by a wide range of affordances that, unlike most analog technologies, allow for multiple technological relations depending on the context. This is a rather new phenomenon. Take for example the simpler technology of a hammer, which also has a range of affordances. But whether used to hammer nails, crack nuts, or break rocks, it is difficult to imagine traversing multiple types of technological relations with a hammer. An individual using a hammer is most likely to have an embodiment relation with it; it is an extension of the hand which mediates engagement associated with the act of hammering.

In the case of simple analog technologies, shifting between technological relations is so unusual that it has been used as a cinematic plot device. For example, in the 2001 film *Castaway*, the protagonist forms a relationship with a soccer ball on a deserted island; this is essentially an alterity relation, where the protagonist is not engaging through the soccer ball, but with it. Similar examples have been seen with Siri-like technologies in movies such as the 2013 movie *Her*, but as AI improves, alterity relations

with digital technologies have become more normalized. As students in this study have demonstrated, newer handheld digital technologies such as the iPad may be uniquely fluid in the way they allow for multiple types of technological relations, not only in succession, but concurrently.

7.5.2 Autonomy

The flipped classroom format in S2 was designed to provide students with more autonomy and to give the teacher more opportunities to support this autonomy. According to self-determination theory, autonomy-support fosters higher-quality motivation and engagement. Benefits for behavioral and cognitive engagement were reported by students who perceived an increase in autonomy resulting from the self-paced format of the classes. However, many others perceived an inverse relationship between autonomy and engagement: being less engaged when they felt more autonomy and more engaged when they felt less autonomy. The student perceptions revealed in this study are summarized in table 7.4.

Characterization of autonomy	S2/S1 comparison
1. *Increased* time autonomy (self-pacing) beneficial for *behavioral and cognitive* engagement	Better
2. *Increased* autonomy (access to information) beneficial for *behavioral and cognitive* engagement, but detrimental to *relational* engagement with teacher	Better and worse
3. *Increased* autonomy (solitary work) detrimental to *relational* engagement with group members	Worse
4. *Reduced* autonomy within activities (linear format) beneficial for *behavioral and cognitive* engagement	Better
5. *Reduced* autonomy within activities (linear format) detrimental to *behavioral and cognitive* engagement	Worse
6. *Reduced* autonomy within activities (progress tracking) beneficial for *behavioral and cognitive* engagement	Better

Table 7.4 Perceptions of autonomy in second semester.

Of the six characterizations of autonomy revealed in this study, items 1 and 5 in the table above reflect the effects of autonomy need satisfaction that one might expect based on self-determination theory (i.e., autonomy is purely beneficial for motivation and engagement). Items 3, 4, and 6 reveal the opposite effect, where some students felt that less autonomy stimulated more engagement.

In order to understand this perception, it may be useful to situate the student experience in a larger context. The participants in the study were all enrolled in a compulsory English course which denied students the autonomy to decide what they will study, when they will study it, and by whom they will be taught. Consequently, students were unlikely to expect a high degree of autonomy in these classes, and may, in some cases, prefer

that the course format stay true to their expectations. We saw in sections 7.4.1.3 and 7.4.1.4 that the flipped classroom (background relation) broadly supported relational engagement, suggesting that relational engagement may be vital to overriding such expectations. Item 3 in table 7.4 makes sense in this view as it suggests that autonomy at the group level overrides the need for individual autonomy satisfaction. Creating an environment that encourages social interactions, over and beyond flipping alone, may be one way to moderate such expectations of low autonomy that can undermine compulsory education.

An interesting observation is that Sugata Mitra's School in the Cloud initiative in India has addressed a lack of societal resources, a shortage of teachers, by leveraging technology to increase autonomy and relational engagement amongst schoolchildren (Mitra, 2019). His "self-organized learning environments" parallel the flipped classroom in that groups of students work cooperatively in pursuit of a common goal, and, as in this study, relational engagement and group-level autonomy needs are leveraged to address a deficiency.

The difference, however, is that students in this study (and in Japanese compulsory education more generally) lack not resources, but motivation. This difference can be understood through the four-quadrant framework of integral theory (see chapter 4). Whereas the School in the Cloud has addressed a deficiency in *societal resources* (a systemic problem in the LR),

the flipped classroom was used to address a deficiency in *motivational resources* (UL).

The fulfillment of autonomy needs may be even more important in compulsory EFL than in rural India since autonomy lies directly "upstream" from motivation. In short, the Indian students *want* to study but cannot. Our students *can* study but do not want to. Thus, we can see how similar instructional approaches can address fundamentally different problems depending on the context.

Item 4 in table 7.4 also reveals the perceived benefits of reduced autonomy. A preference for a more linear format does not necessarily suggest an aversion to autonomy per se, but may indicate a desire to have more support along with an increase in autonomy. Additionally, linearity for such students may reduce the extraneous cognitive load (demands placed on the student that are extraneous to the task, making it needlessly complex) by removing competing stimuli and reducing the split attention effect (Chandler & Sweller, 1992; Sweller et al., 1998). Although the reduction of both intrinsic (demands posed by qualities intrinsic to the subject matter) and extraneous cognitive load is an important objective of the flipped classroom approach at KSU, the loading effects of linear versus non-linear task arrangement have never been researched at our institution.

As can be seen from item 5 in table 7.4, not all students perceived a linear format to be beneficial. To accommodate different preferences for linear

versus non-linear formats, teachers should remain attentive to student needs when designing materials that support behavioral and cognitive engagement.

7.5.3 Culture

In the most fundamental sense, the flipped classroom approach aims to radically alter the (micro)culture of a classroom so that students will be motivated to engage more deeply with the course content, their classmates, and their teachers. Shared values are the cultural "grammar" that dictates how individuals think and behave, and like the linguistic grammar of one's native language, cultural values are generally invisible to those who adhere to them. The interviews revealed that some cultural changes were more readily accepted than others. Table 7.5 lists the major effects of the cultural changes engendered by the flipped classroom as perceived by the students.

Beneficial for relational engagement (invisible / applied to most)
1. With classmates
1. Social recognition
2. Sense of responsibility
3. Perception of classmates
4. Overcoming social anxiety (including gender roles)
2. With teacher
Detrimental to behavioral and cognitive engagement (visible / divided views)
1. Traditional teacher-fronted classes better for learning
2. Writing out tasks in longhand better for retaining information
3. Relational engagement incompatible with behavioral and cognitive engagement

Table 7.5 Perceptions regarding the effects of cultural changes in second semester.

In the case of relational engagement, the flipped classroom was universally perceived to have had at least a limited positive effect on relational engagement. The perceived benefits were most pronounced in the class taught by Ned, the only one of the three participating teachers who taught in a strictly teacher-fronted format in S1. This shift in students' perspectives appear to have been prompted by the creation of a new classroom culture. As such, students had difficulty reflecting on the role played by the culture itself, suggesting that it had become integrated into their "worldview" to a certain degree. It had, in other words, become the "grammar" of the classroom, largely invisible to those experiencing it from the inside. In contrast, those who held the view that the flipped classroom was detrimental to behavioral and cognitive engagement were more able to reflect on the classroom culture, which suggests that they had not integrated the culture into their own worldview (i.e., they did not share the values endorsed by the flipped classroom).

The degree to which a new classroom culture is accepted and integrated may be dependent upon how strongly a student identifies with competing extant cultural value systems. For example, there is much truth to the stereotype that Japanese people tend to be reserved. This characteristic is rooted in the cultural values of 内外 (*uchi-soto*), or inside and outside. While belonging to a group is highly valued, building relationships with individuals on the outside of one's social circle takes time and requires the gradual strengthening of trust. This is by no means unique to Japan, but it is an exceptionally prominent aspect of its culture.

In the absence of a system that provides a means by which individuals can form and join groups, shyness and avoidance will often prevail. However, the flipped classroom provided students with a clear system for joining groups and abundant opportunities for social integration. The relational values that define the flipped classroom were readily adopted by most students, perhaps in part because they did not conflict with the relational values of the dominant Japanese (macro)culture. (A case in point: mixed-gender flipped classrooms could not function in places with much higher gender segregation in the dominant culture such as Saudi Arabia.) This may be a reason why the flipped classroom and its benefits for improving relational engagement were more readily integrated into the value systems of our students. The relative importance of group autonomy over individual autonomy in the flipped classroom, seen in the previous section, may also be derived from Japanese culture more broadly.

Acceptance and integration of aspects of the classroom culture that promoted behavioral and cognitive engagement was less straightforward. It appears to have been hampered by conflicting cultural beliefs regarding learning. Teacher-fronted lessons with limited group work and rote memorization through repetitive handwritten tasks remain fundamental elements of Japanese education. It is unsurprising that some students may perceive the lack of these elements in class to be harmful for learning when they have experienced little else over their prior twelve years of schooling. This finding is consistent with multinational research which found collectivism to reliably predict teacher beliefs that controlling

motivational styles are more efficacious, and that these beliefs are informed by broader cultural norms (Reeve et al., 2013).

When attempting to establish new cultural norms that directly contradict deeply held values, their benefits should clearly outweigh their drawbacks. For some students, it seems, the case was not made convincingly enough. It is important to note that all of the students who expressed dissatisfaction were "good" students as selected by teachers, while the benefits of relational engagement were not limited to "good" or "mediocre" students. This suggests that academically inclined students are more likely to desire a traditional pedagogical approach, not only because it is a deeply ingrained cultural norm, but because it has helped them successfully learn in the past.

7.6 Summary

As with the behavioral diversity revealed in phase two, the student interviews in phase three revealed a diverse range of perceptions regarding the use of technology in the classroom and its effects on engagement. The most important findings are summarized below.

1. Students related to technology (the iPad and the flipped classroom format itself) via all four of the relations posited by mediation theory (background, embodiment, hermeneutic, and alterity). Some of these were perceived as supportive of engagement, while others were not.

2. In certain situations, students related to the iPad in multiple ways concurrently depending on its use, revealing a multistable nature of the technological relationship marked by a wide range of affordances and a high degree of fluidity.

3. The role of the iPad as a mediator of social interactions (supporting relational engagement) was not by design. Instead, students repurposed the device to address this need.

4. Students were able to reflect on relational engagement as a separate construct, whereas behavioral and cognitive engagement were closely interrelated. This mirrors the quantitative results of phase one, in which behavioral and cognitive engagement were measured as a unitary construct.

5. Perceived increases in autonomy did not always result in higher quality engagement, possibly due to expectations of low autonomy shaped by the broader cultural context. Fostering relational engagement through the increase of group-level autonomy at the expense of individual autonomy may be instrumental in modifying these expectations.

6. The acceptance and integration of a new classroom (mirco)culture may be contingent upon the degree of student adherence to wider Japanese (macro)cultural values that are either compatible with or conflict with the newly introduced, class-level cultural values.

The next chapter examines student engagement from the perspective of two teachers.

Chapter 8: [Phase Four] Teacher Perceptions of Engagement

In this final phase of the study, I examined teacher perceptions of student engagement in relation to iPad use and the flipped classroom. To this end, two teachers whose students participated in phases two and three were interviewed. The pseudonyms *Byron* and *Ned* are used to refer to these teachers in this chapter.

8.1 Research question

This phase of the study was based on the following research question in the context of the flipped-iPad classes of second semester:

> How did teachers perceive the iPad and the flipped classroom in terms of their impact on student engagement and autonomy?

Teachers were prompted to compare their experiences in first semester conventional-textbook classes, second semester flipped-iPad classes, and second semester flipped-textbook classes. Special attention was paid to how teacher beliefs and values regarding pedagogy may have influenced their perceptions.

8.2 Methods

Two of the three teachers whose students participated in the flipped-iPad classes (phase two and three) were interviewed for this phase of the study (the third teacher was myself). Each teacher was interviewed once. As the teachers were both native English speakers, interviews were conducted

entirely in English. The interviews for Byron and Ned were 69 and 95 minutes long, respectively. Audio recordings of the interviews were transcribed verbatim using the transcription software HyperTRANSCRIBE (Version 1.6, 2013), resulting in a combined total of 24,751 words.

After the transcriptions were labeled by topic (e.g., iPad, flipped, relational engagement, autonomy, etc.), the responses within each topic were coded descriptively (e.g., "Reproducing vs. understanding"). Based on this initial analysis, I found that many responses appeared to be grounded in the values and beliefs of the interviewees in regards to pedagogy and technology. I therefore reread the transcript and added another set of descriptive codes indicating personal values and beliefs that may have underpinned the teachers' perceptions (e.g., "Tech bad for social skills"). This may be considered "values coding", a subset of affective coding (Saldaña, 2015). The resulting code pairs for each teacher were compared and contrasted to obtain a perspective on student engagement that takes into consideration the beliefs and values of the teachers themselves.

8.3 Findings

The high degree of individual variation amongst students revealed in phase two and three was not reflected in the teacher interviews. In fact, the interviewees typically referred to their students as a collective without focusing on individual instances of technology use by specific students. Evidence that the teachers perceived any depth or diversity in how

students related to technology in terms of mediation theory (i.e., the four technological relations and multistability) was sparse, and was therefore not the central focus of the analysis as it was in phase three. Furthermore, while the flipped classroom was perceived to have had an effect on relational engagement amongst students, it was perceived to have had little effect on student-teacher social dynamics. This was surprising considering how, in many cases, the flipped classroom had a profound effect on student perceptions of their teacher (section 7.4.1.4).

The relative superficiality that characterized teacher perceptions of student engagement, particularly in relation to the iPad, may in part be due to the teachers' negative perceptions of the iPad itself. Neither teacher believed the iPad contributed meaningfully to student engagement, and in many instances, it was felt to be more detrimental than beneficial. This perception may have discouraged both teachers from reflecting deeply on the finer details of engagement with and through the iPad.

In addition, the lived experience of the students (cognitive and relational engagement in the UL and LL interior quadrants) is understandably more difficult to assess through inferences based on the external cues of behavioral engagement alone, and since the teachers did not speak with their students specifically about engagement, it should not be surprising that their characterization of it lacks the depth and diversity revealed through the interviews in phase three.

Nevertheless, the teachers did express their thoughts on why they felt the iPad was unsupportive of engagement, as well as contrasting perceptions of the flipped classroom and how it affected engagement. In addition, the interview with Ned revealed sharp contrasts between his perceptions and those of some of his students regarding autonomy and relational engagement.

Although the initial objective of this phase was to investigate additional third-person perspectives on student engagement in a relatively straightforward manner, a preliminary analysis suggested that personal values and beliefs were an important factor in shaping perceptions regarding the effects of pedagogy and technology on engagement. Taking into account the potential influence of these values and beliefs, the following sections examine teacher perceptions regarding student engagement from the perspectives of course objectives, iPad use, the flipped classroom, and autonomy.

8.3.1 Beliefs regarding course objectives

Both teachers expressed their belief in holding to a broader objective for the course that went over and beyond acquiring English language skills. This fundamental belief appeared to have influenced how the teachers construed engagement, and provided important insights into which engagement subtype they most valued. Byron considered the development of basic social skills to be a core objective of his course:

> Byron: Just how to politely deal with people, interact with people, social skills I think would be—I think a lot of the students here, a lot of them are socially awkward, or just kind of—maybe have learning disabilities, and they don't interact with people very well. They don't make eye contact very well. So yeah, social skills. I mean, I don't think of myself as—I'm an English teacher—but I'm trying to teach them a little about life, I guess, too.

In Byron's view, this objective may even supersede the formal course goal of acquiring English language skills:

> Byron: So I'm saying like [other teachers'] students will get clear rises in test scores. Measurable achievements. Whereas in mine, maybe my students aren't going off the charts on their TOEIC scores, but maybe they're learning to relax around a foreigner. Maybe they're being more willing to open up to an adult—somebody who's older than them or that sort of thing.

In contrast, Ned considered the development of study skills to be a core objective of his course:

> Ned: I think it's just as important as learning the content because again, if they know, if they can learn to do this stuff by themselves, if they learn the techniques, then they can learn the content of their choosing. I think it's our job to teach them how to understand this stuff. That's why I like this Communication Spotlight book so much, because it focuses on, like, how to listen to it to understand it. So

> then, you can listen to anything to be able to figure it out. But if you just have, like, content, "Okay. I'll be learning this content." But if they're not taking anything away, they're waiting for teachers to give them content. Right? So again, our students are… They're waiting for—because the way they learned computers, right, they wait for teachers to show them how to do stuff, whereas, like, North American kids learn computers, like, through fucking around and just spending time on their own.

Throughout the interviews, the teachers' comments about engagement reflected their beliefs. Byron (who emphasized social skills) focused mainly on the quality of relational engagement, and Ned (who emphasized study skills) focused on the quality of cognitive engagement. As we have a natural inclination to notice and prioritize things we value, the most salient and insightful comments made by Byron and Ned were squarely aligned with their respective belief domains.

Based on my experience teaching at KSU for over a decade, I've found that the ability to remember student names can function as a proxy for determining the relative importance teachers place on relational engagement with their students. According to Ned:

> Ned: I have students that come up to me in February and they say "Sensei" and start asking me a question about their grades. I just dump the memory of a student from year to year. It's like, "You're my student?", and I have to say to them, "Give me a year. Give me a

class", and then if they do that, then I can usually remember them, but I just can't remember every student.

Byron, on the other hand, was on the opposite end of the spectrum when it came to remembering names, and was frequently observed calling students by name in the hallways and recalling personal details even several years after a student had completed his course.

These examples demonstrate how diametrically opposed Byron and Ned were in terms of the value they placed on relational and cognitive engagement. The excerpts in the following sections reflect this largely unidimensional (single subtype) construal of student engagement that characterized the teachers' comments.

8.3.2 Perceptions of the iPad

Neither teacher felt the iPad effectively supported their goals for the course. Byron spoke of this in terms of the iPad thwarting his ability to relationally engage with his students:

> Byron: The relational engagement—I think that it fosters learning in other ways that maybe are not measurable, and I would say that the iPad classes took away from this for me, and I think that's maybe one reason, one overarching reason, why I think the flipped [flipped-textbook] classes are better than the iPad [flipped-iPad] classes, because I just feel more connected with my students in a flipped class than in an iPad class. I can't pinpoint why, but I just

> felt like my relationships with them, my interpersonal relationships with the students, was not as strong in an iPad environment. It's a distraction. The iPad was a distraction. I felt like it was getting between me and my students, so to speak.

Moreover, Byron at times made it clear that he considered digital technologies in general to have a negative effect on relational engagement:

> Byron: I'd think most technology is bad for social skills. Unless it's that India [School in the Cloud] example, but for the most part, people—yeah, I think that's not only in Japan, it's everywhere. You hear a lot of people complaining, "Kids these days. They don't know how to talk to adults, they don't know how to talk to each other, they don't communicate well anymore because they're always punching away on their phones," and whatnot. *It's just the nature of technology*. [emphasis added]

While Ned also viewed the iPad negatively, his criticisms differed from Byron's in that he felt the device failed to support cognitive engagement:

> Ned: They looked engaged, but I think they were just like monkeys poking buttons at random. They were involved in it, but my feelings were, they had no idea what they were doing or what they were supposed to be doing. I think, again, *it's the nature of these students* [emphasis added]—it goes back to their philosophy of learning and beliefs about learning. It's like reproducing versus understanding.

> They don't understand anything, they're just reproducing what they need to do to pass the course.
>
> Interviewer: What do you think they didn't understand?
>
> Ned: I don't know if they really understood the point of what they were doing. It's positive in that it was giving them practice and exposure, but there wasn't that extra layer of understanding the point of why we're practicing this.

Despite his negative view of the iPad activities, Ned was known to be a strong advocate of using digital technologies, particularly for the purpose of fostering good study habits, such as time management smartphone apps (e.g., Pomodoro Technique timers). Since the iPad activities themselves were not specifically designed to support the type of metacognitive engagement that Ned felt was a hallmark of his instructional style, he may have felt that any benefits conferred in terms of behavioral engagement were meaningless "reproducing". As we shall see later, the flipped classroom may have prevented Ned from providing the "extra layer of understanding" that he was accustomed to delivering in a teacher-fronted format.

A telling contrast between the beliefs of the two teachers is revealed in Byron's comment, "It's just the nature of technology," and Ned's comment, "...it's the nature of these students." Byron appears to place the blame on technology for frustrating the expression of an innate desire to engage relationally with others, while Ned places it on the students themselves

(i.e., low effort) for avoiding cognitive engagement when circumstances allow them to do so. In other words, while Byron sees technology as a thwart to behavioral engagement, Ned sees it less as a thwart, and more as something that *fails to support* cognitive engagement. This may seem like a distinction without a difference; Byron may actually agree with Ned (and vice versa) in the case of different engagement subtypes. Nevertheless, within the domain of their respective class objectives and engagement subtypes (Byron: relational engagement, Ned: cognitive engagement), the role played by the iPad, albeit negative for both teachers, may be fundamentally different in terms of how it is perceived as either actively *thwarting* engagement (Byron) or simply *failing to support* it (Ned).

8.3.3 Perceptions of the flipped classroom

Although Bryon felt the iPad to be a thwart to relational engagement, he perceived the flipped classroom format to be highly supportive of it. In the previous section, we saw that he felt "...more connected with my students in a flipped class than in an iPad class." He also mentioned how the flipped classroom fostered relational engagement amongst students:

> Byron: In the flip classes, it was great because they have the one audio player, and they'd all listen together, and they'd write down the same answers, and when you came back and said, "Okay, you got it right," they were like, all together as a group. They were like,

> "All right, yeah, we did it!" sort of thing, where I didn't really get that feeling as much in the iPad classes.

While later speaking of the benefits of the flipped classroom, he emphasized the importance of creating a friendly and supportive class atmosphere, contrasting his beliefs with those of stricter teachers who taught in a teacher-fronted format:

> Byron: They're more just like, "I don't care if you like me or not." "You're going to learn this and I'm going to—over my dead body you will fail." That sort of thing. And that seems to be quite effective, and I think the students probably learn more than maybe, say, my students, but I can't, I just can't do that.

In contrast, Ned was unambiguously opposed to the flipped classroom format, going so far as to state bluntly, "I think it's fucking wrong." While he did at times acknowledge some benefits of flipping, these were usually perceived as being outweighed by the efficiency of teacher-fronted instruction:

> Interviewer: Were you interacting with individual students about the same rate?
>
> Ned: No. I interacted more because I was going around. I think a lot of that interaction time I could've done to everybody at the same time.
>
> Interviewer: So, you don't see that as a positive, per se? That you got to have the opportunity to interact with people?

> Ned: I thought it was positive. However, because I was running around so much all of the time, that it just detracted, and I think a lot of students weren't getting the time they probably might have, kind of, wanted, or I could have spent with them. So, it's a positive, but I think there was a portion of the time that was just wasted, that I could have just put into fronting each activity.

For Ned, the main purpose for interacting with students was more for the purpose of providing top-down instruction than for relationally engaging with his students. A teacher-fronted format allowed him to pursue this goal efficiently without the need for constant repetition that, in his view, hindered the flipped classroom approach. While explaining the benefits of his teacher-fronted approach, he defended his belief that being "liked" by his students as a result of the improved relational engagement in the flipped classroom was unnecessary and even counterproductive for effective learning to occur:

> Ned: I'm seeing some people think I'm a bit of a prick. But yes, it seems that way because I'm just like, again, I'm getting you guys to do it. You don't have to like me, but I want you to at least do it. [...] And from there, when they start to get shit, then they start to feel good. And they don't even think of me as a prick anymore, because it becomes a non-issue. Because they're learning stuff, and they're kind of getting it. This is it. At first, I'm kind of hard and the drill instructor to get them to do stuff, but when they're doing stuff, these

> classes just rock. Because I lighten up. I just have to be that way at the beginning just to get them on board, and to get them doing stuff.

If relational engagement with students was important at all to Ned, it appeared to be a distant second to the goal of maximizing the amount of time he spent on teacher-fronted instruction. Since one of the major intentions of the flipped classroom was to improve relational engagement, my own biases as the researcher may have come to the fore more than once when asking follow up questions. For example, my apparent incredulousness when asking, "So, you don't see that as a positive, per se? That you got to have the opportunity to interact with people?" may have prompted Ned to soften his tone on the benefits for relational engagement in his reply. As for the effects of the flipped classroom on relational engagement amongst students, Ned saw the increase in interpersonal sentiment as mostly "just screwing around" that detracted from the more serious work he felt capable of stimulating through his teacher-fronted approach.

8.3.4 Perceptions of autonomy-support and control

Finally, on the topic of student autonomy, the two teachers were more in agreement on its importance and the need to increase it gradually over time:

> Byron: Yeah, I try to understand where they're coming from. I understand the educational environment—I sort of understand the educational environment that they had in junior high school and

high school. I've worked at junior high schools here and high schools here. So I kind of have a feel for the kind of learning—I've said this to [another teacher] specifically for the Four Skills program—I feel like we're asking too much of them. We're asking them to, "All right guys, forget about everything you did in high school. Forget about the teacher standing up in front of you and giving lectures, and we're going to teach you this new way to learn where you're going to study on your own, and you're going to, blah blah blah." I get it, that's what we should be moving them toward. But I think, to just throw them into the deep end of the pool and just give them way too much autonomy isn't good. We need to, kind of—that's what I try to do in my Four Skills classes. I'd say, "Look guys, this is what we want you to do, this is how we want you to do it, this is why we want you to do it. I don't expect all of you to be able to do this perfectly." There's typically a handful of kids who handle that quite well, but I would say the vast majority of them still want to have their hand held through the process, and I try to do that.

As with Byron, Ned had significant experience teaching at high schools, giving him insight into the educational background of his students prior to their entering university:

Ned: I think it needs to, it has to be slowly, autonomy slowly increases. You can't just give autonomy right from the beginning because again, they can't do it, they can't cope with it because they

> never had to. It's like, I'll throw you in an eighteen-wheeler and say, "Go drive, Nick." Like, you couldn't cope with it, but if I said okay, we're going to drive a four wheel drive this week, next week we're going to be in a school bus and work you up to the eighteen-wheeler, you'd be able to drive it. I think the students, looking at their background, and again spending time with other university students—I really think every university teacher should go spend a month in a high school just so they know where these students are coming from because, again, so many at the university just have no idea. You've got to really design these things into the program so that it increases autonomy as you go through. Autonomy is a hard one, especially the types of students we have—some students probably could deal with autonomy. These students—well, no, because these were the ones who were bombing out of high school.

Both teachers were similar in their belief that their students were not initially prepared to handle a high level of autonomy. However, as with the iPad, they differed in where they placed the locus or blame for this phenomenon. Byron suggested that the cultural norms of his students' pre-university educational environments were primarily to blame. While Ned also displayed an understanding of his students' educational backgrounds, he suggested that the blame lay primarily with the students themselves as evidenced by their poor academic achievement in high school (i.e., lack of effort or ability).

In addition, Byron generally used supportive language throughout the interview, such as his acknowledgement that his students have a desire to do well, but that they want their "hand held" through the process. In contrast, Ned, in regards to student perceptions of his standard top-down approach, made comments like, "They don't understand that it's good for you," and generally used more controlling language throughout, such as the following:

> Ned: There's always, I say, four to five that think, "He's a prick," and either just stop coming or eventually fail. Those students, I do talk to them when they are engaged and stuff. It's like, "Kenji, just do it. You're spending time here, just do it. If you do it, I'm not going to give you a hard time." But then for some reason, they just refuse to do it. I've had students turn around too. But, again, I have to do that at the beginning to get them on board. Then I can lighten up later.

These comments show that although the teachers agreed on the need to increase student autonomy gradually over time, their opinions diverged on the reasons why students have difficulty handling autonomy and how teachers should (or should not) support it. In terms of pedagogy, Byron's approach appeared to be more autonomy-supportive, while Ned's was more controlling. While the literature strongly suggests that an autonomy-supportive approach fosters higher quality motivation, I do not suggest that one is necessarily "better" than the other in this research context. In

fact, Ned employed his more controlling approach for the express purpose of ultimately nurturing a more autonomous mindset in his students in terms of study skills and habits, mentioning that he would "lighten up" after the students are "on board". It may therefore be the case that he advocates a highly controlling orientation early in the semester, shifting to a more autonomy-supportive one as students integrate his approach to learning.

8.3.5 The perspective of the researcher

I will now briefly turn a mirror upon myself to investigate my own beliefs. Like Byron and Ned, I too pursued a broader course objective that transcended language acquisition. While I agree with the importance of acquiring both social skills and study skills via relational and cognitive engagement, in my view, the most important goal is helping students be as engaged as possible in the moment, regardless of the longer-term objectives. This might be characterized as being "present" or "mindful", but on a deeper level it refers to being attuned to multiple dimensions of reality (see chapter 4). There is no question that the ultimate instrumental goal of class engagement, learning English, is important. However, I am less concerned with this goal than I am with ensuring that students remain engaged and focused on the task at hand, ideally in all three subtypes of engagement.

With social media and other digital distractions increasingly vying for the attention of students, my view has taken on new import. There can be no

agency without attention, no autonomy nor desirable motivational states without control over where students focus their minds. As the neuroscientist Sam Harris wrote, "There is now little question that how one uses one's attention, moment to moment, largely determines what kind of person one becomes. Our minds—our lives—are largely shaped by how we use them" (2014, p. 31).

To my eye, this capacity for students to focus and engage in classwork for extended periods is diminishing yearly, and I fear that the long-term happiness of our students is at stake. Recent research has revealed a global decline in levels of subjective well-being amongst adolescents, with Japanese adolescents worsening the most (Marquez & Long, 2020). My feeling is that, beyond engagement in our classes, having the capacity to engage deeply at all is an important contributor to well-being that should be a focus of instruction in any subject.

In terms of the iPad, I again find myself agreeing with both Byron and Ned. Yes, it supported relational engagement for many students, but at times it felt like yet another layer of technology veiling the in-person communication that our classes were meant to encourage. Students spend much of their day communicating to friends via social media. Do they need even more technology-mediated communication in class when the other person is right there in front of them? My feeling is that in communicative language classes, the best uses of such technology are for providing instant feedback and serving as a portal to the wider world.

In terms of the flipped classroom approach, I am in full agreement with Byron in that the benefits far outweigh the drawbacks. However, I feel that both teachers had misconceptions about autonomy (possibly due to my own failure to explain it well). A highly structured learning environment does not by its own nature impede the satisfaction of autonomy needs. The key is for that environment to be autonomy-supportive. This is what is meant by "autonomy" in self-determination theory (Reeve, 2016). In my own classes, I have found the flipped classroom useful in helping me provide this type of support. Unsurprisingly, I align more closely with Byron in my views on autonomy, but I differ with both teachers in that I feel most students are ready to handle a high degree of autonomy from the beginning if provided with the appropriate scaffolding and support.

8.4 Discussion

This phase of the research revealed that the perceptions of teachers regarding the flipped-iPad classes were underpinned by their core pedagogical values and beliefs. Of course, all perceptions are invariably underpinned by values and beliefs, but in the case of these interviews, the connections between them were exceptionally salient. The teachers spoke with a candor and self-awareness not seen in the student interviews of phase three. (It helped that both teachers had over twenty years of experience teaching in Japan.) The findings in this chapter are summarized in table 8.1.

	Byron	Ned
Core values and beliefs		
Course objective	Social skills	Study skills
Engagement focus	Relational	Cognitive
Perceptions of iPad		
Appraisal	Negative	Negative
Reason	Actively thwarts relational engagement (a distraction)	Passively fails to support cognitive engagement
Causal attribution	Technology (the iPad)	Student effort
Perceptions of flipped classroom		
Appraisal	Positive	Negative
Reason	Supports relational engagement	Thwarts cognitive engagement (by reducing teacher-fronted instruction)
Perceptions of autonomy		
Appropriateness for context	Low (increasing over time)	Low (increasing over time)
Causal attribution	Sociocultural background	Student effort
Autonomy orientation	Generally supportive	Generally controlling (with an aim to foster autonomy)

Table 8.1 Overview of teacher values and perceptions.

8.4.1 Beliefs and values: perceptions of the iPad, the flipped classroom, and student autonomy

A number of contrasts can be observed between the two teachers, starting with a fundamental difference in what they considered to be a major objective of the course and the engagement subtype they believed best supported it (Byron: social skills/relational engagement; Ned: study

skills/cognitive engagement). Their perceptions of the two technologies, the iPad and the flipped classroom, can be considered through the lens of these pedagogical beliefs and values.

The unanimously negative appraisal of the iPad for supporting engagement was surprising given how student opinions were more diverse—though in the case of Byron, his view may be rooted in broader misgivings about the application of technology in the classroom. His negative bias is understandable, however, considering how distracting touchscreen devices have proven to be for students, not only in Japan, but around the world (Mahsud et al., 2020). Ned, on the other hand, appeared to believe that relational engagement was antithetical to his focus on cognitive engagement, and while the iPad may have facilitated relational engagement to a limited degree, this engagement was, in his view, largely misplaced because students lacked the metacognitive awareness of why they were engaged in the activity. As the activities themselves were not oriented toward teaching study skills, Ned felt that the iPad did little to support his objective for the course.

Perceptions of the flipped classroom format were divided. Byron had already been an enthusiastic devotee of the approach for several years as it allowed him to spend more class time interacting with students on a personal level, a consequence that was aligned with his course objective. Ned felt that the flipped classroom impeded his ability to focus on his

course objective, something that could be executed more efficiently in a teacher-fronted format.

Autonomy (and by extension, autonomous motivation) was perceived by both teachers as being challenging for students to manage appropriately unless it was gradually incorporated into the course over the year. It is unclear whether the teachers had a rigorous understanding of the nature of autonomy as a psychosocial need that is supported through the creation of an autonomy-supportive environment (teachers often equate autonomy with a removal of structure or support). Nevertheless, the interviews suggest that Byron was generally more autonomy-supportive in his orientation towards his students, while Ned was generally more controlling.

8.4.2 Causal attributions of disengagement

Causal attribution refers to inferences regarding the causes of behavior. According to attribution theory (Heider, 1958), we make *internal* or *external* attributions depending on whether we believe a behavior arose due to personal or situational causes. Byron makes *external attributions* regarding the problems associated with both the iPad and autonomy integration, placing the locus on technology and Japanese society. In contrast, Ned makes *internal attributions*, placing the locus on the students themselves.

By adding an axis of *stable* versus *unstable* to the model (Weiner, 1985), which captures whether the causes are likely to change over time or not,

we gain insight into the four basic types of attributions made to explain success and failure: effort (motivation), ability, level of task difficulty, and luck (figure 8.1). This framework is useful for examining teachers' attributional beliefs regarding their students' successes and failures, framed in this study as engagement and disengagement.

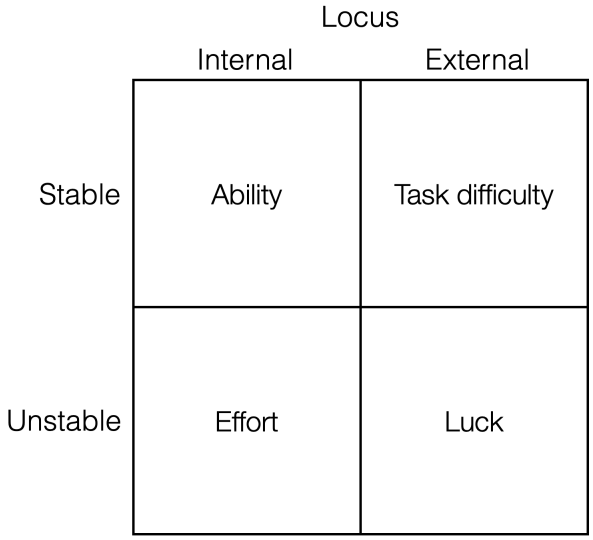


Figure 8.1 Causal attributions regarding engagement and disengagement.
Note. Engagement and disengagement are construed as success and failure in the original theory.

Viewed through this framework, Byron's attributions of disengagement to the iPad and Japanese society could be considered *external-stable* (i.e., students are blameless; is fundamentally unalterable), while Ned's attribution of disengagement to student effort could be considered *internal-unstable* (i.e., students are culpable; is fundamentally alterable). In its standard use, where the framework describes how one attributes causes to one's own behaviors, high achievers typically make internal attributions for their successes and external attributions for their failures,

while low achievers do the opposite. Thus, when the framework is applied to others from a third-person perspective, external attributions for failures (disengagement) may initially appear to be the more favorable view since it reflects the high achiever orientation.

However, I hypothesize that when teachers apply the framework to students, both internal and external attributions may be useful for improving engagement. While teachers clearly have agency over many external-stable elements (task difficulty), they also have influence over internal-stable elements (ability) and internal-unstable elements (effort). Despite the potential for teachers to feel agency over many of the causes of student disengagement, there was no evidence in this phase that Byron felt he had any agency over the external-stable elements in question—not the iPad activities, and certainly not Japanese culture at large. This places Byron in a position of helplessness in terms of what he felt he could practically do to enact change. I therefore suspect that despite his more controlling orientation, Ned was mentally better positioned to improve student engagement—at least in terms of his focus on cognitive engagement—as he felt he had some agency over his students' internal-unstable effort beliefs.

8.4.3 Situating myself in the research

I will conclude this chapter by reflexively examining my own role in this phase of the study. At the time of the research, I had recently been tenured and found myself suddenly thrust into a supervisory role to

coworkers with whom I had previously been equal in rank. Based on the supportive relationship I had built up with them over several years, I did not, at the time, believe this change influenced the perceptions expressed by the participating teachers. They were both committed to their profession, and were never reticent about their views on education.

My intimate knowledge of the teachers and my own prior experiences teaching identical courses positioned me as an "insider-researcher". Most notably, I had seen how the innate psychosocial needs posited by self-determination theory applied not only to students, but also to teachers. This has since become a guiding principle in my management philosophy: how effectively is the working environment supporting the teachers' sense of competence, autonomy, and relatedness? How are the perceptions of teachers affected by the satisfaction of these needs? Finding the answers to such questions is never easy. However, it is worth reflecting on whether, for example, Byron valued relational engagement while Ned valued cognitive engagement because they respectively felt more competent at teaching relational and cognitive skills. Could it also be that they felt unwilling to admit to the benefits of the iPad, or of the flipped classroom, because it was an affront to their sense of competence? Such a finding resulted from a previous study in which a participant expressed criticism of the flipped classroom, saying that he preferred to, "feel like the maestro" in a more teacher-fronted format (Bovee & Howarth, 2014).

It could also be that the research itself, which imposed new materials and pedagogy that was entirely out of their control, undermined their sense of autonomy. While I never felt that the research was overbearing, subtle power dynamics resulting from my change in employment status may have influenced the degree to which teachers held a positive view of the instructional approach, especially since my own endorsement of the flipped classroom was far from secret. It is doubtful that the teachers themselves would admit of such relational factors having any bearing on their perceptions, but the possibility is worth keeping in mind. As prior research has demonstrated that autonomously-motivated teachers engage in more autonomy-supportive instruction (Roth, et al., 2007), it may be useful in the future to involve the teacher participants more in the course content design so that they feel a greater sense of ownership and autonomy.

8.5 Summary

The teacher interviews again revealed diverse perspectives on student engagement and autonomy in relation to the technologies of the iPad and the flipped classroom. However, the most striking finding of this phase was the extent to which teachers' perspectives were filtered through their pedagogical beliefs and values. This phase therefore approached the topic from a level abstracted from student engagement in an attempt to connect teacher beliefs and values to their perceptions of engagement and autonomy.

Although both interviewed teachers were in agreement about the importance of student engagement, they expressed highly contrasting views. The findings are summarized below.

1. The perceptions of the interviewed teachers clearly reflected their fundamental beliefs and values regarding pedagogy.

2. Each teacher focused on a different engagement subtype that was believed to most effectively support their own course objective.

3. The iPad was not seen as being supportive of the engagement subtypes valued by each teacher.

4. The flipped classroom approach was seen as being supportive of engagement by one teacher, but not the other.

5. Both teachers perceived students as being unable to immediately handle a high degree of autonomy.

6. One teacher was more autonomy-supportive while the other was more controlling.

7. Attribution theory is a useful tool for examining teachers' attributional beliefs regarding their students' engagement and disengagement.

8. To explain why students failed to engage in class, one teacher made external-stable attributions, while the other made internal-unstable attributions.

9. Both internal and external attributions may be conducive to improving engagement as long as the teacher feels a degree of agency over the elements in question.

In the following chapter, I discuss the implications of this study for theory, research, and instructional practice.

Chapter 9: Contributions to Knowledge

This study primarily investigated the phenomenon of student engagement within an iPad-supported flipped EFL classroom. This instructional approach aimed to increase the satisfaction of students' autonomy needs through creating a class format in which they engaged more freely with classwork in collaborative groups, obliging them to take more personal responsibility for their learning. It increased opportunities for students to interact with classmates, with the teacher playing a supportive role by providing differentiated instruction and personalized feedback. It was hoped that these changes would stimulate student engagement, and that this engagement would in turn lead to improved outcomes.

The study employed multiple perspectives and research methodologies in an attempt to produce a comprehensive picture of the phenomenon. We saw that the quadrants of integral theory can be used to conceptually frame both second-language acquisition theories and the engagement construct (figures 4.4.4 and 4.4.6). We also saw that the flipped classroom approach does not by its own nature align with any specific theory. Instead, it represents an attempt to radically alter the LR class format in order to generate an LL classroom culture that fosters a greater sense of autonomy and deeper engagement, regardless of the instructional approach. The iPads were introduced to support this autonomy and engagement. In regards to the engagement construct itself, the reconceptualization of the emotional engagement subtype as relational

engagement revealed what I believe is the underlying ontology of the subtypes within the UR, UL, and LL quadrants.

The empirical component of the study is composed of four phases which can similarly be framed by the integral quadrants. Phase one (chapter 5) took a UL quadrant perspective on behavioral (UR), cognitive (UL), and relational (LL) engagement by using survey data to statistically measure changes in self-reported perceptions of engagement over time, perceptions of autonomy-support (the teacher supporting student autonomy), and control (the teacher undermining student autonomy). Phase one also correlated these survey results with the "real-world" (UR) variables of learning outcomes (achievement test scores) and automated e-learning completion. Phase two (chapter 6) took a UR perspective on behavioral engagement by analyzing observational data of student and teacher behaviors in the classroom. Phases three and four (chapters 7 and 8) both took a UL perspective, relying on student and teacher interviews to investigate the phenomenology of classroom engagement (i.e., UL perspectives on other quadrants). In the following sections, I examine the key contributions this study has made to knowledge in terms of theory, research methodology, and classroom instruction.

9.1 Implications for theory

9.1.1 Orienting the engagement subtypes within the integral framework

Although most conventional views of engagement portray the construct as being composed of three subtypes, rarely do researchers consider their

underlying ontology. Granted, the division of engagement into behavioral, cognitive, and emotional engagement makes intuitive sense based on first-person experience. Yet despite this phenomenological parsimony (or perhaps because of it), the lack of ontological parsimony in this division has been previously overlooked.

In chapter three, I presented my case for reconceptualizing emotional engagement as relational engagement, and how the subtypes of behavioral, cognitive, and relational engagement fit within the integral framework. From the perspective of a teacher seeking to use the engagement construct in their instruction or research, this shift in perspective may initially appear to be of little interest. After all, emotional engagement can in fact serve as a viable proxy for the more fundamental relational engagement from which it arises.

So why then concern ourselves with such philosophical excogitations? By recognizing that relational engagement is the primary source of emotions, teachers can start to place less priority on the valence of emotional responses. The quality of the underlying relational engagement can then take higher precedence. By shifting their focus, they can relinquish the common notion that teaching should aim to evoke only positive emotions. After all, meaningful relational engagement frequently results in "negative" emotions such as anxiety and frustration. Such emotions are in fact necessary for learning and growth. This shift in perspective may

encourage teachers to help students learn how to navigate difficult emotions more skillfully instead of avoiding situations that evoke them.

Moreover, the importance of engagement runs deeper than mere instrumentality. To be sure, engagement is a means to an end, but experiencing life in a manner that integrates a wider swath of reality, represented by the three engagement subtypes, is in itself a worthwhile pursuit. By recognizing the significance of the underlying ontology of the subtypes, my hope is that teachers will feel a renewed sense of purpose in fostering engagement for the sake of engagement.

This is not to suggest that teachers should focus on engagement to the detriment of learning outcomes, but in many educational contexts, proximal learning gains are typically modest, and tremendous efforts to improve instruction through creative interventions can all too often produce disappointing results (which are commonly reported as successes in the field of language education research, based solely on statistical significance). The results of phase one were no different in this regard, with the intervention having a limited effect on the outcome variables. Acknowledging engagement itself as a valid outcome, one that potentially has a lasting impact on the well-being of students beyond the scope of the classroom, empowers teachers to recognize and honor their own accomplishments. While it may be clichéd, living in the moment really is the key to well-being, and the journey really is the reward.

9.1.2 Orienting second-language acquisition theories and class format within the integral framework

My professional experience in two decades of formal education has shown that proponents of any given theory of second-language acquisition often adhere dogmatically to its associated instructional approaches. This can be a problem when confirmation bias hinders the acceptance of new instructional approaches that conflict with prior views. For example, many older teachers favor behavioristic choral repetition activities (UR) to the exclusion of more interactionist or constructivist instructional approaches (LL). In chapter 3, I situated four representative second-language acquisition theories within the integral framework in an attempt to demonstrate how each theory, while not equally effective in every context, are equally valid perspectives on how we learn new languages (figure 4.4.4). Each theory prioritizes a single quadrant, and if we accept the notion that engagement with more quadrants leads to greater wholeness and well-being, it seems reasonable to assume that engagement in the service of learning should also seek to involve as many quadrants as possible. At minimum, teachers should be aware of their biases and how their chosen instructional approach fits within this larger framework.

Over the years, I have also noticed that teachers often conflate learning theories with class format (the systemic elements of an instructional approach in the LR). The assumption that simply changing the format of a class spontaneously induces a deeper change in the fundamental philosophy underpinning instruction is a misguided one. Although we saw

in phase three how adopting the flipped classroom markedly influenced how students perceived their teacher, phase four demonstrated that the underlying pedagogical beliefs of the teachers were unlikely to have been significantly affected. This occurred presumably because the class format exists independently of teacher beliefs regarding instruction. For example, teachers who strongly believe in a behavioristic approach are apt to adhere to that approach regardless of whether the class takes a teacher-fronted or more student-centered format. Similarly, teachers who prefer a more social approach to instruction will tend to actualize that belief within any class format.

9.2 Implications for research methodology

9.2.1 Applying the integral framework to educational research design

With regards to each phase of this study, the integral framework was used to map the methods and aspects of the phenomenon under investigation. The framework honors the presence of four irreducible perspectives (quadrants) on any given occasion. Since every occasion can be viewed from one or more of these perspectives, the framework clarifies which perspectives are included and excluded from a chosen research approach. When applied to educational research, an abridged checklist may look as follows:

> In my research on students, I am investigating…
>
> 1. ...behaviors, outcomes, or physiological responses. (UR)
> 2. ...perceptions, feelings, or opinions. (UL)

3. ...relationships, values, or culture. (LL)
4. ...technologies, class formats, or educational systems. (LR)

Granted, most teachers recognize that formal education should strive to provide, at minimum, positive UL student experiences and measurable UR learning outcomes. This recognition already makes educational research more multiperspectival than research in the "hard sciences". However, I have found that educational researchers often conduct investigations with little awareness of the ontological assumptions that underpin their research design. The most common misguided notion is that the science of measuring psychological constructs (UL) is functionally equivalent to the science of measuring behaviors or outcomes (UR). The commonly used distinction between quantitative and qualitative research can obscure the fundamental difference in validity claims represented by each quadrant. For example, questionnaire-based quantitative studies of UL psychological constructs, despite their positivistic veneer, fundamentally rely on subjective self-report measures, making their validity claim "truthfulness" (i.e., are the subjects truthfully conveying their thoughts) rather than the objective "truth" of the UR. The "mixed-methods" label muddies the waters further as any number of different methods can be employed within the epistemological perspective of a single quadrant. Reliance on a diversity of methods therefore does not necessarily signify a multiperspectival or *multiquadrant* approach as portrayed by the integral framework.

This should not be taken as a criticism of research that is restricted to a single quadrant. In general, investigations that include more perspectives either require greater resources such as time, or must sacrifice depth for breadth, and researchers must make choices based on their circumstances. However, my hope is that the integral framework will help educational researchers at my institution see more clearly how their research design fits within a larger map of the ontological and epistemological territory.

In a more general sense, my hope is that the integral framework will help researchers appreciate how each quadrant constitutes one-fourth of the picture, as both an epistemological perspective and an ontological dimension of reality, and by extension, how interior realities of individuals and groups (the left-hand quadrants) and their exteriors (right-hand quadrants) are equally real.

9.2.2 Analyzing interview transcripts through the use of compound codes

As we saw in phase three, the compound codes I devised for this study were composed of four subcodes that applied engagement theory (engagement subtype) and mediation theory (technological relation), as well as an evaluation (comparison with prior experiences) and the verbatim student comment on which these subcodes were based. This method is useful for deductive analytical approaches that apply multiple theoretical frameworks to interview data. It generates a "flat" (as opposed to nested) view of the coded categories, simplifying the initial sorting according to multiple predetermined categories.

This deductive approach does not prevent the researcher from applying a more inductive analysis in a subsequent step. For example, while any particular compound code in this study revealed in general terms how a student engaged with a technology (e.g., relationally engaged / embodied technological relation / S2 better than S1), subsequent analysis of the associated in vivo code revealed details about how that student made sense of their engagement experience. By first deductively categorizing interview comments according to existing theories, it allows the researcher to focus inductively on analyzing what was said in light of these theories. Therefore, this approach is especially useful when the interviews fail to elicit deep self-reflection and require the researcher to "read between the lines" to a greater degree.

9.3 Implications for classroom instruction

9.3.1 The flipped classroom supports engagement; iPads have potential

The results of phase one revealed a number of weak to moderate relationships between student perceptions of their own engagement, perceptions of autonomy-support and control, and the outcome variables. For reasons that were discussed, we saw that higher engagement did not appear to lead to measurably higher learning outcomes as measured by the proficiency test, nor did use of the iPad or flipping the classroom. Therefore, despite the absence of clear evidence for its pedagogical efficacy, phases two, three, and four were conducted not only on the assumption that engagement has knock-on effects for learning in a general sense, but

also that it is an intrinsic good regardless of the measured learning outcomes.

We saw that in comparison to the conventional-textbook group, self-reported engagement was higher in both the flipped-textbook and flipped-iPad groups. At $d = 0.335$, the largest effect size of all was seen in the engagement increase over the semester in the flipped-iPad group. To understand what this means in real-world terms, it is useful to look to the work of John Hattie, who in his synthesis of over 800 meta-studies defined $d = 0.4$ to be a "hinge point" above which an intervention has a greater than average influence on achievement (Hattie, 2008). Granted, his analysis focuses entirely on effects on learning, which differs from the effect of time on engagement observed in this study. Still, as a rough measure, it is useful to understand that the effect size for engagement increase over the semester falls just under Hattie's hinge point of meaningful effects.

If the intervention were conducted over an entire year with improved activities and execution, we may in fact see the effect size of time on engagement rise above this hinge point. Suffice it to say, the data strongly suggests that the intervention, at minimum, did not have a detrimental effect on overall student engagement, and the upward trend suggests that engagement did not primarily result from the novelty effect of introducing the iPads.

Based on the findings in phase one, the main takeaway messages for teachers at my institution in regards to student perceptions of overall engagement levels are as follows: (a) the flipped-textbook classes were more engaging than conventional-textbook classes, and (b) engagement in the flipped-iPad classes was roughly equivalent to that in conventional-textbook classes at the beginning of the semester, but rose to match the engagement levels of flipped-textbook classes by the end of the semester. These findings suggest that while iPads have potential to support engagement within a flipped classroom, it may take longer for students to overcome the various technological and psychological hurdles associated with it.

9.3.2 The flipped classroom mediates engagement via background relations

It is unknown whether using iPads in flipped-iPad classes over an entire year would have stimulated engagement to a point where it surpassed engagement in flipped-textbook classes. What can be said based on the data collected over a single semester is that the flipped classroom appears to be the more critical element for activating engagement, as engagement in the flipped-textbook format remained consistently higher over the semester. This presumption is supported by the similar counts of student-student student interactions in flipped-textbook and flipped-iPad classes in phase two, student comments in phase three, as well as the pro-flipping comments by a teacher in phase four.

If the flipped classroom format is indeed the more consequential element for activating engagement, it is important for teachers to recognize that the class format itself, construed as a technology, becomes largely transparent to a student who feels engaged within it (as seen in phase three). This was interpreted as a "background relation" in terms of mediation theory. Viewed through the integral framework, the flipped classroom represents a structure in the LR that resulted in a change in the LL, and it is this LL classroom culture that likely became normalized over time for those students who were engaged in class.

At the beginning of a school year, students must first become accustomed to a novel classroom culture. Their relation with the flipped classroom format, as a technology, is initially opaque as they learn the new cultural norms and behaviors. This relation then progressively shifts to become increasingly transparent over time, terminating in a background relation for those whom the classroom culture has been assimilated successfully. It is the task of teachers to shepherd this perceptual shift, while being sensitive to the fact that the barometer for success is the degree to which the technological relation has become invisible to students. When it has become invisible, students are no longer engaging *with* the flipped classroom, but *through* it. When their engagement with the flipped classroom remains opaque, the teacher should be able to recognize that it is not working for them and take appropriate actions to remedy the situation.

9.3.3 Student engagement is highly diverse

Although phase one revealed a broad picture of engagement, phases two and three revealed considerable diversity amongst students. Some spent the majority of class time interacting with their iPad, while others spent more time interacting directly with their peers (phase two). Some perceived the iPads as mediating engagement in a positive way, while others saw it and the flipped classroom as a distraction (phase three). And from the perspective of teachers, heightened relational engagement was seen as either being accordant with course goals or detracting from them (phase four). When it comes to the details of engagement, the wide diversity of behaviors and perceptions make it difficult to make best practice recommendations that would satisfy all students and teachers.

First and foremost, it is important for teachers to be aware of the various ways in which their students engage with instruction as mediated by classroom technologies. A mental taxonomy of how students engage behaviorally, cognitively, and relationally via the technology can help teachers keep close tabs on the efficacy of their instruction. By being sensitive to behavioral cues and by asking students directly about their engagement, teachers can gain a deeper understanding of the heterogeneity of engagement in their classes. Since no particular activity universally resulted in greater engagement, a good rule of thumb is to provide a mix of various instructional approaches: from Siri voice-to-text input to handwritten submissions; linear iPad activities to dispersed textbook tasks; group work to whole-class activities. As a starting point,

this taxonomy of engagement could include the various behaviors and student perceptions of engagement that were revealed in phases two and three of this study.

Teachers should be particularly attuned to unplanned, multistable uses of the technology that deviate from its intended use, particularly when those uses promote a desirable aspect of the class (e.g., encouraging an embodied relationship with the iPad to support relational engagement, even when the activity itself was designed for solitary use). In the context of a flipped classroom, these desirable aspects are often pro-social or relational in nature. An unintended but desirable use of technology might be leveraged by formally incorporating it into instruction. For example, the number of iPads could be deliberately reduced to one per group, obliging students to cooperate more closely on activities (as in Sugata Mitra's School in the Cloud initiative).

9.3.4 Physical proximity spontaneously humanizes instruction

Through flipping, the quality of student-student and student-teacher relational engagement improved for nearly all interviewed students, but particularly for students who experienced poor-quality relational engagement in the prior semester (phase three). In terms of student-teacher relational engagement, this perceptual shift was likely precipitated by the increases in both physical proximity and interaction times, clearly evident in phase two. Physical proximity alone may facilitate a shift in the conventional social identities of "teacher" and "student", in a

sense forcing the students to relate to their teacher on a more personal level (and vice versa, though this was not substantiated in phase four). Furthermore, the format is likely to help prevent the occurrence of student deindividuation and its attendant loss of accountability. In short, the flipped classroom powerfully humanizes classroom instruction, regardless of whether or not the teacher wishes for it.

9.3.5 Pedagogical beliefs influence perceptions of engagement

Regardless of how students actually engaged, beliefs about how students *ought* to engage remained resistant to change. Phase four revealed how such beliefs—based on teachers' views on course objectives, iPads, flipped classrooms, and autonomy-support—influenced their perceptions of student engagement (e.g., which subtype gets prioritized). It would be beneficial for teachers to reflect upon their beliefs and consider how they might affect their perceptions.

Seen through the lens of attribution theory, we saw how the internal-unstable causal attribution (i.e., effort) may be the most effective view for teachers to have on engagement. Yet, the teachers said little about how they specifically supported their students' sense of autonomy. This may imply that they believed the flipped classroom itself was automatically filling this role, with little extra effort required on their part. However, both phase one and phase three revealed that flipping does not automatically lead to enhancement of a student's sense of autonomy, with

some students expressing a preference for a more controlling classroom climate.

Fostering a sense of autonomy is one of the most important goals of teaching in any classroom, and if self-determination theory does in fact apply cross-culturally, then students who claim to prefer less autonomy may actually be seeking more structure and support (which they may perceive as more abundant in a teacher-fronted format). Autonomy and support are not mutually exclusive, and developing a healthy sense of autonomy usually *requires* support. Teachers must first agree on the importance of autonomy for fostering healthy motivation and subsequent engagement. If teachers can then shift their attribution of student disengagement to an internal-unstable locus (over which they feel agency to influence in the classroom), they should be able to take better advantage of the flipped format to support student autonomy through engaging relationally with their students.

9.4 Future directions

In this study, we have seen how students perceive classroom technologies, the flipped classroom in particular, in varying degrees of opacity. This variability in perceptions of technologies and their social impact, both intended and unintended, has been explored in an extension to mediation theory proposed by Tromp, Hekkert, and Vebrbeek (2011). Their framework situates technologies along the dimensions of salience (degree of visibility) and force (strength of impact). The background relation of the

flipped classroom appeared to have the greatest impact when it was the least visible to students. Does this relationship hold true for other classroom technologies? Is technological salience dependent upon student characteristics such as motivation and perceptions of autonomy-support? Future research should apply this framework in a more nuanced investigation of both digital and non-digital classroom technologies with an aim to discover how their salience relates to engagement in the classroom.

9.5 Conclusions

My work in this study has resulted in three theoretical contributions that are useful for teachers. Principally, my reinterpretation of the engagement construct can serve as a useful mental model for classroom instruction. By taking a first principles "bottom-up" approach based on fundamental truths, I attempted to demonstrate how the construct represents the quantity and quality of how we live with motivated intentionality in every moment. Teachers who have this ontological awareness should be able to more accurately interpret engagement cues exhibited by their students, particularly by focusing more on the quality of engagement and less on its concomitant emotions. Most importantly, the model should help teachers acknowledge that engagement is itself a worthwhile outcome of instruction.

Secondly, I demonstrated how mediation theory can help teachers make sense of the various ways in which students engage with and through

technology. This model can be applied when introducing new technology into the classroom (digital or otherwise) to gain a deeper understanding of how students perceive their own engagement during class.

Finally, I showed how attribution theory can help teachers recognize the causal attributions they make to explain student engagement and disengagement. The pedagogical beliefs that underpin these attributions were found to influence the relative value teachers place on the engagement subtypes. Teachers must therefore be mindful of their beliefs and values, taking note of how they affect their perceptions regarding instructional efficacy.

These three theoretical models can serve as useful heuristic devices that allow teachers to make more nuanced interpretations of student engagement in their own classrooms. In the context of the present study, student engagement was found to be highly diverse in character, both in its expression as observed behaviors and its perception by the students themselves. This diversity may be the single most surprising outcome of the study, as teachers (myself included) were unaware of just how differently students engaged in class. Wide variations in behavioral engagement were revealed among individual students. In many instances, student perceptions challenged our assumptions regarding autonomy (e.g., negative perceptions of autonomy increase), technology use (e.g., unintentional multistability), and classroom culture (e.g., infringement of Japanese cultural values).

Despite this diversity, the flipped-iPad classes did appear to be generally supportive of instruction as evidenced by the modest pre-post gain in engagement levels and the comparatively higher quantity of student-student interactions.

Based on these results, I suggest that future iterations of this pedagogical approach should continue to use the flipped classroom as a base. Any digital technologies that are introduced should be improved to better support a sense of competence (e.g., by providing higher quality feedback), relatedness (e.g., by meditating relational engagement with peers), and autonomy (e.g., by providing students with multiple options for engagement).

Above all, it is important that administrators shift their perspective on engagement to recognize that it is more than a means to an end. This may be the most daunting challenge of all as it requires nothing short of a sea change in deeply rooted cultural values. Although cultural change within education moves at an unbearably slow pace, I hope my work will at least inspire more people to take notice of engagement as a valid outcome of instruction.

References

Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education*, *126*, 334–345. https://doi.org/10.1016/j.compedu.2018.07.021

Akinoğlu, O., & Tandoğan, R. Ö. (2007). The effects of problem-based active learning in science education on students' academic achievement, attitude and concept learning. *Eurasia Journal of Mathematics, Science and Technology Education*, *3*(1), 71–81. https://doi.org/10.12973/ejmste/75375

Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools*, *45*(5), 369–386. https://doi.org/10.1002/pits.20303

Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology*, *44*(5), 427–445. https://doi.org/10.1016/j.jsp.2006.04.002

Ashwin, P., & McVitty, D. (2015). The meanings of student engagement: Implications for policies and practices. In A. Curaj, L. Matei, R. Pricopie, J. Salmi, & P. Scott (Eds.), *The European higher education area: Between critical reflections and future policies* (pp. 343–359). Springer. https://doi.org/10.1007/978-3-319-20877-0_23

Ayres, P. (2006). Using subjective measures to detect variations of intrinsic cognitive load within problems. *Learning and Instruction*, *16*(5), 389–400. https://doi.org/10.1016/j.learninstruc.2006.09.001

Banathy, B. H., Trager, B. C., & Waddle, C. D. (1966). Use of contrastive data in foreign language course development. In A. Valdman (Ed.), *Trends in language teaching*. McGraw-Hill.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science*, *1*(2), 164–180. https://doi.org/doi.org/10.1111/j.1745-6916.2006.00011.x

Barbour, I. (1992). *Ethics in an age of technology: The Gifford Lectures, Volume Two*. HarperOne.

Barrett, L. F. (2012). Emotions are real. *Emotion*, *12*(3), 413–429. https://doi.org/doi.org/10.1037/a0027555

Bennett, B. (2011, October 18). Video is not the answer. *Ohhey*. https://blog.ohheybrian.com/2011/10/video-is-not-the-answer

Bergmann, J., & Sams, A. (2012a). *Flip your classroom: Reach every student in every class every day*. International Association for Technology in Education.

Bergmann, J., & Sams, A. (2012b). Before you flip, consider this. *Phi Delta Kappan*, *94*(2), 25. https://doi.org/10.1177/003172171209400206

Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., Wallet, P. A., Fiset, M., & Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research*, *74*(3), 379–439. https://doi.org/10.3102/00346543074003379

Berrett, D. (2012, February 19). How "flipping" the classroom can improve the traditional lecture. *The Chronicle of Higher Education*. http://chronicle.com/article/How-Flipping- the-Classroom/130857

Bloom, B. S., Hastings, J. T., & Madaus, G. F. (1971). *Handbook on formative and summative evaluation of student learning*. McGraw-Hill.

Bodie, G. D., Powers, W. G., & Fitch-Hauser, M. (2006). Chunking, priming and active learning: Toward an innovative and blended approach to teaching communication-related skills. *Interactive Learning Environments*, *14*(2), 119–135. https://doi.org/10.1080/10494820600800182

Bovee, N., & Howarth, M. (2014). Teacher and student perceptions of a pilot flipped English conversation course at KSU. *Kyushu Sangyo University Language Education and Research Center Journal*, *9*, 38–62.

Brislin, R. W. (1980). Translation and content analysis of oral and written material. In H. C. Triandis & J. W. Berry (Eds.), *Handbook of cross-cultural psychology: Methodology*. Allyn & Bacon.

Brown, D. H. (2000). *Principles of language learning and teaching* (4th ed.). Longman.

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods and Research*, *21*(2), 230–258. https://doi.org/doi.org/10.1177/0049124192021002005

Bruton, A. (2009). The Vocabulary Knowledge Scale: A critical analysis. *Language Assessment Quarterly, 6,* 288–297. http://dx.doi.org/10.1080/15434300902801909

Buhs, E. S., & Ladd, G. W. (2001). Peer rejection as antecedent of young children's school adjustment: An examination of mediating processes. *Developmental Psychology*, *37*(4), 550–560. https://doi.org/10.1037/0012-1649.37.4.550

Burnett, P. C., & Mandel, V. (2010). Praise and feedback in the primary classroom: Teachers' and students' perspectives. *Australian Journal of Educational and Developmental Psychology*, *10*, 145–154.

Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and Instruction*, *8*(4), 293–332. https://doi.org/10.1207/s1532690xci0804_2

Chandler, P., & Sweller, J. (1992). The split-attention effect as a factor in the design of instruction. *British Journal of Educational Psychology*, *62*(2), 233–246. https://doi.org/10.1111/j.2044-8279.1992.tb01017.x

Chaplin, S. (2009). Assessment of the impact of case studies on student learning gains in an introductory biology course. *Journal of College Science Teaching*, *39*(1), 72–79.

Chapman, E. (2019). Alternative approaches to assessing student engagement rates. *Practical Assessment, Research, and Evaluation*, *8*(1). https://doi.org/doi.org/10.7275/3e6e-8353

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). SAGE Publishing.

Chomsky, N. (1959). A review of B. F. Skinner's Verbal Behavior. *Language*, *35*(1), 26–58. https://doi.org/doi.org/10.2307/411334

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, *53*(4), 445–459. https://doi.org/10.3102/00346543053004445

Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development*, *42*(2), 21–29. https://doi.org/10.1007/BF02299088

Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the life-span. In D. Cicchetti (Ed.), *The self in transition: Infancy to childhood* (pp. 61–67). University of Chicago Press.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *The Minnesota symposia on child psychology, Vol. 23. Self processes and development* (pp. 43–77). Lawrence Erlbaum Associates, Inc.

Cook, D. A., & Artino, A. R., Jr. (2016). Motivation to learn: An overview of contemporary theories. *Medical Education*, *50*(10), 997–1014. https://doi.org/doi.org/10.1111/medu.13074

Council of Europe. (2001). *Common European Framework of Reference for Languages: Learning, teaching, assessment*. Cambridge University Press.

Crouch, C. H., & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics*, *69*(9), 970–977. https://doi.org/10.1119/1.1374249

Davis, H. A., Chang, M.-L., Andrzejewski, C. E., & Poirier, R. R. (2014). Examining relational engagement across the transition to high schools in three US high schools reformed to improve relationship quality. *Learning Environments Research*, *17*(2), 263–286. https://doi.org/10.1007/s10984-013-9148-4

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. A. Dienstbier (Ed.), *Current theory and research in motivation, Vol. 38. Nebraska Symposium on Motivation, 1990: Perspectives on motivation* (pp. 237–288). University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological*

Inquiry, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Dunn, O. J. (1964). Multiple comparisons using rank sums. *Technometrics*, *6*(3), 241–252.

Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, *6*(3–4), 169–200. https://doi.org/10.1080/02699939208411068

Esbjörn-Hargens, S., Reams, J., & Gunnlaugson, O. (2010). *Integral education: New directions for higher learning*. SUNY Press.

ETS. (n.d.). *TOEIC Bridge Test*. https://www.ets.org/toeic/bridge

Fautch, J. M. (2015). The flipped classroom for teaching organic chemistry in small classes: Is it effective? *Chemistry Education Research and Practice*, *16*(1), 179–186. https://doi.org/10.1039/C4RP00230J

Filsecker, M., & Kerres, M. (2014). Engagement as a volitional construct: A framework for evidence-based research on educational games. *Simulation & Gaming*, *45*(4–5), 450–470. https://doi.org/10.1177/1046878114553569

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, *59*(2), 117–142. https://doi.org/10.3102/00346543059002117

Finn, J. D., & Owings, J. (2006). *The adult lives of at-risk students the roles of attainment and engagement in high school*. Diane Publishing.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, *82*(2), 221–234. https://doi.org/10.1037/0021-9010.82.2.221

Finn, J. D., & Zimmer, K. S. (2012). Student engagement: What is it? Why does it matter? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 97–131). Springer. https://doi.org/10.1007/978-1-4614-2018-7_5

Fischer, C. T. (2009). Bracketing in qualitative research: Conceptual and practical matters. *Psychotherapy Research, 19*(4-5) 583-590. https://doi.org/10.1080/10503300902798375

Frederickson, N., Reed, P., & Clifford, V. (2005). Evaluating Web-supported learning versus lecture-based teaching: Quantitative and qualitative perspectives. *Higher Education*, *50*(4), 645–664. https://doi.org/10.1007/s10734-004-6370-0

Fredricks, J. A. (2011). Engagement in school and out-of-school contexts: A multidimensional view of engagement. *Theory Into Practice*, *50*(4), 327–335. https://doi.org/10.1080/00405841.2011.607401

Fredricks, J. A. (2014). *Eight myths of student disengagement: creating classrooms of deep learning*. Corwin Press.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*(1), 59–109. https://doi.org/10.3102/00346543074001059

Fredricks, J. A., & McColskey, W. (2012). The measurement of student engagement: A comparative analysis of various methods and student self-report instruments. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 763–782). Springer. https://doi.org/10.1007/978-1-4614-2018-7_37

Freeman, S., O'Connor, E., Parks, J. W., Cunningham, M., Hurley, D., Haak, D., Dirks, C., & Wenderoth, M. P. (2007). Prescribed active learning increases performance in introductory biology. *CBE—Life Sciences Education*, *6*(2), 132–139. https://doi.org/10.1187/cbe.06-09-0194

French, D. C., & Conrad, J. (2001). School dropout as predicted by peer rejection and antisocial behavior. *Journal of Research on Adolescence*, *11*(3), 225–244. https://doi.org/10.1111/1532-7795.00011

Fryer, L. K., & Bovee, H. N. (2016). Supporting students' motivation for e-learning: Teachers matter on and offline. *The Internet and Higher Education*, *30*, 21–29. https://doi.org/10.1016/j.iheduc.2016.03.003

Fryer, L. K., & Bovee, H. N. (2018). Staying motivated to e-learn: Person- and variable-centred perspectives on the longitudinal risks and support. *Computers & Education*, *120*, 227–240. https://doi.org/10.1016/j.compedu.2018.01.006

Fryer, L. K., & Bovee, H. N. (2020). Teaching for course interest. *Studies in Higher Education*. https://doi.org/10.1080/03075079.2020.1712692

Fryer, L. K., Bovee, H. N., & Nakao, K. (2014). E-learning: Reasons students in language learning courses don't want to. *Computers & Education*, *74*, 26–36. https://doi.org/10.1016/j.compedu.2014.01.008

Furlong, M. J., & Christenson, S. L. (2008). Engaging students at school and with learning: A relevant construct for ALL students. *Psychology in the Schools*, *45*(5), 365–368. https://doi.org/10.1002/pits.20302

Furlong, M. J., Whipple, A. D., St. Jean, G., Simental, J., Soliz, A., & Punthuna, S. (2003). Multiple contexts of school engagement: Moving toward a unifying framework for educational research and practice. *The California School Psychologist*, *8*(1), 99–113. https://doi.org/10.1007/BF03340899

Furrer, C. J., Skinner, E. A., & Pitzer, J. R. (2014). The influence of teacher and peer relationships on students' classroom engagement and everyday motivational resilience. In D. Shernoff & J. Bempechat (Eds.), *NSSE yearbook. Engaging youth in schools: Evidence-based models to guide future innovations* (pp. 101–123). Teachers College Record.

George, D., & Mallery, P. (2010). *SPSS for Windows step by step: A simple guide and reference 17.0 Update* (10th edition). Pearson.

Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *The Journal of Early Adolescence*, *13*(1), 21–43. https://doi.org/10.1177/0272431693013001002

Graham-Marr, A. (2009). *Communication spotlight: Speaking strategies and listening skills*. Abax.

Greenwood, C. R., Horton, B. T., & Utley, C. A. (2002). Academic engagement: Current perspectives on research and practice. *School Psychology Review*, *31*(3), 328–349. https://doi.org/10.1080/02796015.2002.12086159

Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied thematic analysis*. SAGE Publishing. https://doi.org/10.4135/9781483384436

Harris, S. (2014). *Waking up: A guide to spirituality without religion*. Simon & Schuster.

Hattie, J. (2008). *Visible learning: A synthesis of meta-analyses relating to achievement*. Routledge.

Heider, F. (1958). *The psychology of interpersonal relations*. Wiley. https://doi.org/10.1037/10628-000

Hoaglin, D. C., Iglewicz, B., & Tukey, J. W. (1986). Performance of some resistant rules for outlier labeling. *Journal of the American Statistical Association*, *81*(396), 991–999. https://doi.org/10.1080/01621459.1986.10478363

Horton, L. (1979). Mastery learning: Sound in theory, but... *Educational Leadership*, *37*(2), 154–156.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huba, M. E., & Freed, J. E. (2000). *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning*. Allyn & Bacon.

Hung, H.-T. (2015). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, *28*(1), 81–96. https://doi.org/10.1080/09588221.2014.967701

Hutchby, I. (2001). Technologies, texts and affordances. *Sociology*, *35*(2), 441–456. https://doi.org/10.1177/S0038038501000219

HyperTRANSCRIBE [Computer software]. (2013). http://www.researchware.com

Ihde, D. (1990). *Technology and the lifeworld: From garden to earth*. Indiana University Press.

Izard, C. E. (1989). The structure and functions of emotions: Implications for cognition, motivation, and personality. In I. S. Cohen (Ed.), *The G. Stanley Hall lecture series: Vol. 9* (pp. 39–73). American Psychological Association. https://doi.org/10.1037/10090-002

Izard, C. E. (1991). *The psychology of emotions*. Plenum Press.

Jang, H., Reeve, J., Ryan, R. M., & Kim, A. (2009). Can self-determination theory explain what underlies the productive, satisfying learning experiences of collectivistically oriented Korean students? *Journal of Educational Psychology*, *101*(3), 644–661. https://doi.org/10.1037/a0014241

Japan Society for the Promotion of Science. (2014). *「科学の健全な発展のために」- 誠実な科学者の心得 -* [For the sound development of science: The attitude of a conscientious scientist]. https://www.jsps.go.jp/j-kousei/data/rinri_e.pdf

Jensen, J. L., Kummer, T. A., & Godoy, P. D. (2015). Improvements from a flipped classroom may simply be the fruits of active learning. *CBE Life Sciences Education*, *14*(1). https://doi.org/10.1187/cbe.14-08-0129

Jimerson, S. R., Campos, E., & Greif, J. L. (2003). Toward an understanding of definitions and measures of school engagement and related terms. *The California School Psychologist*, *8*(1), 7–27. https://doi.org/10.1007/BF03340893

Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education, 38*(5), 758-773. https://10.1080/03075079.2011.598505

Kleinginna, P. R., & Kleinginna, A. M. (1981). A categorized list of emotion definitions, with suggestions for a consensual definition. *Motivation and Emotion*, *5*(4), 345–379. https://doi.org/10.1007/BF00992553

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, *74*(7), 262–273.

Knight, J. K., & Wood, W. B. (2005). Teaching more by lecturing less. *Cell Biology Education*, *4*(4), 298–310. https://doi.org/10.1187/05-06-0082

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice, 24*(1), 120-124. https://doi.org/10.1080/13814788.2017.1375092

Krashen, S. (1982). *Principles and practice in second language acquisition*. Pergamon Press.

Lado, R. (1957). *Linguistics across cultures*. University of Michigan Press.

Lape, N., Levy, R., Yong, D., Haushalter, K., Eddy, R., & Hankel, N. (2014). Probing the inverted classroom: A controlled study of teaching and learning outcomes in undergraduate engineering and mathematics. *2014 ASEE Annual Conference*. https://scholarship.claremont.edu/hmc_fac_pub/1128

Lawson, M. A., & Lawson, H. A. (2013). New conceptual frameworks for student engagement research, policy, and practice. *Review of Educational Research*, *83*(3), 432–479. https://doi.org/10.3102/0034654313480891

Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford University Press.

Libbey, H. P. (2004). Measuring student relationships to school: Attachment, bonding, connectedness, and engagement. *Journal of School Health*, *74*(7), 274–283. https://doi.org/10.1111/j.1746-1561.2004.tb08284.x

Lindquist, K. A., Wager, T. D., Kober, H., Bliss-Moreau, E., & Barrett, L. F. (2012). The brain basis of emotion: A meta-analytic review. *The Behavioral and Brain Sciences*, *35*(3), 121–143. https://doi.org/10.1017/S0140525X11000446

Linnenbrink-Garcia, L., Rogat, T. K., & Koskey, K. L. K. (2011). Affect and engagement during small group instruction. *Contemporary Educational Psychology*, *36*(1), 13–24. https://doi.org/10.1016/j.cedpsych.2010.09.001

Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, *3*(2), 157–189. https://doi.org/10.1016/0030-5073(68)90004-4

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, *57*(9), 705–717. https://doi.org/10.1037/0003-066X.57.9.705

Long, M. (1985). Input and second language acquisition theory. In S. M. Gass & C. G. Madden (Eds.), *Input in second language acquisition* (pp. 377–393). Newbury House.

Maddox, S. J., & Prinz, R. J. (2003). School bonding in children and adolescents: Conceptualization, assessment, and associated

variables. *Clinical Child and Family Psychology Review*, *6*(1), 31–49. https://doi.org/10.1023/a:1022214022478

Mahsud, M., Khalaf, A. J. M., Mahsud, Z., Afzal, A., & Afzal, F. (2020). Addiction to smartphones leading to distraction in the classrooms: Effect of different cultures. *Journal of Statistics and Management Systems, 24*(4), 741–754. https://doi.org/10.1080/09720510.2020.1834660

Marquez, J., & Long, E. (2021). A global decline in adolescents' subjective well-being: A comparative study exploring patterns of change in the life satisfaction of 15-year-old students in 46 countries. *Child Indicators Research, 14*, 1251–1292. https://doi.org/10.1007/s12187-020-09788-8

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, *103*(3), 391–410. https://doi.org/10.1037/0033-2909.103.3.391

Marshall, H. W., & DeCapua, A. (2013). *Making the transition to classroom success: Culturally responsive teaching for struggling language learners*. University of Michigan Press.

Martin, A. J. (2007). Examining a multidimensional model of student motivation and engagement using a construct validation approach. *British Journal of Educational Psychology*, *77*(2), 413–440. https://doi.org/10.1348/000709906X118036

Martin, A. J. (2012). Motivation and engagement: Conceptual, operational, and empirical clarity. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of Research on Student Engagement* (pp. 303–311). Springer. https://doi.org/10.1007/978-1-4614-2018-7_14

Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511811678

Mazur, E. (1996). *Peer instruction: A user's manual*. Pearson.

McLaughlin, B. (1978). The monitor model: Some methodological considerations. *Language Learning*, *28*(2), 309–332. https://doi.org/10.1111/j.1467-1770.1978.tb00137.x

Meyer, J. P., & Gagnè, M. (2008). Employee engagement from a self-determination theory perspective. *Industrial and Organizational*

Psychology, *1*(1), 60–62. https://doi.org/10.1111/j.1754-9434.2007.00010.x

Michael, J. (2006). Where's the evidence that active learning works? *Advances in Physiology Education*, *30*(4), 159–167. https://doi.org/10.1152/advan.00053.2006

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publishing.

Mitra, S. (2019). *The school in the cloud: The emerging future of learning*. Corwin.

Mitra, S., Dangwal, R., Chatterjee, S., Jha, S., Bisht, R. S., & Kapur, P. (2005). Acquisition of computing literacy on shared public computers: Children and the "hole in the wall." *Australasian Journal of Educational Technology*, *21*(3). https://doi.org/10.14742/ajet.1328

Mitra, S., & Rana, V. (2001). Children and the Internet: Experiments with minimally invasive education in India. *British Journal of Educational Technology*, *32*(2), 221–232. https://doi.org/10.1111/1467-8535.00192

Moodle (Version 2.4) [Computer software]. (2012). https://moodle.org

Mosher, R., & MacGowan, B. (1985). Assessing student engagement in secondary schools: Alternative conceptions, strategies of assessing, and instruments. *University of Wisconsin, Research and Development Center (ERIC Document Reproduction Service No. ED 272812)*. https://eric.ed.gov/?id=ED272812

Murray, C., & Greenberg, M. T. (2001). Relationships with teachers and bonds with school: Social emotional adjustment correlates for children with and without disabilities. *Psychology in the Schools*, *38*(1), 25–41. https://doi.org/10.1002/1520-6807(200101)38:1%3C25::AID-PITS4%3E3.0.CO;2-C

Musallam, R. (2010). *The effects of using screencasting as a multimedia pre-training tool to manage the intrinsic cognitive load of chemical equilibrium instruction for advanced high school chemistry students* [Doctoral dissertation, University of San Francisco]. https://repository.usfca.edu/diss/381

Nalipay, M. J. N., King, R. B., & Cai, Y. (2020). Autonomy is equally important across East and West: Testing the cross-cultural universality of self-determination theory. *Journal of Adolescence*, *78*, 67–72. https://doi.org/10.1016/j.adolescence.2019.12.009

National Research Council and Institute of Medicine. (2004). *Engaging schools: Fostering high school students' motivation to learn*. The National Academies Press. https://doi.org/10.17226/10421

Nespor, M., Shukla, M., & Mehler, J. (2011). Stress-timed vs. syllable-timed languages. In M. Oostendorp, C. J. Ewen, E. Hume, & K. Rice (Eds.), *The Blackwell companion to phonology* (pp. 1–13). Wiley-Blackwell. https://doi.org/10.1002/9781444335262.wbctp0048

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education*. https://doi.org/10.1177/1477878509104318

Novak, G. M., Patterson, E., Gavrin, A., & Christian, W. (1999). *Just-in-time teaching: Blending active learning with Web technology*. Prentice Hall.

O'Dowd, D. K., & Aguilar-Roca, N. (2009). Garage demos: Using physical models to illustrate dynamic aspects of microscopic biological processes. *CBE—Life Sciences Education*, *8*(2), 118–122. https://doi.org/10.1187/cbe.09-01-0001

Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, *70*(3), 323–367. https://doi.org/10.3102/00346543070003323

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health*, *42*(5), 533–544. https://doi.org/10.1007/s10488-013-0528-y

Papadopoulos, C., & Roman, A. S. (2010). *Implementing an inverted classroom model in engineering statics: Initial results* [Paper presentation]. 2010 Annual Conference & Exposition, Louisville, Kentucky. https://doi.org/10.18260/1-2--16768

Parkinson, B. (1996). Emotions are social. *British Journal of Psychology*, *87(4)*, 663–683. https://doi.org/10.1111/j.2044-8295.1996.tb02615.x

Patton, M. Q. (2008). *Utilization-focused evaluation* (4th ed.). SAGE Publishing.

Postman, N. (1993). *Technopoly: The surrender of culture to technology*. Vintage Books.

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149–172). Springer. https://doi.org/10.1007/978-1-4614-2018-7_7

Reeve, J. (2014). *Understanding motivation and emotion* (5th ed.). Wiley.

Reeve, J. (2016). Autonomy-supportive teaching: What it is, how to do it. In W. Liu, J. Wang, & R. Ryan (Eds.), *Building autonomous learners*. Springer. https://doi.org/10.1007/978-981-287-630-0_7

Reeve, J., & Halusic, M. (2009). How K-12 teachers can put self-determination theory principles into practice: *Theory and Research in Education*, *7*(2), 145–154. https://doi.org/10.1177/1477878509104319

Reeve, J., & Tseng, C. (2011). Agency as a fourth aspect of students' engagement during learning activities. *Contemporary Educational Psychology*, *36*(4), 257–267. https://doi.org/10.1016/j.cedpsych.2011.05.002

Reeve, J., Vansteenkiste, M., Assor, A., Ahmad, I., Cheon, S. H., Jang, H., Kaplan, H., Moss, J. D., Olaussen, B. S., & Wang, C. K. J. (2014). The beliefs that underlie autonomy-supportive and controlling teaching: A multinational investigation. *Motivation and Emotion, 38*, 93–110. https://doi.org/10.1007/s11031-013-9367-0

Reschly, A. L., & Christenson, S. L. (2006). Prediction of dropout among students with mild disabilities: A case for the inclusion of student engagement variables. *Remedial and Special Education*, *27*(5), 276–292. https://doi.org/10.1177/07419325060270050301

Reschly, A. L., & Christenson, S. L. (2012). Jingle, jangle, and conceptual haziness: Evolution and future directions of the engagement construct. In S. Christenson, A. Reschly, & C. Wylie (Eds.),

Handbook of research on student engagement (pp. 3–19). Springer. https://doi.org/10.1007/978-1-4614-2018-7_1

Rigby, C. S., Deci, E. L., Patrick, B. C., & Ryan, R. M. (1992). Beyond the intrinsic-extrinsic dichotomy: Self-determination in motivation and learning. *Motivation and Emotion*, *16*(3), 165–185. https://doi.org/10.1007/BF00991650

Röhl, A., Reddy, S., & Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning strategies. *Journal of Family and Consumer Sciences*, *105*(2), 44–49. https://doi.org/10.14307/JFCS105.2.12

Roth, G., Assor, A., Kanat-Maymon, Y., & Kaplan, H. (2007). Autonomous motivation for teaching: How self-determined teaching may lead to self-determined learning. *Journal of Educational Psychology, 99*(4), 761–774. https://doi.org/10.1037/0022-0663.99.4.761

Rozin, P. (2001). Social psychology and science: Some lessons from Solomon Asch. *Personality and Social Psychology Review*, *5*(1), 2–14. https://doi.org/10.1207/S15327957PSPR0501_1

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, *57*(5), 749–761. https://doi.org/10.1037/0022-3514.57.5.749

Ryan, R. M., & Deci, E. L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67. https://doi.org/10.1006/ceps.1999.1020

Saldaña, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). SAGE Publishing.

Saussure, F. (1960). *Course in general linguistics* (W. Baskin, Trans.). Peter Owen Publishers. (Original work published 1916).

Scheff, T. J., Phillips, B. S., & Kincaid, H. (2015). *Goffman unbound!: A new paradigm for social science*. Routledge.

Schwartz, B. (2000). Self-determination: The tyranny of freedom. *American Psychologist*, *55*(1), 79–88. https://doi.org/10.1037/0003-066X.55.1.79

Shaver, P. R., Wu, S., & Schwartz, J. C. (1992). Cross-cultural similarities and differences in emotion and its representation. In M. S. Clark (Ed.), *Review of personality and social psychology, No. 13. Emotion* (pp. 175–212). SAGE Publishing.

Sinatra, G. M., Heddy, B. C., & Lombardi, D. (2015). The challenges of defining and measuring student engagement in science. *Educational Psychologist*, *50*(1), 1–13. https://doi.org/10.1080/00461520.2014.1002924

Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. Appleton-Century.

Skinner, B. F. (1957). *Verbal behavior*. Prentice Hall.

Skinner, E. A., Kindermann, T. A., Connell, J. P., & Wellborn, J. G. (2009). Engagement and disaffection as organizational constructs in the dynamics of motivational development. In K. R. Wenzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 223–245). Routledge.

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*(3), 493–525. https://doi.org/10.1177/0013164408323233

Skinner, E. A., & Pitzer, J. R. (2012). Developmental dynamics of student engagement, coping, and everyday resilience. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 21–44). Springer. https://doi.org/10.1007/978-1-4614-2018-7_2

Smith, C. A., & Lazarus, R. S. (1993). Appraisal components, core relational themes, and the emotions. *Cognition and Emotion*, *7*(3–4), 233–269. https://doi.org/10.1080/02699939308409189

Stephen, N. (2017, October 3). *Why flipped learning is still going strong 10 years later*. EdSurge. https://www.edsurge.com/news/2017-10-03-why-flipped-learning-is-still-going-strong-10-years-later

Stewart, J., Batty, A. O., & Bovee, N. (2012). Comparing multidimensional and continuum models of vocabulary acquisition: An empirical examination of the Vocabulary Knowledge Scale. *TESOL Quarterly, 46*(4), 695–721. https://doi.org/10.1002/tesq.35

Stewart, J., & Bovee, N. (2016). Using the OCST as a speaking activity in LERC Reading & Writing classes. *Language Education and Research Center Journal*, *11*, 51–56.

Strayer, J. F. (2012). How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning Environments Research*, *15*(2), 171–193. https://doi.org/10.1007/s10984-012-9108-4

Sweller, J., van Merrienboer, J. J. G., & Paas, F. G. W. C. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, *10*(3), 251–296. https://doi.org/10.1023/A:1022193728205

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Pearson.

Talbert, R. (2018, March 1). What does the research say about flipped learning. *Robert Talbert, Ph.D.: Math, Technology, Education, Productivity*. http://rtalbert.org/what-does-the-research-say

Tomkins, S. S. (1962). *Affect, imagery, consciousness, vol. 1: The positive affects*. Springer. https://doi.org/10.1037/14351-000

Tomkins, S. S. (1963). *Affect, imagery, consciousness, vol. 2. The negative affects*. Springer.

Tromp, N., Hekkert, P., & Verbeek, P.-P. (2011). Design for socially responsible behavior: A classification of influence based on intended user experience. *Design Issues*, *27*(3), 3–19. https://doi.org/10.1162/DESI_a_00087

Trowler, V. (2015). Negotiating contestations and 'chaotic conceptions': Engaging 'non-traditional' students in higher education. *Higher Education Quarterly*, *69*(3), 295–310. https://doi.org/10.1111/hequ.12071

Turan, Z., & Akdag-Cimen, B. (2020). Flipped classroom in English language teaching: A systematic review. *Computer Assisted Language Learning*, *33*(5–6), 590–606. https://doi.org/10.1080/09588221.2019.1584117

Twaddell, W. F. (1935). On defining the phoneme. *Language*, *11*(1), 5–62.

UCLA: Statistical Consulting Group. (n.d.). *How can I do tests of simple main effects in SPSS?* https://stats.idre.ucla.edu/spss/faq/how-can-i-do-tests-of-simple-main-effects-in-spss

Van den Broeck, A., Ferris, D. L., Chang, C.-H., & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management*, *42*(5), 1195–1229. https://doi.org/10.1177/0149206316632058

Vansteenkiste, M., Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. C. Urdan & S. A. Karabenick (Eds.), *The decade ahead: Theoretical perspectives on motivation and achievement, vol. 16, part A* (pp. 105–165). Emerald Publishing. https://doi.org/10.1108/S0749-7423(2010)000016A007

Voerman, L., Meijer, P. C., Korthagen, F. A. J., & Simons, R. J. (2012). Types and frequencies of feedback interventions in classroom interaction in secondary education. *Teaching and Teacher Education*, *28*(8), 1107–1115. https://doi.org/10.1016/j.tate.2012.06.006

Vygotsky, L. S. (1962). *Thought and language*. MIT Press. https://doi.org/10.1037/11193-000

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Wang, M.-T., & Degol, J. (2014). Staying engaged: Knowledge and research needs in student engagement. *Child Development Perspectives*, *8*(3), 137–143. https://doi.org/10.1111/cdep.12073

Warter-Perez, N. J., & Dong, J. (2012). *Flipping the classroom: How to embed inquiry and design projects into a digital engineering lecture.* Paper presented at the ASEE PSW section conference, California

Polytechnic University, San Luis Obispo, CA. https://api.semanticscholar.org/CorpusID:61557051

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, *92*(4), 548–573. https://doi.org/10.1037/0033-295X.92.4.548

Wentzel, K. R. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology*, *89*(3), 411–419. https://doi.org/10.1037/0022-0663.89.3.411

Wilber, K. (1995). *Sex, ecology, spirituality: The spirit of evolution*. Shambhala.

Wilber, K. (2001). *A brief history of everything*. Shambhala.

Wilber, K. (2007). *Integral spirituality*. Shambhala.

Williams, G. C., Wiener, M. W., Markakis, K. M., Reeve, J., & Deci, E. L. (1994). Medical students' motivation for internal medicine. *Journal of General Internal Medicine*, *9*(6), 327–333. https://doi.org/10.1007/BF02599180

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology*, *96*(2), 236–250. https://doi.org/10.1037/0022-0663.96.2.236

Yarbro, J., Arfstrom, K. M., McKnight, K., & McKnight, P. (2014). *Extension of a review of flipped learning.* Flipped Learning Network. https://flippedlearning.org/wp-content/uploads/2016/07/Extension-of-FLipped-Learning-LIt-Review-June-2014.pdf

Yazzie-Mintz, E. (2007). *Voices of students on engagement: A report on the 2006 high school survey of student engagement.* Bloomington: Center for Evaluation & Education Policy, Indiana University. https://eric.ed.gov/?id=ED495758

Yik, M., Russell, J. A., & Steiger, J. H. (2011). A 12-point circumplex structure of core affect. *Emotion*, *11*(4), 705–731. https://doi.org/10.1037/a0023980

Young, J. R. (2012, June 25). A conversation with Bill Gates about the future of higher education. *The Chronicle of Higher Education.*

https://www.chronicle.com/article/a-conversation-with-bill-gates-about-the-future-of-higher-education

Zainuddin, Z., & Halili, S. H. (2016). Flipped classroom research and trends from different fields of study. *The International Review of Research in Open and Distributed Learning*, *17*(3). https://doi.org/10.19173/irrodl.v17i3.2274

Zepke, N. (2014). Student engagement research in higher education: Questioning an academic orthodoxy. *Teaching in Higher Education*, *19*(6), 697–708. https://doi.org/10.1080/13562517.2014.901956

Appendices

Appendix One: Phase two student consent form

同意書

(Consent Form: Class Observations)

iPad 授業に関する調査

Title of Project（調査の題名）: Left to Their Own Devices: Using Tablets to Enhance Student Autonomy and Engagement in a Flipped EFL Classroom

Name of Researcher（研究者の名前）: H. Nicholas Bovee

Please carefully read the information below and listen to the teacher's explanation. If you do not wish to have your video-recorded classroom behaviors included in the outlined investigation, please tell your teacher. It will not affect your grade. If you have any questions, please ask the teacher at any time.
下記の説明をよく読み、教員の説明を聞いて下さい。撮影されたあなたの教室での行動を調査への使用に同意しない場合は、遠慮なく教員へ申し出て下さい。成績には影響しません。また、このプロジェクト研究に対しての質問も随時受け付けます。

Several of the iPad classes that were held this semester were video-recorded. These videos will be observed by the researcher to investigate the ways in which students were engaged during class. The research findings will contribute to improvements on how iPads are used at Kyushu Sangyo University. All recorded student behaviors will be referenced completely anonymously in the investigation through the use of pseudonyms. Any behaviors that may potentially reveal your identity will not be used in future reports or academic papers. All video data recorded for this research will be kept private and anonymous, and will be destroyed within 3 years of collection. You can have access to your video data at any time – just ask your teacher. Please do not hesitate to ask the teacher if you ever have any questions regarding this investigation.

今学期に行われた iPad 授業は数回ビデオ撮影されました。これを使い、授業への様々な取り組み方が研究者に観察されます。 研究結果は九州産業大学での iPad 使用法の改善に貢献します。撮影された学生の行動は、偽名を用いることで全くの匿名で引用されます。また、身元を明らかにする可能性がある発言はレポートや論文などに使用されません。収集されたビデオデータはすべて無記名で使用し、３年間保管しその後破棄します。自分のビデオデータを見たい場合はいつでも教員に連絡して下さい。この調査に対しての質問があれば、遠慮なく教員に問い合わせ下さい。

I understand that analysis based on my video-recorded classroom behaviors will be used as part of a PhD investigation and will potentially be included in academic publications. I understand that I have the right to withdraw from this investigation at any time.

撮影された私の教室での行動に基づいた分析は、博士過程の調査の一部として使用され、学術論文に含まれる可能性があることを理解しています。本調査からいつでも撤退できる権利を持っていることを理解しています。

I hereby give permission for my video-recorded classroom behaviors to be used for research purposes.

撮影された私の教室での行動を研究目的で使用することに同意します。

日付: .....　　署名: .....

Appendix Two: Phase three student consent form

同意書

(Consent Form: Student Interviews)

iPad 授業に関する調査

Title of Project（調査の題名）: Left to Their Own Devices: Using Tablets to Enhance Student Autonomy and Engagement in a Flipped EFL Classroom

Name of Researcher（研究者の名前）: H. Nicholas Bovee

Please carefully read the information below and listen to the teacher's explanation. If you do not wish to have your interview data used in the outlined investigation, please tell your teacher. It will not affect your grade. If you have any questions, please ask the teacher at any time.
下記の説明をよく読み、教員の説明を聞いて下さい。収集したインタビューデータを調査への使用に同意しない場合は、遠慮なく教員へ申し出て下さい。成績には影響しません。また、このプロジェクト研究に対しての質問も随時受け付けます。

You will be interviewed about the iPad classes that were held this semester. Opinions gathered in the interview will contribute to improvements on how iPads are used at Kyushu Sangyo University. All audio-recorded statements will be quoted completely anonymously through the use of pseudonyms. Any statements that may potentially reveal your identity will not be used in future reports or academic papers. All interview data collected for this research will be kept private and anonymous, and will be destroyed within 3 years of collection. You can have access to your data at any time – just ask your teacher. Please do not hesitate to ask the teacher if you ever have any questions regarding this investigation.

今学期に行われた iPad 授業についてインタビュー調査を行います。インタビューで収集された意見は九州産業大学での iPad 使用法の改善に貢献します。収録された発言は、偽名を用いることで全くの匿名で引用されます。また、身元を明らかにする可能性がある発言はレポートや論文などに使用されません。収集されたインタビューデータはすべて無記名で使用し、３年間保管しその後破棄します。自分のデータを見たい場合はいつでも教員に連絡して下さい。この調査に対しての質問があれば、遠慮なく教員に問い合わせ下さい。

I understand that my recorded interview data will be used as part of a PhD investigation and will potentially be included in academic publications. In addition, I understand that I have the right to review my transcribed statements prior to their use in publications. Finally, I understand that I have the right to withdraw from this investigation at any time.

収録されたインタビューデータは、博士過程の調査の一部として使用され、学術論文に含まれる可能性があることを理解しています。また、論文に使用される前に書き起こされた発言を確認する権利を持っていることを理解しています。最後に、本調査からいつでも撤退できる権利を持っていることを理解しています。

I hereby give permission for my recorded interview statements to be used for research purposes.

インタビューで収録された発言を研究目的で使用することに同意します。

日付: .....　　署名: …….....

Appendix Three: Phase four teacher consent form

Participant Information Sheet (for teachers)

Title of Project: Left to Their Own Devices: Using Tablets to Enhance Student Autonomy and Engagement in a Flipped EFL Classroom

Researcher: H. Nicholas Bovee

Full Address: LERC, Kyushu Sangyo University, 2-3-1 Matsukadai, Higashi-ku, Fukuoka, 813-8503
Tel: 092-673-5370 (LERC)
Email: bovee@ip.kyusan-u.ac.jp

Supervisor: Dr. Jo Warin

County South, Lancaster University, LA1 4YD, UK
Tel: +44 (0)1524 594266
Email: j.warin@lancaster.ac.uk

Date:_____

Dear _____,

I would like to invite you to take part in my thesis research with the Centre for Technology Enhanced Learning in the Department of Educational Research at the University of Lancaster.

Before you decide if you wish to take part you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Talk to others about the study if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

This document includes:

- Information about the purpose of the study (what I hope to find out).
- Information about what participation means and how to withdraw when and if you wish (what you will be doing).

- Details of what notes, recordings and other sources of information may be used as 'data' in the study - for the group and with you as an individual.
- Information about how this data will be secured and stored.
- Information about how any quotes will be used and how you will be involved in checking, agreeing and consenting to their use.
- How the information will be used in the thesis and for other purposes such as conference presentations or publication.

The purpose of the study

This research is for my thesis on the PhD in Technology Enhanced Learning programme with the Centre for Technology Enhanced Learning in the Department of Educational Research at Lancaster University. It is likely that the research will also be used for journal articles and conference presentations.

My research aims to explore how iPads can be best used in the classroom to support student autonomy and engagement. The evidence will comprise a first step towards understanding how iPads can support teaching and learning in a compulsory EFL context, and whether they should be adoped on a larger scale in the future at Kyushu Sangyo University.

What participation involves and how to withdraw if you no longer wish to participate

Why have I been invited?

You have been invited because you are a teacher of one of four classes selected to pilot the use of iPads in the classroom over the second semester in 2014.

Do I have to take part?

No, your participation is entirely voluntary. If you do not wish to take part, then please let me know. Although some of the classes will be video recorded, you may wish to opt-out from this portion of the investigation. In addition, you may also opt-out of the interviews and reflective journal writing that is included in this research project. However, please be aware that withdrawing from the use of iPads altogether will be difficult since their use will be integral to your second semester classes.

You can withdraw at *any* time during the study and there is absolutely no obligation on you to continue, nor is there any penalty for withdrawing. Your related data (recordings, notes, etc.) can be destroyed and all reference removed at any time.

The cutoff point for withdrawing from the study is January 20th, which is the final class of second semester.

What would taking part involve for me?

Taking part in the research project would involve, at minimum, conducting the class on a weekly basis. In addition, you will have the opportunity to provide feedback on the new class format via weekly reflective journals, observational notes, and individual interviews.

Protecting your data and identity

What will happen to the data?

'Data' here means the researcher's notes, video recordings, and audio recordings. In adherence to publishing regulations, the data may be kept for up to but no more than ten years after the successful completion of the PhD *Viva* as per Lancaster University requirements, and after any personal data will be destroyed. Audio recordings will be transferred and stored on my personal laptop and deleted from portable media.

Identifiable data (including recordings of your and other participants' voices) on my personal laptop will be encrypted. With devices such as portable recorders where this is not possible, identifiable data will be deleted as quickly as possible. In the meantime I will ensure the portable device will be kept safely until the data is deleted.

You can request to view the field notes, watch the classroom videos, or listen to the interview audio. Any parts you are unhappy with will be deleted or disregarded from the data. Data may be used in the reporting of the research (in the thesis and then potentially in any papers or conference presentations). Please note that if your data is used, it will not identify you in any way or means, unless you otherwise indicate your express permission to do so.

You have the right to request this data is destroyed at any time during the study as well as having full protection via the UK Data Protection Act. The completion of this study is estimated to be by January 1, 2016, although data collection will be complete by January 20, 2015.

How will my identity be protected?

A pseudonym will be given to protect your identity in the research report and any identifying information about you will be removed from the report.

Who to contact for further information or with ***any*** concerns

If you would like further information on this project, the programme within which the research is being conducted or have any concerns about the project, participation or my conduct as a researcher, please contact:

Dr Paul Ashwin – Head of Department

Tel: +44 (0)1524 594443
Email: P.Ashwin@Lancaster.ac.uk

Room: County South, D32, Lancaster University, Lancaster, LA1 4YD, UK.

Thank you for reading this information sheet.

H. Nicholas Bovee

I hereby give permission for my recorded interview statements to be used for research purposes.

Date _____ Signature _____

Appendix Four: Request for institutional approval

August 1, 2014

To: Eiichi Mori, Dean of the KSU Language Education and Research Center

Permission Request for Research

Dear Professor Mori,

I am writing in relation to my practice in the LERC and my doctoral studies supervised by Dr. Jo Warin within the Department of Education Research at Lancaster University. I would like to ask permission to recruit 80-100 current freshmen students in the course Listening & Speaking II to investigate their perspective on the use of iPads in the classroom, and on how their in-class engagement compares with students in classes that do not use iPads.

This study will help to gain an understanding of the different ways these students engage with the iPad-supported class, particularly in a "flipped classroom" format. In view of the institutional developments, this research can serve to produce a useful first step in understanding how tablet devices can be leveraged to support teaching and learning in compulsory English courses at Kyushu Sangyo University.

Participation in the study involves the use of data collected by questionnaires and interviews, which will be held with a selection of students at a time convenient for participants. Data will also be collected in the form of classroom observations. Perceptions of two full-time KSU teachers will be gathered in the form of written feedback and interviews. Ethical clearance in relation to the research is being sought from the Lancaster University Research Support Office.

If you would like further information about this project, please contact me. You can also contact my supervisor, Dr. Jo Warin, or the Head of Educational Research Department, Dr. Paul Ashwin.

Please sign below and return to give permission for this research. A copy is attached for your own records.

Dean: _____ Date: _____

Researcher: Hiroyuki Nicholas Bovee / bovee@ip.kyusan-u.ac.jp

Supervisor: Dr. Jo Warin / j.warin@lancaster.ac.uk

Head of Department: Dr. Paul Ashwin, paul.ashwin@lancaster.ac.uk

Appendix Five: Phase three interview schedule

As the interviews were conducted entirely in Japanese, this interview schedule outlines the content, but not the actual wording of the interview questions.

Primary questions: How did students engage with the flipped-iPad classes? What opinions are voiced regarding how the use of iPads supported or failed to support the flipped classroom approach?

Problem (from prior experience): Student responses to questions generally lack significant depth or introspection.

Reasons: Shallow experience (compulsory education, one class per week), lack of interest in learning the subject, teacher-student power imbalance, etc.

Addressing the problem:

1. Make it clear that student opinions are confidential.
2. Make it clear that their opinions have no bearing on their class assessments.
3. Make it clear that their opinions are highly valued, and that they will help create a better experience for future students.
4. Provide students with ample time to reply. (Long pauses are okay!)

Preamble – Permission to record, ethics form

Go over numbers 1–3 in "Addressing the problems" above. Make sure the student understands that I am mainly interested in their opinions about their experiences in the classroom. Try to get the student to relax.

Section 1: Overall views (identifying which aspects of their experience they feel are important)

1. How would you describe yourself as a student? [added after completing several interviews]

2. Tell me your thoughts about the flipped-iPad classes (in comparison with the conventional-textbook classes in S1).

Follow-up probing questions will be selected from section 2 below.

Section 2: Views on specific engagement subtypes

These specific subtypes may be brought up by the student in section 1, in which case more specific probing questions should be asked.

Behavioral engagement (attention, effort, persistence, on/off-task, downtime, etc.)

Level of participation, task involvement, and pro-social conduct in class activities.

1. Did you try hard in your classes this semester (compared with S1)? Why do you think you feel this way?

2. Did you interact differently with your group this semester? (What about with your teacher?) In what way? Examples?

3. How would you describe the way you concentrated on class activities this semester? Examples?

4. Did you ever feel sleepy during your classes this semester? Examples of when?

5. Did you talk with students about things unrelated to class? Examples?

Emotional (relational) engagement (enjoyment, "happiness", interest, boredom, value)

Includes positive and negative reactions to teachers, classmates, academics, and class. It reflects an individual's sense of belonging and sense of identification with the class or group.

**Many of the questions below are also appropriate as follow-up questions to the questions about behavioral engagement.*

1. How did you feel during your classes (compared to S1)? Why?

2. Did you find your classes enjoyable this semester? Why do you think so?

3. How did you feel about working together with the other members of your group?

4. Has your perception of the teacher changed? How so?

Cognitive engagement (deep-learning strategies, willingness to undertake hard/challenging work)

Refers to the investment, thoughtfulness, and the willingness to exert the mental effort necessary in an activity.

1. How would you describe the quality of your learning in class this semester?

2. Did you mainly try to understand the content, or did you just try to complete the tasks? (compared to S1)

Agentic engagement (taking ownership of learning)

Did you ask the teacher about things you didn't understand? What kinds of questions?

Did you tell the teacher what activities you liked or disliked?

*Follow-up to any of the questions above:

1. Do you think the use of the iPads had anything to do with how you feel? How?

Supplemental question: autonomy-support

1. Did you feel you had more or less "freedom" in class this semester? What role do you think the teacher played in the way you feel?

Final questions

1. Was there anything else positive or negative about the second semester classes? [This was reworded after completing several interviews to: "Was there anything you think could be improved (*kaizen*) in second semester?"]

2. If you had to pay ¥10,000 per class, which instructional approach would you choose? Why? [added after completing several interviews]